HAMDARD Scholar

ACCORDING TO THE NEW PAPER PATTERN OF ALL SECONDARY BOARDS
LAHORE, MULTAN, GUJRANWALA, SAHIWAL, SARGODHA, FAISALABAD, BAHAWALPUR, D.G KHAN AND RAWALPINDI.

FOR PREPARATION OF ANNUAL EXAMINATION 2026

MODEL PAPERS

9

THE STUDENTS WHO ARE WEAK IN STUDIES CAN GET GRADE A+ AFTER ONLY 2 MONTHS PREPARATION

BIOLOGY

WRITTEN BY EXPERIENCED TEACHERS & RENOWNED EDUCATIONISTS

Hamdard Kutab Khana
Technical & Educational Publishers
14-Urdu Bazar, Lahore. 042-37312368-37358947 Fax:042-37210412
Email: hamdard.kutab@gmail.com, visit us: www.hamdardkutabkhana.com.pk

WARNING

"علم حاصل کرنا ہر مسلمان مرد و عورت پر فرض ہے"۔

علم روشنی ہے اور یہ روشنی پھیلانے میں ہمدرد® کتب خانہ گزشتہ نصف صدی سے زیادہ عرصہ سے کوشاں ہے۔ طلبہ و طالبات کے لیے بہترین اور معیاری کتب کی فراہمی ادارے کی اوّلین ترجیح ہے۔ ہمارا عزم ہے کہ ملک کا ہر فرد زیورِ تعلیم سے آراستہ ہو کر ملک و قوم کی ترقی میں اپنا کردار ادا کرے۔ ان شاء اللہ ہم اس مذہبی، اخلاقی اور انسانی فریضہ کو احسن طریقہ سے سرانجام دے کر ملک و ملّت کی ترقی میں اپنا کردار ادا کرتے رہیں گے۔

چیئرمین

Managing Director: Kashif Hussain Gohar

Project Director: Muhammad Asif Saeed

Project Manager: Ghulam Mustafa

Writers: Senior Teachers & Educationists

Layout, Composing & Designing: Hamdard Composing & Designing Section

Sales Managers: Fawad Iqbal, Husnain Shah

Printing Manager: Tariq Rasheed

Marketing Managers: Raja Yasir, Muhammad Khalid

Printing Press: Mian Irshad Printing Press

Head Office: Hamdard Educational Center, 106-R, Rattigan Road, Lahore.

Hamdard Kutab Khana
Technical & Educational Publishers
14-Urdu Bazar, Lahore. 37312368-37358947 Fax: 37210412
Email:hamdard.kutab@gmail.com, visit us:www.hamdardkutabkhana.com.pk

CONTENTS

✳✳✳

Chapter 01

The Science of Biology

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

1.1 Biology and its Branches

1. Which branch of science related to the study of living organisms?
(A) Chemistry (B) Physics (C) Biology (D) Mathematics

2. The scientific study of living organisms is called:
(A) Farming (B) Chemistry (C) Biology (D) Physics

3. "Bios" means:
(A) function (B) life (C) study (D) structure

4. The study of plants is done in:
(A) Zoology (B) Botany (C) Microbiology (D) Physics

5. The study of form and structure of organisms is called:
(A) Anatomy (B) Morphology (C) Physiology (D) Cytology

6. It helps in disease diagnosis, medical device development and improving quality of life.
(A) Anatomy (B) Physicology (C) Cytology (D) Histology

7. Which branch of biology deals with the functioning of body parts?
(A) Cytology (B) Morphology (C) Physiology (D) Molecular Biology

8. Fundamental unit of life is:
(A) Tissue (B) Cells (C) Molecule (D) Nucleus

9. The study of cells is done in:
(A) Histology (B) Physciology (C) Cytology (D) Anatomy

10. In which branch of biology biological molecules like carbohydrates, proteins, studied?
(A) Embryology (B) Ctytology (C) Physiology (D) Molecular biology

11. The study of transfer of characteristics from parents to offsprings is studied in:
(A) Taxonomy (B) Ecology (C) Morphology (D) Genetics

12. Which branch of biology deals with the study of fossils?
(A) Genetics (B) Taxonomy (C) Paloentology (D) Pathology

13. The branch of biology deals with the classification of organisms into groups on the basis of similarities and differences:
(A) Ecology (B) Taxonomy (C) Immunology (D) Embryology

14. The study of disease, their causes and effects is related to:
(A) Immunology (B) Pathalogy (C) Ecology (D) Cytology

15. Which branch of biology deals with the relationship of biology between organisms and their environment?
(A) Taxonomy (B) Ecology (C) Pathology (D) Physiology

Answers

1. Biology **2.** Biology **3.** life **4.** Botany
5. Morphology **6.** Anatomy **7.** Physiology **8.** Cells **9.** Cytology
10. Molecular biology **11.** Genetics **12.** Paloentology **13.** Taxonomy
14. Pathalogy **15.** Ecology

1.2 Relation of Biology with other Sciences
1.3 Careers in Biology

1. The structure and reactions of different chemical substances present in living system is studied in:
(A) Biophysics (B) Biochemistry (C) Biogeoraphy (D) Bioecnomics

2. **Photosyntesis and respiration are the examples of:**
(A) Photosynthesis (B) Biophysics (C) Ecology (D) Biochemistry

3. **In which filed of biology scientists use Mathematics models, algorithm and computer simulations?**
(A) Biostatistics (B) Computational Biology
(C) Biotechnology (D) Bioecnomics

4. **In which fields biostatistics play a crucial role?**
(A) Biological research (B) Health care (C) Public health (D) All of these

5. **Insulin harmone is used to treat:**
(A) Malaria (B) Diabetes (C) Dengue (D) Corona

6. **The study of organisms from economical point of view is called:**
(A) Biogeography (B) Computer science (C) Bioecnomics (D) Biotechnology

7. **Which profession of biology deals with the diagnosis and treatement of disease?**
(A) Medicine (B) Pharmacology
(C) Surgery (D) Veterinary medicine

8. **The effects of drugs on human body is studied in:**
(A) Physiotherapy (B) Pharmacology (C) Medicine (D) Forestry

9. **Who use physical exercise and physical modalities (such as massage) to improve patient's physical movement?**
(A) Dentists (B) Pharmacologists (C) Physiotherapists (D) Biotechnologists

10. **The field involves breeding and caring for livestock:**
(A) Agriculture (B) Physiotherapy (C) Pharmacology (D) Animal husbandry

11. **Horiculturists cultivate:**
(A) Fruits (B) Vegetables (C) Flowers (D) All of these

12. **In which field of biology Forests and wildlife manage and conserve?**
(A) Farming (B) Biotehcnology (C) Forestary (D) Horticulture

13. **Solving issues related to pollution and natural resources is studes in:**
(A) Microbiology (B) Genetic counselling
(C) Veterinary science (D) Environmental science

14. **Veterinary medicine is related to:**
(A) Plants (B) Animals (C) Humans (D) flowers

Answers **1.** Biochemistry **2.** Biochemistry **3.** Computational Biology
4. All of these **5.** Diabetes **6.** Bioecnomics **7.** Medicine **8.** Pharmacology
9. Physiotherapists **10.** Animal husbandry **11.** All of these **12.** Forestary
13. Environmental science **14.** Animals

1.4 Quranic Instructions to reveal the study of life
1.5 Science as a collaborative field

1. **According to Quranic verses all living things were created from:**
(A) Soil (B) Water (C) Fire (D) Wind

2. **In which Surah Allah Said "He made man from clay like the potter."**
(A) Surah: Al-Ambia (B) Suarh: Al Rehman
(C) Surah: Al-Mominoon (D) Surah: Al-Noor

3. **Human genome project is completed in:**
(A) 2002 (B) 2003 (C) 2004 (D) 2006

4. **Oncologists are:**
(A) Stomach consultants (B) Cancer consultants
(C) Heat consultants (D) Throat consultants

5. **Fields included in robotics and artifical intelligence (AI):**
(A) Computer science (B) Neuroscience (C) Psycology (D) All of these

6. **Scientists from various fields like astrophysics, planetory science, engineering, Biology and medicine are include in:**
(A) Mecical research (B) Space exploration
(C) Climate change research (D) Environmental pollution

Answers 1. Water 2. Suarh: Al Rehman 3. 2003
4. Cancer consultants 5. All of these 6. Space exploration

1.6 Scientific method
1.7 Theory and Law (Principle)
1.8 Malaria An example of Biological Method

1. **First step of scientific method is:**
(A) Reconition of a problem (B) Observations
(C) Hypothesis (D) Deductions

2. **Scientists make observation using:**
(A) Four senses (B) Three senses (C) Five senses (D) Six senses

3. **Observations may be:**
(A) Qualitative (B) Quantitative
(C) Qualitative or Quantitative (D) None of these

4. **The observations that cannot be measured with numbers:**
(A) Quantitative (B) Qualitative (C) Both a and b (D) Proved

5. **How many steps are involved in scientific method?**
(A) 5 (B) 6 (C) 7 (D) 8

6. **The tenatative answer of scientific problem is called:**
(A) Principle (B) Law (C) Hypthesis (D) Deduction

7. **"Leaf discoloration and stunted growth in a plant are caused by a deficiency of iron in soil" This statement refers to:**
(A) Deduction (B) Hypothesis (C) Results (D) Obseravtions

8. **The fundamental steps of scientific method is:**
(A) Deduction (B) experimentation (C) Hypothesis (D) Results

9. **If a theory is proved again and again by experiments, it becomes:**
(A) Hyposthesis (B) Law (C) Deduction (D) Result

10. **The only remedy for malaria from 17th to 20th century was:**
(A) Chloro quinine (B) Quinine (C) Paracetamol (D) Herbal tea

11. **Which scientist did reserach on the "cause of malaria"?**
(A) A.F.A King (B) Laveran (C) Ronald Ross (D) Aristotle

12. **Malarial patients have in their blood:**
(A) Virus (B) Plasmodium (C) Bacteria (D) Fungus

13. **"If plasmodium is the cause of malaria, then all malarial patients should have plasmodium in their blood". This statement was:**
(A) Hypothesis (B) Deduction (C) Theory (D) Law

14. **A.F.A King did observations in:**
(A) 1980 (B) 1883 (C) 1870 (D) 1860

15. **How many observations listed by A.F.A King?**
(A) 15 (B) 20 (C) 30 (D) 10

16. **When Ronal Ross performed experiments?**
(A) 1980 (B) 1880 (C) 1870 (D) 1860

17. Ronald Ross was:
(A) British army physician (B) Greek army physician
(C) French army physician (D) Greek Biologist

18. Which organism was choosen by Ronald Ross for experiment instead of humans?
(A) Crow (B) Sparrow (C) Mosquito (D) Ant

19. Anophelese mosquito causes disease:
(A) Dengue (B) Malaria (C) Flu (D) Typhoid

20. Plasmodium multiplying in the:
(A) Liver (B) Stomach
(C) Heart (D) Intestins

21. Plasmodium is transferred through:
(A) Mosquito (B) Sparrows (C) Humans (D) Flies

22. When italian biologist allowed an Anophelese mosquito to bite a malarial patient?
(A) 1896 (B) 1897 (C) 1898 (D) 1878

Answers

1. Reconition of a problem **2.** Five senses
3. Qualitative or Quantitative **4.** Qualitative **5.** 6 **6.** Hypthesis
7. Hypothesis **8.** experimentation **9.** Law **10.** Quinine **11.** Laveran
12. Plasmodium **13.** Deduction **14.** 1883 **15.** 20 **16.** 1880
17. British army physician **18.** Sparrow **19.** Malaria **20.** Stomach
21. Mosquito **22.** 1898

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. Which branch of Biology focuses on the study of the structure and function of cells?
a) Cytology b) Microbiology c) Histology d) Ecology

2. The study of the processes of heredity and variation in living organisms is known as:
a) Ecology b) Genetics c) Anatomy d) Embryology

3. Insulin made through bacteria is an example of the technique of:
a) Parasitology b) Biotechnology c) Biochemistry d) Histology

4. Heart pumps Blood, stomach digests food, and kidneys excrete wastes. The statement, comes from.
a) Physiology b) Anatomy c) Morphology d) Histology

5. Which branch of Biology involves the study of the classification of organisms?
a) Taxonomy b) Physiology c) Palaeontology d) Biogeography

6. Which step comes between making hypothesis and doing experiments?
a) Making deductions b) Making observations
c) Summarizing results d) Analysing data

7. Which of the following is NOT a characteristic of the scientific method?
a) It relies on evidence b) It involves formulating hypothesis
c) Hypothesis will always be correct d) It requires rigorous testing

8. Choose the correct sequence of steps of scientific method?
a) Observations - hypothesis - deduction- experiments
b) Observations - hypothesis - law - theory
c) Hypothesis - observations - deduction- experiments
d) Law - theory - deduction - observations

9. People who slept near smoky fire had less chance to suffer from malaria. Why?

a) Smoke kills Plasmodium in their blood
b) Fire increases temperature and Plasmodium are killed in air
c) Mosquitoes cannot tolerate smoke and are repelled
d) Smoke kills Plasmodium present in mosquitoes

10. Experiments are very important in scientific method because a researcher:

a) Always gets correct results
b) Disproves many hypotheses and gets some hypothesis proved
c) Is sure that he will prove the hypotheses
d) Gets a chance to work in the laboratory

Answers

1. (a) **2.** (b) **3.** (b) **4.** (a) **5.** (a) **6.** (a) **7.** (c)
8. (a) **9.** (c) **10.** (b)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

1.1 Biology and its Branches

1. What is meant by Biology? From which two word does the word "Biology" originate?

Ans. Biology: Biology is the study of living things. It explores the structures functions and interactions of living organisms. The word "Biology" comes from two Greek words i.e., "bios" (life) and "logos" (study).

2. Differentiate between zoology and botany.

Ans. Zoology: It is the study of animals, including their structure, function, behaviour and diversity.
Botany: It is the study of plants including their structure, growth, reproduction and interaction with their environment.

3. What is marine biology related to?

Ans. Marine biology is the branch of biology that deals with the study of life in oceans.

4. For what antibiotics are used?

Ans. Antibiotics are used to kill bacteria and treat bacterial infections.

1.2 Relation of Biology with other Sciences
1.3 Careers in Biology

1. How physics is useful in the field of Biology?

Ans. Biophysics: It deals with the principles of Physics, which apply to biological processes.
For example: In Biophysics, we study the rules of lever and motion for understanding the function of muscles, bones and joints.

2. What do you know about biotechnology?

Ans. Biotechnology: Biotechnology deals with the use of living organisms or their components to develop beneficial products or processes for various fields including health care, agriculture and environmental management.

3. How patient is treated in physiotherapy?

Ans. Physiotherapy: It is the therapy that is used to restore movement and physical function of body that has been impaired by disease or injury. Physiotherapists use physical exercise and physical modalities (such as massage) to improve patient's physical movement.

4. What is meant by farming? What qualification is required for farming?

Ans. Farming: The professionals of farming prepare farms. e.g. animal farms, poultry farms, fruit farms.
A 4-year BS degree in agriculture or specific farming courses is required for this profession.

5. What is the important work of the career of veterinary medicine in biology?

Ans. The important work of veterinary medicine is to diagnosis and treatment of diseases in animals and surgeries in animals.

1.4 Quranic Instructions to reveal the study of life
1.5 Science as a collaborative field

1. State the verse of the Quran that describes the origin of humans from soil.

Ans. The verse of the Quran that describes the origin of humans from soil is as follow:

"He made man from clay like the potter." (Sura: Al-Rehman, Verse:14)

2. What is meant by medical research in science? Give example.

Ans. Medical research often depends on interdisciplinary collaboration. For example, cancer research involves oncologists (cancer consultants), biologists, biochemists, genetics, pharmacologist and statisticians.

3. Scientists from which fields are involved in organization like NASA and the ISS?

Ans. Organizations like NASA and the international space station (ISS) involve scientists from various fields including astrophysics, planetary science, engineering, biology and medicine.

1.6 Scientific method
1.7 Theory and Law (Principle)
1.8 Malaria An example of Biological Method

1. Differentiate between biological method and biological problem.

Ans. **Biological Method:** Biological method refers to the systematic procedures, techniques and approaches used to conduct research.

Biological Problems: Biological problems are the specific questions or challenges that arise from observing nature and inspire scientific investigation.

2. Which steps are involved in scientific method?

Ans. The following steps are involved in scientific method:

i- Recognition of a scientific problem **ii-** Observation **iii-** Hypothesis
iv- Deduction **v-** Experiments **vi-** Results

3. How scientists do observations?

Ans. Scientists make observations about the problem. They use five senses for making observation. They also read and study the previous researches on the same related problems.

4. What is meant by hypothesis?

Ans. The tentative answer of scientific problem is called hypothesis.

5. Write characteristics of hypothesis.

Ans. A hypothesis has the following characteristics.

- It is a proposed statement to answer the problem.
- It always matches with the available observations.
- It can be tested through experiments.
- There is always a way to disprove the hypothesis.

6. Discuss control group and experimental group with the help of example.

Ans. You want to do experiment to test the necessity of carbon dioxide for photosynthesis you will arrange two similar plants. You will not provide carbon dioxide to one plant (experimental group). While you will provide carbon dioxide to the other plant (control group). The necessity of carbon dioxide will be proved when photosynthesis does not occur in experimental group but occurs in control group.

7. What were the observations about malaria in the last part of 19^{th} century?

Ans. In the last part of 19^{th} century, there were four major observations about malaria:

- Malaria and marshy areas have same relation.
- Quinine is an effective drug for treating malaria.
- Drinking the water of marshy areas does not cause malaria.
- Plasmodium was seen in the blood of malarial patients.

8. How Ronald Ross proved that Mosquitoes transmit plasmodium and are involved in spread of malaria?

Ans. Ronald Ross performed experiment on sparrows instead on man. He allowed female Culex mosquito to bite a sparrow suffering from malaria. He found that plasmodium multiplied in the walls of mosquito's stomach and moved in salivary glands. He allowed some infected mosquitoes to bite healthy sparrow. Ross found that healthy sparrows got malaria. When he examined the blood of these sparrows he found many plasmodium in it. So he proved that mosquitoes transmit plasmodium and are involved in spread of malaria.

Exercise (Short Answer Questions)

B. Write short answers.

1. Define the following branches of Biology.
Genetics, Anatomy, Palaeontology, Marine Biology, Pathology

Ans. **Genetics:** Genetics is the branch of Biology that deals with the study of transfer of characteristics from parents to offspring. In Genetics, scientists also study the causes of genetic diseases, and develop better varieties of plants.

Anatomy: Anatomy is the branch of Biology that explores the internal physical structure of organisms, particularly humans. It helps in disease diagnosis, medical device development, and improving quality of life e.g., the study of the organs of the digestive system.

Palaeontology: Palaeontology is the branch of Biology that deals with the study of fossils. The examination of fossils helps scientists to know the evolutionary history of organisms. For example, dinosaur fossils provide evidence of giant reptiles that roamed the Earth millions of years ago.

Marine Biology: Marine Biology is the branch of Biology that deals with the study of life in oceans and saltwater. It helps to understand ocean biodiversity, discover new species, and address marine conservation issues. For example, coral reefs support a wide variety of marine life.

Pathology: Pathology, is the study of diseases, their causes, and effects. Pathology helps in disease diagnosis, treatment development, and disease prevention. Cancer, for instance, is characterized by uncontrolled growth and spread of abnormal cells.

2. Which branch of Biology involves the study of the development and growth of organisms from fertilization to birth or hatching?

Ans. Embryology is the branch of Biology that involves the study of the development and growth of organisms from fertilization to adulthood.

3. How is the profession of medicine and surgery different from animal husbandry?

Ans. **Difference between Medicine and surgery and animal Husbandary**

Medicine and surgery	Animal Husbandry
The profession medicine deals with the diagnosis and treatment of diseases. In surgery the defective parts of the body are repaired, replaced or removed. For this profession, students need to complete a 5-year Bachelor of Medicine,Bachelor of Surgery (MBBS) degree.	This field involves breeding and caring for livestock to improve their quality and productivity. For it, students can pursue a 4-year BS degree in Animal Husbandry.

4. Differentiate between Morphology and Physiology

Ans.

Morphology	Physiology
The branch of biology deals with the study of form and structures of living organism.	Physiology is the branch of Biology that deals with the functioning of body parts. For example, how the blood circulatory system transports vital substances throughout the body.

5. What is Computational Biology?

Ans. In Computational Biology, scientists use Mathematical models, algorithms, and computer simulations to understand biological systems and relationships. It involves analysing biological data, such as sequence of amino acids in a protein.

6. What is the role of observation and experimentation in the scientific method?

Ans. Role of observations:

Scientist make observations about the problem. They use five senses for making observations. They also read and study the previous researches on the related problem.

Role of Experimentation the Scientific method:

It is the most basic step of scientific method. Scientists perform experiments to test all hypothesis. In a successful experiment, one hypothesis is proved correct and the alternate hypothesis are proved incorrect. The incorrect hypothesis are rejected and the proved one is accepted. Scientists make new deductions from the accepted hypothesis. Then they perform further experiments and confirm the correctness of hypothesis.

Exercise (Essay Type Questions)

1. **Link the study of Biology with that of Physics, Chemistry, Statistics, Geography, Economics and Computer Science.**
2. **Explain how the study of Biology can lead to different professional studies.**
3. **Science is a collaborative field in which scientists work together to share knowledge. Prove this statement by giving examples.**
4. **How a hypothesis is converted to theory, law and principle?**
5. **What are the basic steps a scientist adopts in order to solve scientific problems?**
6. **Describe the work of different scientists in discovering the cause of malaria.**
7. **Write a descriptive note on the experiments performed by Ross.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 01 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:01 **Marks: 12**

The Science of Biology

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions. **12**

1. "Logos" means:

(A) structure (B) understanding (C) activity (D) study

2. The study of bacteria and microscopic fungi is called:

(A) Biophysics (B) Biochemistry (C) Microbiology (D) Farming

3. Which branch of biology explores the internal physical structure of organisms, particularly humans?

(A) Morphology (B) Anatomy (C) Physiology (D) Histology

4. The microsopic study of tissues is called:

(A) Embryology (B) Cytology (C) Physiology (D) Histology

5. The human body contains cell:

(A) over 30 trillion (B) over 20 trillion (C) over 10 trillion (D) over 40 trillion

6. The study of the process of development of organism from fertilized egg is called:

(A) Anatomy (B) Embryology (C) Histology (D) Physiology

7. The influence of climate change on the distribution of organisms is studied in:

(A) Biotechnology (B) Biogeography (C) Biochemistry (D) Biostatistics

8. Who analyse physical evidence from crime scenes?

(A) Pharmacologists (B) Biotechnologists (C) Forensic scientists (D) Agriculturalist

9. Researchers from which disciplines were included in human genome project?

(A) Molecular biology (B) Genetics (C) Informatics (D) All of these

10. Logical results of hypothesis are called:

(A) Theories (B) Hypothesis (C) Deductions (D) Results

11. Scientists publish their finding in:

(A) Scientific Journals (B) Books (C) Both a and b (D) None of these

12. When Laveran did research on the "cause of malaria"?

(A) 1876 (B) 1877 (C) 1878 (D) 1978

Roll No.(in figures): ..... (in words): .....

Chapter:01 **SUBJECTIVE TYPE** Marks: 48

The Science of Biology **(PART - I)** Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What are the major fields of biology? Name them.

(ii) What is physiology? Give example.

(iii) What molecular biologists do?

(iv) What is embryology and genetics?

(v) What is the role of computational Biology in the field of Biology?

(vi) What is meant by Bio-economics?

(vii) BDS degree is related to which carrer?

(viii) What kind of jobs do fisheries and wildlife department offers to biologists?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What do forensic scientists do?

(ii) In which fields genetic counseling helps us?

(iii) Write the names of four important careers related to biology?

(iv) Which fields are involved in robotics and artificial intelligence (AI) and in which fields this collaboration has led to advancements?

(v) How is a scientific problem identified?

(vi) Differentiate between qualitative and quantitative observations.

(vii) What is meant by deduction?

(viii) What is the most basic step of scientific method?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Define experimental group and control group.

(ii) Differentiate between Morphology and Physiology

(iii) How scientists report their results?

(iv) What is meant by scientific theory? Give example.

(v) How Laveran did research on the "Cause of malaria"?

(vi) What was the cause of malaria according to the hypothesis of biologists?

(vii) Write down any two observations of A.F.A King?

(viii) Which mosquito is responsible for transmitted malaria in sparrow and which mosquito is responsible for transmitted malaria in man?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Define biology. Elaborate major fields of biology. 4

(b) Write a note on different branches of Biology. 5

Q6. (a) Discuss relation of Biology with other Sciences. 4

(b) Explain how the study of Biology can lead to different professional studies. 5

Q7. (a) Write about some more careers and their major jobs in biology. 4

(b) What do you know about the instructions of Quran to reveal the study of life? 5

Chapter 01: The Science of Biology	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. The study of plants is done in:

(A) Zoology (B) Botany (C) Microbiology (D) Physics

2. Which branch of biology deals with the functioning of body parts?

(A) Cytology (B) Morphology (C) Physiology (D) Molecular Biology

3. In which branch of biology biological molecules like carbohydrates, proteins, studied?

(A) Embryology (B) Ctytology (C) Physiology (D) Molecular biology

4. The branch of biology deals with the classification of organisms into groups on the basis of similarities and differences:

(A) Ecology (B) Taxonomy (C) Immunology (D) Embryology

5. Photosynthesis and respiration are the examples of:

(A) Biochemistry (B) Biophysics (C) A and B both (D) Bioeconomics

6. Insulin hormone is used to treat:

(A) Malaria (B) Diabetes (C) Dengue (D) Corona

7. The effects of drugs on human body is studied in:

(A) Physiotherapy (B) Pharmacology (C) Medicine (D) Forestry

8. Which degree is required for fisheries and wildlife?

(A) BS (B) MS (C) M.Phil (D) a and b both

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Differentiate between zoology and botany.

(ii) For what antibiotics are used?

(iii) What do you know about biotechnology?

(iv) What is meant by farming? What qualification is required for farming?

(v) What is meant by medical research in science? Give example.

(vi) Differentiate between biological method and biological problem.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Link the study of Biology with that of Physics, Chemistry, Statistics, Geography, Economics and Computer Science.

Chapter 01: The Science of Biology	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Solving issues related to pollution and natural resources is studied in:
(A) Microbiology (B) Genetic counselling
(C) Veterinary science (D) Enviornmental science

2. In which Surah Allah Said "He made man from clay like the potter."
(A) Surah: Al-Ambia (B) Suarh: Al Rehman
(C) Surah: Al-Mominoon (D) Surah: Al-Noor

3. Oncologists are:
(A) Stomach consultants (B) Cancer consultants
(C) Heat consultants (D) Throat consultants

4. Scientists make observation using:
(A) Four senses (B) Three senses (C) Five senses (D) Six senses

5. The observations that cannot be measured with numbers:
(A) Quantitative observations (B) Qualitative observations
(C) Both a and b (D) Proved

6. The tenatative answer of scientific problem is called:
(A) Principle (B) Law (C) Hypothesis (D) Deduction

7. It a theory is proved again and again by experments, it becomes:
(A) Hyposthesis (B) Law (C) Deduction (D) Result

8. Malarial patients have in their blood.
(A) Virus (B) Plasmodium (C) Bacteria (D) Fungus

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) What is meant by hypothesis?

(ii) Discuss control group and experimental group with the help of example.

(iii) How Ronald Ross proved that Mosquitoes transmit plasmodium and are involved in spread of malaria?

(iv) Define Cytology and Taxonomy.

(v) How is the profession of medicine and surgery different from animal husbandry?

(vi) What is the role of observation and experimentation in the scientific method?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: What are the basic steps a scientist adopts in order to solve scientific problems?

Chapter 02

Biodiversity

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

2.1 Biodiversity
2.2 Classification

1. How many kinds of organisms have been classified by biologists?
(A) 3 million (B) 1 million (C) 2 million (D) 4 million

2. Which regions of earth have more biodiversity?
(A) Polar (B) Trophical (C) Sub-Trophical (D) Temperate

3. Diversity of plants is:
(A) 0.5 million (B) 0.25 million (C) 1.5 million (D) 1 million

4. Diversity of animals is:
(A) 0.5 million (B) 0.25 million (C) 1.5 million (D) 1 million

5. Classification done on the basis of:
(A) Structure and function (B) Physical properties
(C) Chemical properties (D) Similarities and differences

Answers **1.** 2 million **2.** Trophical **3.** 0.5 million **4.** 1.5 million **5.** Similarities and differences

2.3 Taxonomic Ranks
2.4 History of Classification

1. Who introduced the system of classification of organisms for the first time:
(A) Ernst Hackel (B) Aristotle (C) Carlous Linnaeus (D) Robet Wittaker

2. The rank of domain was added to the system in:
(A) 1977 (B) 1967 (C) 1987 (D) 1976

3. The highest taxonomic rank is:
(A) Kingdom (B) Specie (C) Phylum (D) Domain

4. Domain Eukarya is divided into how many kindogms?
(A) 3 (B) 5 (C) 4 (D) 6

5. Each family is further divided into:
(A) Family (B) Order (C) Genus (D) Class

6. Ech Phylum is divided into:
(A) Family (B) Order (C) Genus (D) Class

7. Scientific name of pea plant is:
(A) *Dilbergia sisso* (B) *Homo sapiens* (C) *Pissum indicum* (D) *Pisum sativum*

8. The genus of fruit fly is:
(A) Homo (B) Pisum (C) Drosophila (D) Allium

9. Febaceae is the family of:
(A) Pea (B) Potato (C) Tomato (D) Ginger

10. Magnoliophyta is the phylum of:
(A) Human (B) Fly (C) Tomato (D) Pea

11. Class of human is:
(A) Magnoliopsida (B) Mammalia (C) Insectia (D) Primates

12. Family of human is:
(A) Febaceae (B) Febales (C) Hominidae (D) Homo

13. **Abu Usman Umer Al-Jahiz described the characteristics of how many species of animals?**
(A) 340 (B) 360 (C) 350 (D) 330

14. **The organisms which can prepare their own food are called:**
(A) Heterotrophs (B) Herbivores (C) Autotrophs (D) Carnivores

15. **Euglena have characteristics:**
(A) Plants like (B) Plants and animals like
(C) Animals like (D) fungus like

16. **Who proposed the three-kingdom classification system?**
(A) E-Chalton (B) Ernst Hackel (C) Carlous Linnaeus (D) Robert Whittaker

17. **Euglena was placed in:**
(A) Two kingdom system (B) Three kingdom system
(C) Five kingdom system (D) Six kingdom system

18. **When Robert Wittaker introduced the five kingdom classification system?**
(A) 1976 (B) 1967 (C) 1937 (D) 1896

19. **E-Chatton suggested the term of "Prokaryotic" to describe:**
(A) Bacteria (B) Fungi (C) Animal cell (D) Plant cell

Answers

1. Carlous Linnaeus **2.** 1977 **3.** Domain **4.** 4
5. Genus **6.** Class **7.** *Pisum sativum* **8.** Drosophila **9.** Pea
10. Pea **11.** Mammalia **12.** Hominidae **13.** 350 **14.** Autotrophs
15. Plants and animals like **16.** Ernst Hackel **17.** Three kingdom system
18. 1967 **19.** Bacteria

2.5 Domains of Living Organisms
2.6 Classification of Domain Eukaraya
2.7 Status of Virus in Classfication

1. **Most primitive organism on Earth are:**
(A) Prokaryotes (B) Fungi (C) Eukaryotes (D) Algae

2. **Cell membrane of domain archea contains:**
(A) Carbohydrates (B) Lipids (C) Fats (D) Nucleic Acid

3. **Which domain of living organisms produce oxygen?**
(A) Archaea (B) Eukarya (C) Bacteria (D) Protista

4. **Halophytes are found in:**
(A) Hot springs (B) Salty environment (C) Acidic environment (D) seas

5. **Which domain of living organisms form chains, clusters or colonies of cells?**
(A) Anamalia (B) Eukarya (C) Bacteria (D) Archaea

6. **Cell wall of bacteria is made up of:**
(A) Cellulose (B) Glycogen (C) Peptidoglycan (D) Chitin

7. **Entamoeba histolytica caused disease:**
(A) Malaria (B) Sleeping sickness (C) Dengue (D) Amoebic dysentery

8. **Slime-molds and water molds are the examples of:**
(A) Animal like protist (B) Fungi like protist (C) Plants like protist (D) Mosses

9. **The cell-wall of fungi is made up of:**
(A) Cellulose (B) Peptidoglycan (C) Chlorophyll (D) Chitin

10. **Common example of kingdom fungi:**
(A) Mushrooms (B) Algae (C) Ferns (D) Mosses

11. **Nuclear envelope is present in all except:**
(A) Bacteria (B) Animals (C) Plants (D) Fungi

12. **Viruses are:**
(A) Unicellular (B) A cellular (C) Multicellular (D) Both A and B

13. Which are composed of protein only:
(A) Bacteria (B) Virus (C) Prions (D) Viroids

14. A viroid consists of:
(A) DNA only (B) RNA only (C) Protein only (D) DNA and RNA

15. Coronavirus identified in late:
(A) 2018 (B) 2019 (C) 2012 (D) 2020

16. Washing hands with sanitizer which contains how much alcohol can prevent from coronavirus?
(A) 70% (B) 30% (C) 60% (D) 50%

17. Play a crucial role in protecting from COVID-19.
(A) Sanitization (B) Antibiotics (C) Vaccincation (D) Sedatives

Answers
1. Prokaryotes **2.** Lipids **3.** Archaea
4. Salty environment **5.** Bacteria **6.** Peptidoglycan **7.** Amoebic dysentery
8. Fungi like protist **9.** Chitin **10.** Mushrooms **11.** Bacteria **12.** A cellular
13. Prions **14.** RNA only **15.** 2019 **16.** 60% **17.** Vaccincation

2.8 Binomial Nomenclature

1. Carl Linnaeus was:
(A) German scientist (B) France scientist (C) Swedish Scientist (D) Arab scientist

2. Who introduced first, the system of binomial nomenclature?
(A) Aristotle (B) Carlous Linnaeus (C) Ernst Hackel (D) Robert Whittaker

3. Scientific name of tomato is:
(A) *Solanum tuberosum* (B) *Zia-maiz*
(C) *Solanum esculentum* (D) *Apis cerana*

4. Apis cerana is the scientific name of:
(A) Tiger (B) Honeybee (C) Tomato (D) Potato

5. Scientific names are taken from with language:
(A) English (B) Latin (C) Greek (D) Italics

6. Scientific names are usually printed in:
(A) English (B) Latin (C) Greek (D) Italics

Answers
1. Swedish Scientist **2.** Carlous Linnaeus
3. *Solanum esculentum* **4.** Honeybee **5.** Latin **6.** Italics

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. Which of the following taxonomic ranks represents the broadest rank.
a) Species b) Genus c) Kingdom d) Domain

2. Which characteristics is unique to organisms in the domain Archaea?
a) Cell walls made of peptidoglycan b) Presence of a nucleus
c) Ability to live in extreme environments d) Lack of ribosomes

3. Which of these statements is NOT related to bacteria?
a) Do not have a nucleus. b) Cell wall made of peptidoglycan
c) Most are heterotrophic d) Have chlorophyll in their chloroplast

4. Which of these organisms belong to the domain Eukarya?
a) Escherichia coli b) Yeast c) Coronavirus d) None of these

5. Which of the following is a key characteristic that distinguishes eukaryotic cells from prokaryotic cells?
a) Lack of a cell wall b) Presence of a nucleus

c) Absence of ribosomes d) Smaller size

6. Which kingdom includes organisms that are primarily unicellular, eukaryotic and often heterotrophic?

a) Archaea b) Protista c) Fungi d) Plantae

7. Why are fungi included in heterotropic organisms.

a) Have chitin in cell wall b) Absorb nutrients

c) Reproduce by spores d) d) Can not prepare food

8. Why it is impossible to classify viruses within traditional biological kingdoms?

a) They lack cellular structure and organelles.

b) They can not perform photosynthesis.

c) They are smaller in size than bacteria. d) They are parasites.

9. Which of the following is the correct way for writing the scientific name of humans?

a) *Homo sapiens* b) Homo sapiens c) Homo Sapiens d) homo sapiens

10. Which information you can get if you know the scientific name of an organism?

a) Kingdom and phylum b) Phylum and genus

c) Genus and species d) Class and species

Answers

1.	(d)	**2.**	(c)	**3.**	(d)	**4.**	(b)	**5.**	(b)
6.	(c)	**7.**	(b)	**8.**	(a)	**9.**	(a)	**10.**	(c)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

2.1 Biodiversity
2.2 Classification

1. Define biodiversity.

Ans. Biodiversity means the variety of organisms in a particular area. Biologists mainly focus on the number of different kinds of organism and the variation within each kind of organisms.

2. Write down the importance of biodiversity.

Ans. Some benefits of biodiversity are as follow:

i. Climate regulations: Plants and algae absorb carbondixoide, helping to regulate the climate.

ii. Natural resources: Biodiversity provided a vast array of resources, from food and medicine to building materials and fuel.

3. How classification is helpful for us?

Ans. Advantage of classification:

i. Classification helps in the indetification of new species and in understanding their evolutionary relationships.

ii. It explains the inter-relationship among various organisms.

2.3 Taxonomic Ranks
2.4 History of Classification

1. Define taxonomy.

Ans. Taxonomy is the study of naming and classification of organism into groups and sub groups based on their similarities and differences.

2. What is the most specific level of classification? Define it.

Ans. Species is the most specific level of classification. A species is a group of organisms which can interbreed freely among themselves and produce fertile offsprings, but are reproductively isolated from all other such groups in nature.

3. Write names of five kingdoms of classification.

Ans. i. Kingdom Monera **ii.** Kingdom Planate **iii.** Kingdom Protista

iv. Kingdom Animalia **v.** Kingdom Fungi

2.5 Domains of Living Organisms
2.6 Classification of Domain Eukarya

1. What is the importance of classification of organisms into three domains?

Ans. It provides basic framework to know about history of life and to understand the evolutionary relationship among organisms. It help the scientists to study the organisms on the basis of similarities and differences among them.

2. What do you known about Domain Eukarya?

Ans. Eukarya consists of kingdoms Protista, fungi, plante and animalia. It includes all eukaryotes which consists of complex, eukaryotic cell containing nucleus and other membrane bound organelles.

3. Write down some uses of fungi.

Ans. Fungi are used in production of bread, cheese and beer. Others have medicinal properties, such as penicillin, an antibiotic derived from the fungus penicillium.

2.7 Status of Virus in Classfication

1. Differentiate between prions and viriods.

Ans. Prions and viroids are acellular particles and are not included in classification system. Prions are composed of protein only and viroids are composed of circular RNA only. Both these particles cause infectious diseases in certain plants.

2. How coronavirus spread?

Ans. Corona virus primarly spread through respiratory droplets when an infected person coughs, sneezes, talks or breaths. It can also spread by touching surfaces contaminated with the virus.

Exercise (Short Answer Questions)

B. Write short answers.

1. What is the term used to describe the variety of organisms in ecosystem?

Ans. Biodiversity is the term used to describe the variety of life in ecosystem.

2. How is the biodiversity crucial for humans and for the planet Earth?

Ans. Biodiversity is crucial for humans and for the planet Earth because we rely on nature to provide us with food, clean water, medicines, oxygen production, economic opportunities, recreational activities, cultural significance, scientific data, to prevent floods and other extreme weather effects etc.

3. What are the seven taxonomic ranks used in the Linnaean system?

Ans. Following are the seven taxonomic ranks used in the Linnaean system:

(i) Domain (ii) Kingdom (iii) Phylum (iv) Class
(v) Order (vi) Family (vii) Genus (viii) Species

4. Write the taxonomic ranks of lion and corn?

Ans. Taxonomic classification for lions and corn:

Taxonomic Rank	Lion	Corn
Kingdom	Animalia	Plantae
Phylum or Division	Chordata	magnoliophyta
Class	Mammalia	Liliopsida
Order	Carnivora	Cyperales
Family	Felidae	Poaceae
Genus	Panthera	Zea
Species	Panthera Leo	Zea Mays

5. What are the basic differences between archaea and bacteria?

Ans. Differences between Archaea and Bacteria

Archaea	Bacteria
These are prokaryotes whose cell wall does not contain peptidoglycan.	These are prokaryotics whose cell wall is made of peptidoglycan.

6. What are the short comings of the three-kingdom classification system?

Ans. Shortcomings of the Three-kingdom classification system:

i. In this system, fungi were still included in the kingdom plantae.

ii. This system did not clear the difference between prokaryotes and eukaryotes.

7. Which kingdom includes organisms that are multicellular, heterotrophic, and lack cell walls?

Ans. In Five kingdom system kingdom Animalia is the system that includes organisms that are multicellular, heterotrophic and lack cell walls.

8. Enlist the distinguishing characteristics of fungi.

Ans. Distinguishing characteristics of Fungi

1. Fungi are eukaryotic organisms.

2. They do not have cellulose in their cell walls but possess chitin.

3. They lack chlorophyll and hence cannot perform photosynthesis.

4. They are multicellular.

9. List the three main domains that encompass all living organisms.

Ans. Following are the three main domains that encompass all living organisms:

(i) Domain Archaea **(ii)** Domain Bacteria **(iii)** Domain Eukarya

10. Why cannot we classify viruses in any kingdom?

Ans. We cannot classify viruses in any kingdom because they are at the borderline of living and non-living, they are acellular and they depend upon the host cell to replicate and syntehsize their proteins.

11. How does binomial nomenclature facilitate clear communication about organisms across different languages?

Ans. Binomial nomenclature facilitates clear communication about organisms across different languages because, in binomial nomenclature each organism is given a scientific name consisting of two parts. The first part is the genus name and the second part is the species name. The words of scientific name are taken from Latin language (spoken by no country) so that no country is favoured. The scientific name of an organism is the same anywhere in the world, so this system provides a standard way of communication all over the world.

Exercise (Essay Type Questions)

1. Discuss biodiversity and its significance in maintaining the health of ecosystems.

2. Explain the importance of classification in biology and how it helps us to understand the relationships between different organisms.

3. Describe the Linnaean system of classification in detail, stating the seven taxonomic ranks and their relationships.

4. Compare and contrast the domains Archaea and bacteria, focusing on their key characteristics;

5. Describe the diagnostic characteristics of the four kingdoms within the domain Eukarya.

6. Discuss the challenges of classifying viruses within the traditional three domains of life.

7. Explain the rules and guidelines for suggesting scientific names to organisms.

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 02 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:02

Biodiversity

Marks: 12

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions. **12**

1. The International biodiversity day designated by "the United Nation." was:

(A) May 23rd (B) May 21st (C) May 22nd (D) May 25th

2. Carlous Linnaeus devised the Linnaeus system of taxonomic ranks in:

(A) 1735 (B) 1745 (C) 1725 (D) 1765

3. Scientific name of human beings is:

(A) *Pisum satirum* (B) *Homo sapiens* (C) *Rosa Indica* (D) *Allium cepa*

4. Insecta is a class of:

(A) Human (B) Pea (C) Fruit fly (D) cat

5. Eukarya is the domain of:

(A) Fruit fly (B) Human (C) Pea (D) All of these

6. Texa of class and species were introduced by:

(A) Robert Hook (B) Robert whitakker (C) Aristotle (D) Tournefort

7. Margulis and Schwartz modified the five-kingdom classification system in:

(A) 1988 (B) 1968 (C) 1998 (D) 1958

8. Domain bacteria includes:

(A) Bacteria (B) Cyanobacteria (C) a and b both (D) None of these

9. Kingdom protista includes:

(A) Prokaryotes (B) Fungi (C) Eukryotes (D) Plants

10. Cell wall is absent in:

(A) Plants (B) Bacteria (C) Animals (D) Fungi

11. A virus consists of:

(A) DNA only (B) RNA only (C) Protein only (D) DNA and RNA

12. The scientific name of organism consist of :

(A) Two Parts (B) Three Parts (C) Four Parts (D) Five Parts

Roll No.(in figures): ..... (in words): .....

Chapter:02

Biodiversity

SUBJECTIVE TYPE (PART - I)

Marks: 48

Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write down the factors on which biodiversity depends.

(ii) Why international biodiversity day is celebrated?

(iii) Write down the aims of classification.

(iv) What is domain in taxonomy?

(v) Differentiate between class and order.

(vi) Write down the scientific name of fruit fly and pea.

(vii) What are the contribution of Aristotle and Ibn Rushd in classification?

(viii) Differentiate between autotrophs and heterotrophs.

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Why some biologists disagreed about the position of fungi in kingdom Plantae.

(ii) List the three main domains that encompass all living organisms.

(iii) Who introduced the Domain-classification system?

(iv) Write down the classification of Carl Woese.

(v) Write down some characteristics of Domain Archaea.

(vi) Write down the salient features of domain Bacteria.

(vii) Differentiate between algae and protozoans.

(viii) How fungi differ from plants?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by acellular?

(ii) What are the symptoms of coronavirus?

(iii) How vaccination is helpful against COVID-19?

(iv) What is meant by binomial nomenclature?

(v) Write the scientific name of onion and potato.

(vi) What is the significance of binomial nomenclature?

(vii) Write down the scientific name of Honey bee and Tiger?

(viii) Write down the classification of fruit fly?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Discuss the concept of biodiversity and its significance in maintaining the health of ecosystems. 4

(b) Explain the importance of classification in biology and how it helps us to understand the relationships between different organisms. 5

Q6. (a) What are the aims and principles of classification? 4

(b) Describe the Linnaean system of taxonomic hierarchy in detail, outlining the seven major taxonomic ranks and their relationships. 5

Q7. (a) Write down classification of human, fruit fly and pea. 4

(b) Write a note on the history of the classification system. 5

Chapter 02: Biodiversity	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Which regions of earth have more biodiversity?
(A) Polar (B) Trophical (C) Sub-Trophical (D) Temperate

2. Classification done on the basis of:
(A) Structure and function (B) Physical properties
(C) Chemical properties (D) Similarities and differences

3. The highest taxonomic rank is:
(A) Kingdom (B) Specie (C) Phylum (D) Domain

4. Each Phylum is divided into:
(A) Family (B) Order (C) Genus (D) Class

5. Class of human is:
(A) Magnoliopsida (B) Mammalia (C) Insectia (D) Primates

6. Who classified organisms into two groups?
(A) Ernst Haekel (B) Aristotle (C) Carlous Linnaeus (D) Robert Whittaker

7. Euglena have characteristics:
(A) Plants like (B) Plants and animals like
(C) Animals like (D) None of these

8. When Robert Wittaker introduced the five kingdom classification system?
(A) 1976 (B) 1967 (C) 1937 (D) 1896

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Write down the importance of biodiversity.

(ii) How classification is helpful for us?

(iii) Define taxonomy.

(iv) What is the most specific level of classification? Define it.

(v) What is the importance of classification of organisms into three domains?

(vi) What do you known about Domain Eukarya?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3. Explain the importance of classification in biology and how it helps us to understand the relationships between different organisms.

Chapter 02: Biodiversity	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. **Three Domain classification system proposed by:**
   (A) E-Chatton (B) Carl Woese (C) Carlous Linnaeous (D) Ernst Hackel
2. **Cell membrane of domain archea contains:**
   (A) Carbohydrates (B) Lipids (C) Fats (D) Nucleic Acid
3. **Which domain of living organisms form chains, clusters or colonies of cells?**
   (A) Anamalia (B) Eukarya (C) Bacteria (D) Archaea
4. **Entamoeba histolytica caused disease:**
   (A) Malaria (B) Sleeping sickness (C) Dengue (D) Amoebic dysentery
5. **The cell-wall of fungi is made up of:**
   (A) Cellulose (B) Peptidoglycan (C) Chlorophyll (D) Chitin
6. **Nuclear envelope is present in all except:**
   (A) Bacteria (B) Animals (C) Plants (D) Fungi
7. **Which are composed of protein only:**
   (A) Bacteria (B) Virus (C) Prions (D) Viroids
8. **Coronavirus identified in late:**
   (A) 2018 (B) 2019 (C) 2012 (D) 2020

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Write down some uses of fungi.

(ii) Differentiate between prions and viriods.

(iii) Write down the causes of coronavirus.

(iv) What is the term used to describe the variety of organisms in ecosystem?

(v) Write the taxonomic ranks of lion and corn?

(vi) What are the basic differences between archaea and bacteria.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe the diagnostic characteristics of the four kingdoms within the domain Eukarya.

Chapter 03

The Cell

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

3.1 + 3.2 Cell + Structure of cell

1. **Basic unit of life is:** (A) Cell (B) molecule (C) atom (D) Tissue
2. **Basic types of cells are:** (A) two (B) three (C) four (D) five
3. **Who discovered nucleus?**
   (A) Robert Hooke (B) Carlous linnaeous (C) Robert Brown (D) Aristotle
4. **Which organelle provides shape. strength, protection and support to the cell.**
   (A) cell membrane (B) Mitochondria (C) Cell wall (D) Nucleus
5. **Magnesium, calcium and pectin is present in which layer of cell wall.**
   (A) Primary wall (B) Secondary wall (C) middle lamella (D) None of these
6. **Only few molecules can pass through it:**
   (A) Permeable membrane (B) Selectively - permeable membrane
   (C) Non-permeable membrane (D) Cell wall
7. **Cell membrane is mainly composed of:**
   (A) Proteins and lipids (B) Cholesterol (C) Lignin (D) Peptidoglycon
8. **Cholesterol is absent in the cell membranes of most:**
   (A) Bacteria (B) algal (C) fungi (D) plants
9. **Jelly-like substance is:**
   (A) Mitochondria (B) Cytoplasm (C) Nucleus (D) Cytoskeleton
10. **The lipid part of cytoplasm is called:**
    (A) Nucleoplasm (B) Matrix (C) Stroma (D) Cytosol
11. **Glycolosis is the breakdown of:**
    (A) Protein (B) Glucose (C) Lipids (D) Carbohydrates
12. **Which organelle serves as a "control centre"**
    (A) Lysosymes (B) Cell membrane (C) Mitochondria (D) Nucleus
13. **The membrane of nucleus is called:**
    (A) Cell membrane (B) Nuclear envelop (C) Cell wall (D) Middle lamella
14. **Chromatin is composed of:**
    (A) RNA and Protein (B) DNA and RNA (C) DNA and Protein (D) RNA and Protein
15. **Which material is responsible for the transmission of characteristics:**
    (A) RNA (B) Protein (C) DNA (D) Nucleic Acid
16. **Network of thin tubes and filaments is called:**
    (A) Cytoplasm (B) Mitochondria (C) Cytoskeleton (D) Nucleus
17. **Which part of cytoskeleton made up of tubulin protein?**
    (A) Microtubules (B) Intermediate filaments
    (C) Microfilaments (D) Vesicles
18. **Which are finer than microtubules?**
    (A) Intermediate filaments (B) Microfilaments
    (C) Keratin filaments (D) Actin filaments
19. **Which RNA molecule make up of a larger part of ribosome?**
    (A) Messenger RNA (B) Ribosomal RNA (C) Transfes RNA (D) Small nuclear RNA
20. **What is the function of rough endoplasmic reticulum?**
    (A) Protein synthesis (B) Transport (C) Cell division (D) Replication
21. **Smooth endoplasmic reticulum involved in:**
    (A) Lipid metabolism (B) Transport (C) Protein synthesis (D) Both A and B

22. Golgi Apparatus was discovered in:
(A) 1878 (B) 1898 (C) 1888 (D) 1868

23. The flattened sacs in cytoplasm are called:
(A) Thylakoid (B) Cristae (C) Cisternae (D) Centriole

24. Cisternae belongs to:
(A) Mitochondria (B) Golgi Apparatus (C) Vacuole (D) Nucleus

25. Golgi was given nobel prize in:
(A) 1908 (B) 1807 (C) 1906 (D) 1916

26. Lysosomes were discovered by:
(A) Camillio Golgi (B) Robert Hook
(C) Christine Rene de Duve (D) A.F.A king

27. The number of sub-units of ribosome are:
(A) 2 (B) 4 (C) 6 (D) 8

28. In cell, protein is prepared by:
(A) Ribosomes (B) Golgi complex (C) Mitochondria (D) Stroma

29. Which organelle is called the "Powerhouse" of cell?
(A) Ribosomes (B) Nucleus (C) Mitochondria (D) Cell mombrane

30. The fluid of mitochondria is called:
(A) Matrix (B) Nucleoplasm (C) Cristae (D) Cisternae

31. Mitochondria contains their own:
(A) DNA and RNA (B) DNA and ribosomes
(C) DNA and Protein (D) RNA and ribosomes

32. The organelle which produces energy is:
(A) Mitochondria (B) Ribosome (C) Nucleus (D) Vacuole

33. The sites of aerobic respiration in cell are:
(A) Plastids (B) Golgi bodies (C) Mitochondria (D) Ribosomes

34. Green plastids are known as:
(A) Chromoplasts (B) Leucoplasts (C) Chloroplasts (D) Chlorophyll

35. The stack of thlakoid is called:
(A) stroma (B) Cristae (C) Granum (D) Leucoplast

36. Sac - like structures which make a granum is called:
(A) Thylakoid (B) Grana (C) Stroma (D) Cristae

37. Fluid surrounds the thylakoid:
(A) Cristae (B) Stroma (C) Cisternae (D) Cytosol

38. Those plastids which are colourless:
(A) Chloroplasts (B) Leucoplasts (C) Chromoplasts (D) Lipids

39. What is the main function of vacuole:
(A) Synthesis Protein (B) Generate energy
(C) Store water and nutrients (D) Regulate cell growth

40. The membrane of vacuole is called:
(A) Plasma membrane (B) Tonoplast (C) Cell wall (D) Nuclear membrane

41. Pressure of vacuole on the cytoplasm is called:
(A) Osmotic pressure (B) Atmospheric pressure
(C) Hydrostatic pressure (D) Turgor pressure

42. Centrioles are absent in:
(A) Prokaryotes (B) Unicellular organisms
(C) Eukaryotes (D) Multicellula organisms

43. The pair of centriole is called:
(A) Cilium (B) Centrioles (C) Flagella (D) Centrosomes

Answers

1. Cell **2.** two **3.** Robert Brown **4.** Cell wall
5. middle lamella **6.** Selectively - permeable membrane **7.** Proteins and lipids **8.** Bacteria
9. Cytoplasm **10.** Cytosol **11.** Glucose **12.** Nucleus **13.** Nuclear envelop
14. DNA and Protein **15.** DNA **16.** Cytoskeleton **17.** Microtubules **18.** Microfilaments
19. Ribosomal RNA **20.** Protein synthesis **21.** Both A and B **22.** 1898 **23.** Cisternae

24. Golgi Apparatus **25.** 1906 **26.** Christine Rene de Duve **27.** 2
28. Ribosomes **29.** Mitochondria **30.** Matrix **31.** DNA and ribosome **32.** Mitochondria
33. Mitochondria **34.** Chloroplasts **35.** Granum **36.** Thylakoid **37.** Stroma
38. Leucoplasts **39.** Store water and nutrients **40.** Tonoplast **41.** Turgor pressure
42. Prokaryotes **43.** Centrosomes

3.3 Structural Advantages of plant and Animal Cells:

1. Cell wall of plants is made up of:
(A) Cellulose (B) Chitin (C) Hemicellulose (D) Pestidoglycan

2. Plant cells are interconnected by:
(A) Desmosomes (B) Plasmodesmata (C) Gap junctions (D) Tight junctions

3. Helps in cellular cleanup and recycling.
(A) Mitochondria (B) Vocuoles (C) Lysosomes (D) Chloroplasts

4. Sperm cells have _____ that propels them towards the egg.
(A) Cilia (B) Villi (C) Flagella (D) Microvilli

5. Animal cells lack: (A) Cell membrane (B) Nucleus (C) Cell wall (D) Chloroplasts

Answers

1. Cellulose **2.** Plasmodesmata **3.** Lysosomes **4.** Flagella
5. Cell wall

3.4 + 3.5 Cell Specialization + stem cells

1. Which cells are responsible for photosynthesis.
(A) Epidermal cells (B) Mesophyll cells (C) Muscle cells (D) Red blood cells

2. Outer layer of the plant organs is called:
(A) Endodermis (B) Papillary dermis (C) Epidermis (D) Reticular dermis

3. Guard cells are present in:
(A) Upper epidermis (B) Lower epidermis (C) Endodermis (D) Reticular dermis

4. Muscle cells are:
(A) Plants cells (B) Animal cells (C) Birds (D) Both A and B

5. Cardiac muscle cells are found in:
(A) Stomach (B) Kidney (C) Heart walls (D) Liver

6. What is the main function of a neuron?
(A) To produce hormones (B) To transmit messages
(C) To provide support (D) To produce energy

7. What is the function of red blood cells?
(A) To produce antibiotics (B) To carry oxygen to body cells
(C) To fight infections (D) To produce homones

8. Which of the following is the function of liver cells:
(A) Storage of glycogen (B) Detoxification (C) Recycling (D) All of the above

9. Division of labour refers to:
(A) Tissue organization (B) Homeostasis
(C) Cellular specialization (D) Osmoregulation

10. Which organelle is responsible for protein and lipids synthesis?
(A) Mitochondria (B) Endoplasmic reticulum
(C) Lysosomes (D) Ribosomes

11. Muscle cells are responsible for:
(A) Transmitting messages (B) Carrying oxygen
(C) Storage (D) Contraction and movement

12. Which is an unspecialized cell but has the ability to make new cells?
(A) Nerve cell (B) Zygote (C) Muscle cell (D) Gametes

Answers

1. Mesophyll cells **2.** Epidermis **3.** Lower epidermis **4.** Animal cells
5. Heart walls **6.** To transmit messages **7.** To carry oxygen to body cells
8. All of the above **9.** Cellular specialization **10.** Endoplasmic reticulum
11. Contraction and movement **12.** Zygote

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. The process of cellular respiration occurs in:
a) Nucleus b) Mitochondria c) Ribosomes d) Golgi apparatus

2. The smooth endoplasmic reticulum (SER) is primarily involved in the synthesis of:
a) Proteins b) Lipids c) Carbohydrates d) Nucleic acids

3. Ribosomes are composed of:
a) RNA and protein b) DNA and protein
c) Carbohydrates and lipids d) RNA and carbohydrates

4. What is the primary function of ribosomes?
a) Energy production b) Protein synthesis
c) Lipid synthesis d) DNA synthesis

5. Which cell organelle is involved in packaging and modifying proteins?
a) Nucleus b) Mitochondria
c) Golgi apparatus d) Endoplasmic reticulum

6. Which cell organelle is responsible for breaking down waste materials?
a) Golgi apparatus b) Nucleus c) Mitochondria d) Lysosome

7. Which of the following cell structures is involved in maintaining cell shape?
a) Cytoskeleton b) Centrioles c) Nucleus d) Lysosome

8. Which specialized region of the nucleus is responsible for ribosome assembly?
a) Nucleoplasm b) Nucleolus c) Chromatin d) Chromatin

9. What is the main function of the nuclear pores?
a) Regulation of cell division b) Protein synthesis
c) Control of pH of the cell d) Control of transport of molecules

10. Which of the following cellular structures is found in animal cells and helps in cell division?
a) Cell membrane b) Centriole c) Plasmodesmata d) Vacuole

11. Which sub-cellular organelle plays a crucial role in energy production within the cell?
a) Endoplasmic reticulum b) Golgi apparatus
c) Mitochondria d) Lysosomes

12. In a multicellular plant, which cell type is responsible for the production of glucose?
a) Xylem b) Phloem c) Epidermal d) Mesophyll

13. Which organelle can double its number by itself?
a) Ribosomes b) Lysosomes c) Mitochondria d) Golgi apparatus .

14. Which of these are present on the surface of rough endoplasmic reticulum?
a) Ribosomes b) Lysosomes c) Mitochondria d) Vacuoles

Answers

1. (b) **2.** (b) **3.** (a) **4.** (b) **5.** (c) **6.** (d) **7.** (a)
8. (b) **9.** (d) **10.** (b) **11.** (c) **12.** (d) **13.** (c) **14.** (a)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

3.1 + 3.2 Cell + Structure of cell

1. Define cell.
Ans. The cell is the basic unit of life. Cells are the incredible microscopic structures that form the foundation of life. Every living thing, from smallest bacterium to the largest whale, is made of cells.

2. What are the basic types of cells?
Ans. There are two basic types of cells: Prokaryotic and eukaryotic. Eukaryotic cells are more complex than the prokaryotic cells.

3. What is the function of the cell wall?
Ans. Cell wall provides shape, strength, protection and support to the inner living matter (protoplasm) to the cell.

4. What is fluid mosaic model?

Ans. According to the fluid mosaic model the lipids make a fluid-like bilayer in which protein molecules are submerged. The lipids and proteins can move laterally. Due to these movements, the pattern or "mosaic", of lipids and proteins constantly changes

5. Define Nucleoplasm.

Ans. Nucleoplasm is the jelly-like substance within the nucleus of the cell, where the genetic material (DNA) is suspended.

6. Differentiate between chromatin and chromosome.

Ans. **Chromatin:**

- Uncoiled, thread like structure of DNA.
- Found in the nucleus of eukaryotic cells.
- Composed of DNA and Proteins.

Chromosomes:

- Coiled, condensed structure of chromatin.
- Visible during cell division.

7. Write down the function of lysosomes.

Ans. Lysosomes are small membrane - bound vesicles that contain digestive enzymes. Their main function is to break down the food present in vacuole. Lysosomes also have enzymes for breakdown of cellular wastes.

8. Write down the functions of vacuole.

Ans. Functions of vacuoles are:

i. Storing water, salts and food.
ii. Maintaining cell turger pressure.
iii. Storing nutrients.

3.4 Cell specilization
3.5 Stem cells

1. What is cell specialization?

Ans. Cell specialization also known as cell differentiation. It is a process by which a cell becomes specialized in structure and function to perform a specific role within an organism.

2. Define photosynthesis.

Ans. Photosynthesis is the process by which plants, algae and some bacteria convert light energy from sun into chemical energy in the form of glucose, releasing oxygen as a by product.

3. What do you know about epidermal cells? Give example.

Ans. They are flat and tightly packed cells that make the outer layer (epidermis) of plant organs.

Epidermis protects the internal tissues.

For example: Epidermis of root contain root hair cells.

4. Write the structure of a neuron.

Ans. A neuron consists of a cell body and two types of cytoplasmic extentions, one is dendrites and other is axons.

5. Write a short note on red blood cells.

Ans. Red blood cells also known as erythrocytes. These blood cells are specialized to carry oxygen from the lungs to the body tissue. They are biconcave disk- shaped cells.

6. Write down the functions of liver cells.

Ans. **Functions of liver cells:**

i. Storage of glycogen and some vitamins.
ii. Detoxification of toxic substances.
iii. Recycling of red blood cells.

Exercise (Short Answer Questions)

B. Write short answers.

1. What are the main functions of cell membrane?

Ans. The main function of cell membrane is to allows only few molecules to pass through it while blocks many other molecules.

2. What key role does the Golgi apparatus play in eukaryotic cells?

Ans. In eukaryotic cells golgi apparatus is responsible for transporting, modifying and packaging proteins and lipids into vesicles for delivery to targeted destinations.

3. How do lysosomes contribute to the cell's functioning?

Ans.

- Lysosomes fuse with food vacuole and its digestive enzymes break down the food present in vacuole.
- They also engulf the damaged organelles and break them.
- Lysosomes can store certain molecules for later use.

4. Which organelle detoxifies harmful substances and breaks down lipids?

Ans. Smooth endoplasmic reticulum (SER) detoxifies harmful substances and breaks down lipids.

5. What is the smooth endoplasmic reticulum responsible for?

Ans. Smooth endoplasmic reticulum (SER) is involved in lipid metabolism.

- It is involved in the transport of materials from one part of the cell to the other.
- It also detoxifies the harmful chemicals that have entered the cell.

6. How do the vacuoles in plant cells differ from vacuoles in animal cells?

Ans. In plant cells, there is a single, large, central

vacuole, while in animal cells, there are many small vacuoles scattered in the cytoplasm.

7. What could happen if lysosomal enzymes stop working properly?

Ans. Lysosomal enzymes break cellular wastes. When lysosomal enzymes do not work properly, sugars and fats build up in the cell instead of being used or excreted.

8. Why are the cristae important for cellular respiration?

Ans. The cristae play a vital role in cellular respiration by providing a large surface area.

9. How are chromatin and chromosomes related?

Ans. Chromatin is fine thread-like material. It is composed of deoxyribonucleic acid (DNA) and proteins. When a cell starts dividing, its chromatin condenses and takes the shape of thick chromosomes.

10. Which type of cell is responsible for sending nerve signals?

Ans. Neuron is the cell that is responsible for sending nerve signals.

11. What do mesophyll cells do in plant leaves?

Ans. Mesophyll cells contain large number of chloroplasts, which contain the green pigment chlorophyll necessary for capturing light energy. Mesophyll cells are responsible for photosynthesis.

12. How would you define a stem cell?

Ans. Unspecialized cell that has the ability to differentiate into a variety of specialized cell types is called stem cell.

13. Name the chemical compounds that make up:

a. Cell membrane
b. Fungal cell wall
c. Plant cell wall
d. Bacterial cell wall
e. Ribosomes
f. Chromosomes

Ans. **a. Cell membrane:** Cell membrane is composed of proteins and lipids and small quantities of carbohydrates.

b. Fungal cell wall: Fungal cell wall is made up of Chitin.

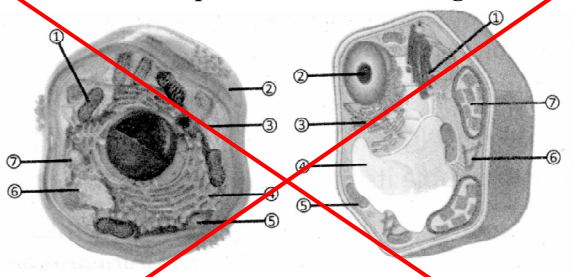
c. Plant cell wall: Plant cell wall is made up of cellulose.

d. Bacterial cell wall: Bacterial cell wall is made up of peptidoglycan.

e. Ribosomes: Ribosomes are made up of proteins and ribosomal RNA (rRNA).

f. Chromosomes: Chromosomes are made up of DNA and proteins.

14. Label the parts of these cell diagrams.



Ans. **Animal cell** **Plant cell**

Animal cell	
1.	Mitochondria
2.	Cell membrane
3.	Cytoplasm
4.	Smooth Endoplasmic Reticulum
5.	Vacuole
6.	Ribosome
7.	Lysosome

Plant cell	
1.	Golgi apparatus
2.	Nucleus
3.	Rough Endoplasmic Reticulum
4.	Vacuole
5.	Mitochondria
6.	Cytoplasm
7.	Chloroplast

Exercise (Essay Type Questions)

1. **Explain the fluid mosaic model of the cell membrane.**
2. **Describe the structure and functions of the cell wall.**
3. **Discuss the components of the nucleus.**
4. **Describe the structure and function of lysosome and endoplasmic reticulum.**
5. **Describe the formation and function of the Golgi complex.**
6. **Describe the structure and functions of the chloroplast.**
7. **How does turgor pressure develop in a plant cell?**
8. **Write any four differences between a plant cell and an animal cell.**
9. **Describe the concept of division of labour and how it applies in multicellular organisms. Give at least three examples.**
10. **Write a note on cell specialization.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 03 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:03 Marks: 12

The Cell **OBJECTIVE TYPE** Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choise Questions. **12**

1. Cell wall is absent in:
(A) Plants (B) Animals (C) Fungi (D) Bacteria

2. The cell wall of algae is made up of:
(A) Peptidoglycan (B) Cellulose (C) chitin (D) Both A and B

3. Jelly like material of nucleus is called
(A) Cytoplasm (B) Chromoplasm (C) Protoplasm (D) Nucleoplasm

4. Which cell do not have a prominent nucleus?
(A) Prokaryotic (B) Unicellular (C) Eukaryotic (D) Multicellular

5. Microfilaments are made up of protein:
(A) Haemoglobin (B) Tubulin (C) Actin (D) Myoglobin

6. The organelles which work for the breakdown of food:
(A) Ribosomes (B) chromosomes (C) Lysosomes (D) Centrioles

7. Which type of plastids helping in the pollination and dispersal of fruit:
(A) Choroplasts (B) Leucoplasts (C) Chromoplasts (D) Starch

8. Chloroplasts convert:
(A) Chemical energy to light energy (B) Light energy to heat energy
(C) Chemical energy to heat energy (D) Light energy to chemical energy

9. The main function of mesophyll cells is:
(A) Photosynthesis (B) Respiration
(C) Fermentation (D) Anaerobic respiration

10. Specialized cells of the nervous system are called:
(A) Muscle cells (B) Neurons (C) Red Blood cells (D) Mesophyll cells

11. Which part of neuron carries signals away from the cell body?
(A) Dendrite (B) Axon (C) Nucleus (D) Chromosome

12. Which protein in red blood cells carry oxygen?
(A) Haemoglobin (B) Insulin (C) Antibodies (D) Platelets

Roll No.(in figures): ..... (in words): .....

Chapter:03
The Cell

SUBJECTIVE TYPE
(PART - I)

Marks: 48
Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What are the variations in the size of cell?

(ii) Who discovered the cell and how?

(iii) What do you know about cell wall?

(iv) Differentiate between the primary and secondary wall of cell wall:

(v) Define plasmodesmata.

(vi) Write down the function of cytoplasm.

(vii) Why nucleus is called the "control center"?

(viii) Define cytoskeleton. Write the name of its parts.

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Write down the function of ribosome.

(ii) How golgi apparatus is formed?

(iii) Give the function of centriole.

(iv) Differentiate between the function of mitochondria and ribosomes.

(v) Define cristae. Write down their function.

(vi) Write about leucoplasts.

(vii) What is called turgor pressure?

(viii) Define basal bodies. Write down their function.

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is the main function of mesophyll cells in plant?

(ii) Differentiate between skeletal muscle cells and cardiac muscle cells.

(iii) Differentiate between dendrites and axons.

(iv) What is the function of a neurons?

(v) Where are liver cells located in the body?

(vi) What is the role of mitochondria and lysosemes?

(vii) Can stem cells be used to regenerate? Give example.

(viii) What are the main functions of cell membrane?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Describe the structure and functions of the cell wall. **4**

(b) Explain the fluid mosaic model of the cell membrane. **5**

Q6. (a) Write a note on cytoplasm. **4**

(b) Discuss the components of the nucleus. **5**

Q7. (a) Write a note on cytoskeleton. **4**

(b) Write a short note on ribosomes. **5**

Chapter 03: The Cell	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Which organelle provides shape, strength, protection and support to the cell.

(A) cell membrane (B) Mitochondria (C) Cell wall (D) Nucleus

2. Cell membrane is mainly composed of:

(A) Proteins and lipids (B) Cholesterol (C) Lignin (D) Peptidoglycan

3. Cholesterol is absent in the cell membranes of most:

(A) Bacteria (B) algae (C) fungi (D) plants

4. Which organelle serves as a "control centre"

(A) Lysosyme (B) Cell membrane (C) Mitochondria (D) Nucleus

5. Which material is responsible for the transmission of characteristics:

(A) RNA (B) Protein (C) DNA (D) Nucleic Acid

6. Which are finer than microtubules?

(A) Intermediate filaments (B) Microfilaments

(C) Keratin filaments (D) Actin filaments

7. Smooth endoplasmic reticulum involved in:

(A) Lipid metabolism (B) Transport (C) Protein synthesis (D) Both a and b

8. The flattened sacs in cytoplasm are called:

(A) Thylakoid (B) Cristae (C) Cisternae (D) Centriole

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) What are the basic types of cells?

(ii) What is fluid mosaic model?

(iii) Define Nucleoplasm.

(iv) Differentiate between chromatin and chromosome.

(v) Write down the functions of vacuole.

(vi) What is cell specialization?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe the structure and function of lysosome and endoplasmic reticulum.

Chapter 03: The Cell	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. Golgi was given nobel prize in:

(A) 1908 (B) 1807 (C) 1906 (D) 1916

2. Prepare protein in the cell:

(A) Ribosomes (B) Golgi complex (C) Mitochondria (D) Stroma

3. The organelle which produces energy is:

(A) Mitochondria (B) Ribosome (C) Nucleus (D) Vacuole

4. Green plastids are known as:

(A) Chromoplast (B) Leucoplast (C) Chloroplast (D) Ribosome

5. Those plastids which are colourless:

(A) Chloroplast (B) Leucoplast (C) Chromoplast (D) Lipids

6. Function of flagella and cilia is:

(A) Movement (B) storage (C) Transport (D) energy production

7. Sperm cells have _____ that propels them towards the egg.

(A) Cilia (B) Villi (C) Flagella (D) Microvilli

8. Outer layer of the plant organs is called:

(A) Endodermis (B) Papillary dermis (C) Epidermis (D) Reticular dermis

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Define photosynthesis.

(ii) Write the structure of a neuron.

(iii) Write a short note on red blood cells.

(iv) What are stem cells?

(v) What key role does the Golgi apparatus play in eukaryotic cells?

(vi) What is the smooth endoplasmic reticulum responsible for?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3. Describe the concept of division of labour and how it applies in multicellular organisms.

Chapter 04

Cell Cycle

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

4.1 Cell Cycle

1. The cell follows a regular series of events during its life is called:
(A) Mitosis (B) Carbon cycle (C) Meiosis (D) Cell cycle

2. The longest phase of cell cycle is:
(A) Interphase (B) Metaphase (C) Prophase (D) Telophase

3. Typically interphase lasts for at least how many percent of total time required for cell cycle?
(A) 90 (B) 70 (C) 80 (D) 60

4. Which phase of cell division is called growth phase?
(A) G-1 Phase (B) G-2 Phase (C) G-3 Phase (D) G-0 Phase

5. Whose cells never enter in G-0 phase?
(A) Liver (B) Kidney (C) Nerves (D) Epithelial

6. Whose cells remain in G-0 Phase temporarily?
(A) Neurons (B) Epithelial (C) Kidney (D) Heart

Answers **1.** Cell cycle **2.** Interphase **3.** 90 **4.** G-1 Phase **5.** Epithelial **6.** Kidney

4.2 Mitosis

1. In mitosis, the number of chromosomes remains:
(A) half (B) double (C) same (D) none of these

2. Which types of cells undergoes mitosis?
(A) Daughter cells (B) Germ line cells (C) Somatic cells (D) Stem cells

3. Karyokinesis means:
(A) Division of cytoplasm (B) Division of chromosomes
(C) Division of mitochondria (D) Division of nucleus

4. Mitosis occurs only in the cells:
(A) Prokaryotic cells (B) Bacterial cells (C) Eukaryotic cells (D) Embryonic cells

5. Complete set of spindle fibres is known as:
(A) Chromatin (B) Chromosome (C) Kinetochore (D) Mitotic spindle

6. Genetic material in nucleus is in loose thread like form is called:
(A) Chromosomes (B) Spindle fiber (C) Centrosome (D) Chromatin

7. In which phase of mitosis, chromatids get separated.
(A) Telophase (B) Prophase (C) Anaphase (D) Metaphase

8. Where is phragmoplast formed?
(A) In the centre of cell (B) At the poles of cell (C) In the cytoslasm (D) In the nucleus

9. Your body consist of about how many cells?
(A) 200 trillion (B) 300 trillion (C) 500 trillion (D) 100 trilion

10. Asexual reproduction in hydra is done by:
(A) Mitosis (B) Budding (C) Cutting (D) Spore formation

11. Sea star gains its lost arm by:
(A) Budding (B) Fragmentation (C) Regeneration (D) Meiosis

12. When the tumors remain in their original location are called:
(A) Benign tumors (B) Malignant tumors (C) Metastasis (D) None of these

13. If tumors invade others tissues, they are called:
(A) Malignant (B) Metastasis (C) Benign (D) Tumor

14. What is a zygote?
(A) Fertilized egg cell (B) Unfertilized egg cell (C) Sperm cell (D) Somatic cell

15. Metastasis is the:
(A) Treatment of disease (B) Spreading of disease (C) Diagnosis of disease (D) Growth of disease

Answers

1. same **2.** Somatic cells **3.** Division of nucleus
4. Eukaryotic cells **5.** Mitotic spindle **6.** Chromatin **7.** Anaphase **8.** In the centre of cell
9. 200 trillion **10.** Budding **11.** Regeneration **12.** Benign tumors **13.** Malignant
14. Fertilized egg cell **15.** Spreading of disease **16.**

4.3 Meiosis

1. What happens to the number of chromosomes during meiosis?
(A) Chromosomes doubles (B) Chromosomes remain same
(C) Chromosomes reduced by half (D) Chromosomes increased by half

2. Oscar Hertwig discovered meiosis in:
(A) 1876 (B) 1976 (C) 1879 (D) 1877

3. In meiosis 1, diploid cell separated and forms:
(A) 2 haploid cells (B) 4 haploid cells (C) 2 diploid cells (D) 1 haploid cell

4. During Anaphase-I of meiosis:
(A) Sister chromotids separate (B) Homologous chromosomes separate
(C) Chromosomes move to the poles (D) Nuclear envelop reforms

5. Which spindle fibres connect with kinetochore of chromosomes?
(A) Microfilament spindles (B) Kinetochore spindles
(C) Microtubule spindles (D) Action spindles

6. Meiosis-II closely resembles with the:
(A) Meiosis-I (B) Mitosis (C) Budding (D) Regeneration

7. In animals the daughter cells are called:
(A) Spores (B) Gametes (C) Sperm cells (D) Egg cells

8. Meiosis brings genetic diversity due to:
(A) Mutation (B) Genetic drift (C) Crossing over (D) Natural selection

9. Errors in meiosis leads to:
(A) Genetic variation (B) Mutation
(C) Chromosomal Abnormalities (D) All of these

10. Disjunction refers to:
(A) Separation (B) Exchange (C) Failure (D) Mutation

Answers

1. Chromosomes reduced by half **2.** 1876 **3.** 2 haploid cells
4. Homologous chromosomes separate **5.** Kinetochore spindles **6.** Mitosis
7. Gametes **8.** Crossing over **9.** All of these **10.** Separation

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. In which phase of cell cycle, maximum growth occurs in cell?
a) M phase b) S phase c) G1 phase d) G2 phase

2. In which phase of cell cycle, the chromosomes duplicate?
a) Mitosis b) G1 phase c) G2 phase d) S phase

3. Which of the following is NOT a characteristic of mitosis?
a) It occurs in somatic cells.
b) It results in genetically identical daughter cells.
c) The chromosome number is halved in daughter cells.
d) It results in the formation of two daughter cells.

4. At which stage of mitosis chromosomes line up in the centre?
a) Prophase b) Metaphase c) Anaphase d) Telophase

5. If you observe a cell in which nuclear membrane is reforming around two sets of Chromosomes, what stage of cell cycle is this?
a) Anaphase b) Telophase c) Prophase d) Metaphase

6. How does the centrosome contribute to mitosis?
a) Initiates DNA replication b) Makes mitotic spindle
c) Forms the nuclear envelope d) Duplicates organelles

7. Centrosomes make mitotic spindle in;
a) Animal cells b) Plant cells c) Prokaryotic cells d) All of these

8. An organism has 4 pairs of chromosomes. After meiosis-I, how many chromosomes and chromatids will be present in each daughter cell?
a) 8 chromosomes and 16 chromatids b) 4 chromosomes and 8 chromatids
c) 4 chromosomes and 4 chromatids d) 8 chromosomes and 8 chromatids

9. Which event is unique to meiosis but not mitosis?
a) DNA replication b) Chromosome alignment
c) Crossing over d) Nuclear division

10. Why is meiosis II necessary after meiosis I?
a) To replicate chromosomes b) To reduce chromosome number
c) To separate sister chromatids d) To ensure genetic recombination

Answers

1.	(c)	**2.**	(d)	**3.**	(c)	**4.**	(b)	**5.**	(b)
6.	(b)	**7.**	(a)	**8.**	(b)	**9.**	(c)	**10.**	(c)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

4.1 Cell Cycle

1. What is meant by cell cycle?

Ans. The cell follows a regular series of events called the cell cycle during its life, the cell cycle can be divided in two main phases.
i- Interphase **ii-** Division phase (Mitosis)

2. Enlist the events that occurs during G1 phase of interphase.

Ans.
- G1 phase is called the growth phase.
- During this phase cell make proteins and organelles and so grows in size.
- Cell also makes enzymes that are required in S phase for DNA replication.

4.2 Mitosis

1. What is meant by mitosis?

Ans. Mitosis is the type of cell division in which a cell divides into two daughter cells, each with the same number of chromosomes as were present in the parent cell.

2. What is meant by phragmoplast?

Ans. In plant cells, Golgi Apparatus makes vesicles. These vesicles move to the middle and fuse to form a plate called phragmoplast. The plate grows outward and its membranes fuse with the cell membrane. This results in two daughter cells.

3. What is the meant by cleavage furrow?

Ans. A cleavage furrow develops where the metaphase plate used to be. This furrow deepens and eventually pinches the parent cell into two daughter cells.

4. What is the difference between benign and malignant tumors?

Ans. **Benign tumors:** If the tumors remain in their original location it is called benign tumors.
Malignant tumors: If the tumors migrate and invade other tissues, they are called malignant tumors.

4.3 Meiosis

1. What is meiosis?

Ans. Meiosis is a type of cell division in which each daughter cells receives half number of chromosomes as compared to the parent cell.

2. Define synapsis.

Ans. During meiosis the homologous chromosomes move close together and pair up. This pairing of homologous chromosomes is called synapsis.

3. Define bivalent. Why it is called tetrad?

Ans. Each pair of homologous chromosomes is called bivalent. Each bivalent has four chromatids, so it may also be called as tetrad.

Exercise (Short Answer Questions)

B. Write short answers.

1. Enlist the events that occur during the G1 phase of interphase?

Ans. Following events occur during the G1 phase of interphase.
- Cell makes proteins and organelles and so grow in size.

- Cells also make enzymes that are required in S phase for the replication of DNA.

2. What is the main purpose of the S phase in the cell cycle?

Ans. The main purpose of S phase in the cell cycle is to copy cell's DNA, doubling the amount of DNA in the cell.

3. During which phase of mitosis sister chromatids separate?

Ans. During anaphase of mitosis the sister chromatids separate and move towards the poles of the cell.

4. How does crossing over contribute to genetic variation in meiosis?

Ans. Crossing over is a genetic process that occurs during prophase-I of meiosis when homologous chromosomes exchange DNA, resulting in new combinations of genes and genetic variation, which is essential for evolution in multicellular organisms.

5. What is the role of spindle fibres in mitosis?

Ans. During mitosis, spindle fibres, also known as the mitotic spindle form a protein structure that divides the genetic material in a cell. This spindle is necessary to equally divide the chromosomes of a parental cell into two daughter cells.

6. How is cytokinesis in animal cell different from plant cell?

Ans. **Cytokinesis in animal cell:**
In animal cell, during cytokinesis, a furrow develops at the equator. At this furrow, the cytoplasm has a ring of microfilaments. The ring contracts and the furrow moves inward. In this way parent cell is pinched into two.
Cytokinesis in plant cell: In plant cell, during cytokinesis, golgi apparatus makes vesicles. These vesicles move to the middle and fuse to form a plate called phragmoplast. The plate grows outward and its membranes fuse with the cell membrane. This results in two daughter cells.

7. What is the difference between prophase of mitosis and prophase-I of meiosis-I?

Ans.

Prophase of Mitosis	Prophase-I of Meiosis-I
● It has the shortest duration.	● It has the longest duration.
● Homologous chromosomes remain separate.	● Homologous chromosomes come close together to form a pair.
● No crossing over occurs.	● Crossing over occur leading to exchange of chromatid segments.

8. How does meiosis differ from mitosis in terms of chromosome number?

Ans. Mitosis produces two daughter cells, each with the same number of chromosomes as were present in the parent cell. For example, if the parent cell has 46 chromosomes, the daughter cells will also have 46 chromosomes.
On the other hand meiosis produces daughter cells, each with half the number of chromosomes as the parent cell. For example, if the parent cell has 46 chromosomes, the daughter cells will each have 23 chromosomes.

9. What are the key events of anaphase in mitosis?

Ans. **Key events of Anaphase in mitosis:**

- The spindle fibres attached with chromosomes pull towards the poles.
- The chromosomes sister chromatids separate.
- Two similar sets of chromatids move towards the poles of the cell.

10. What is the function of the centrosome during cell division?

Ans. The function of centrosome during cell division is to organize microtubules that form the mitotic spindle, which separates replicated chromosomes into daughter cells.

11. What are sister chromatids, and when do they separate in meiosis?

Ans. Sister chromatids are the identical copies of a chromosome that are formed during DNA replication and are joined at the centromere. Sister chromatids separate during anaphase II of meiosis.

12. How is mitosis related to the process of regeneration?

Ans. Mitosis is a cell division that helps with regeneration by producing identical copies of cells that can replace damaged or worn out cells.

Exercise (Essay Type Questions)

1. **Describe the events that occur during the phases of mitosis.**
2. **Describe cytokinesis in animal and plant cells.**
3. **Describe the significance of mitosis.**
4. **Describe the events that occur during the phases of meiosis-I.**
5. **Describe the significance of meiosis.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 04 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:04 Marks: 12

Cell Cycle

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: 12

1. Main phases of cell cycle are:

(A) two (B) four (C) three (D) five

2. Cells that Form the body of organism is called:

(A) Parent cells (B) Somatic cells (C) Daughter cells (D) Germ line cells

3. Protein synthesis takes place in:

(A) G-0 Phase (B) G-1 Phase (C) S Phase (D) G-2 Phase

4. Cell division in prokaryotes is called:

(A) Mitosis (B) Budding (C) Meiosis (D) Binary fission

5. Mitosis was discovered in year:

(A) 1890 (B) 1880 (C) 1870 (D) 1860

6. In which phase of mitosis, nuclear envelop is broken down?

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

7. Formation of metaphase plate takes place in:

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

8. Centrosomes make mitotic spindle in:

(A) Animal cells (B) Plant cells (C) Prokaryotic cells (D) All of these

9. Meiosis was discovered by:

(A) Rudolf Virchow (B) Walther Flemming (C) August Weisman (D) Oscar Hartwig

10. Crossing over occurs in:

(A) Prophase-I (B) Anaphase-I (C) Metaphase-I (D) Telophase-I

11. Nucleoli and nuclear envelop disappear in:

(A) Prophase-II (B) Metaphase-II (C) Anaphase-II (D) Telophase-II

12. In plants, the daughter cells called:

(A) Sperm cells (B) Egg cells (C) Somatic cells (D) Spores

Roll No.(in figures): ..... (in words): .....

Chapter:04
Cell Cycle

SUBJECTIVE TYPE
(PART - I)

Marks: 48
Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Differentiate between interphase and mitoticphase.

(ii) What is the main purpose of S-phase in cell cycle?

(iii) What do you know about G0 phase?

(iv) Differentiate diploid and haploid cells.

(v) By whom and when was the process of mitosis discovered?

(vi) Differentiate between chromatin and chromosomes.

(vii) Write the key events of prophase in mitosis.

(viii) What happens during anaphase?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) How cytokinesis takes place in animal cell?

(ii) Write down the roles of mitosis in growth.

(iii) Define regeneration with example.

(iv) Define metastasis.

(v) What is meant by tumors? Write its types.

(vi) When and who discovered meiosis?

(vii) Differentiate between chiasmata and crossing over.

(viii) What do you known about metaphase-I?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) When cytokinesis occurs?

(ii) What is difference between prophase of mitosis and prophase I of meiosis?

(iii) Why mitosis does not occur in prokoryotic cell?

(iv) What are gametes and spores?

(v) Differentiate between disjunction and non-disjunctions.

(vi) What are sister chromotids and when do they separate during meiosis?

(vii) Define centromere.

(viii) How mitosis is different from meiosis?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) What is the Cell cycle and what are its main phases? 4

(b) Describe the events that occur during the phases of mitosis. 5

Q6. (a) Describe cytokinesis in animal and plant cells. 4

(b) Describe the significance of mitosis. 5

Q7. (a) Describe the events that occur during the phases of meiosis-I. 4

(b) Describe the significance of meiosis. 5

Chapter 04: Cell Cycle	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Typically interphase lasts for at least how many percent of total time required for cell cycle?

(A) 90 (B) 70 (C) 80 (D) 60

2. Whose cells never enter in G-0 phase?

(A) Liver (B) Kidney (C) Nerves (D) Epithelial

3. Which types of cells undergo mitosis?

(A) Daughter cells (B) Germ line cells (C) Somatic cells (D) Stem cells

4. Mitosis occurs only in the cells:

(A) Prokaryotic cells (B) Bacterial cells (C) Eukaryotic cells (D) Embryonic cells

5. Genetic material in nucleus is in loose thread like form is called:

(A) Chromosomes (B) Spindle fiber (C) Centrosome (D) Chromatin

6. Where is phragmoplast formed?

(A) In the centre of cell (B) At the poles of cell (C) In the cytoslasm (D) In the nucleus

7. Budding process is found in:

(A) Hydra (B) Sea star (C) Onion (D) Fern

8. When the tumors remain in their original location are called:

(A) Benign tumors (B) Malignant tumors (C) Metastasis (D) None of these

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Enlist the events that occurs during G1 phase of interphase.

(ii) What is meant by mitosis?

(iii) What is the meant by cleavage furrow?

(iv) What is the difference between benign and malignant tumors?

(v) What is meiosis?

(vi) Define synapsis?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe the events that occur during the phases of mitosis.

Chapter 04: Cell Cycle	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. What is a zygote?

(A) Fertilized egg cell (B) Unfertilized egg cell (C) Sperm cell (D) Somatic cell

2. Metastasis is the:

(A) Treatment of disease (B) Spreading of disease (C) Diagnosis of disease (D) Growth of disease

3. Oscar Hertwig discovered meiosis in:

(A) 1876 (B) 1976 (C) 1879 (D) 1877

4. Which spindle fibres connect with kinetochore of chromosomes?

(A) Aster spindles (B) Kinetochore spindles

(C) Microtubule spindles (D) Actin spindles

5. Meiosis-II closely resembles with the:

(A) Meiosis-I (B) Mitosis (C) Budding (D) Regeneration

6. Meiosis brings genetic diversity due to:

(A) Mutation (B) Genetic drift (C) Crossing over (D) Natural selection

7. Disjunction refers to:

(A) Separation (B) Exchange (C) Failure (D) Mutation

8. At which stage of mitosis chromosomes line up in the centre?

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Define bivalent. Why it is called tetrad?

(ii) What is the main purpose of the S phase in the cell cycle?

(iii) During which phase of mitosis sister chromatids separate?

(iv) How is cytokinesis in animal cell different from plant cell?

(v) How does meiosis differ from mitosis in terms of chromosome number?

(vi) What is the function of the centrosome during cell division?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe the events that occur during the phases of meiosis-I.

Chapter 05 Tissues, Organs, And Organ Systems

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

5.1 Levels of Organization

1. What is the smallest unit of matter?
(A) Cell (B) Molecule (C) Atom (D) Tissue

2. Which tissue is reponsible for the movement in animals?
(A) Epithelial tissue (B) Muscle tissue (C) Epidermal tissue (D) Vascular tissue

3. Mitochondria is responsible for:
(A) Respiration (B) Protein synthesis (C) Photosynthesis (D) Storage

4. Which is the smallest unit of life?
(A) Atom (B) Tissue (C) Molecule (D) Cell

5. Xylem and phloem are the examples of:
(A) Muscle tissue (B) Epidermal tissue (C) Epithelial tissue (D) Vascular tissue

6. What is the main function of shoot system?
(A) Transport nutrients (B) Breakdown of food
(C) Absorbs water and nutrients (D) Supports the plant and photosynthesis

7. Who said: "The whole is greater than the sum of its parts."
(A) Jabir Bin Hayan (B) Bu Ali Sina (C) Aristotle (D) Abdul Malik Asmai

8. Heart is the example of which interaction.
(A) Cell to tissue (B) Organelles to cells
(C) Tissue to organ (D) Organ system to organisms

Answers **1.** Atom **2.** Muscle tissue **3.** Respiration **4.** Cell
5. Vascular tissue **6.** Supports the plant and photosynthesis **7.** Aristotle **8.** Tissue to organ

5.2 Ogans and Ogran System in Plants

1. Which of the following are the organs of plants?
(A) Roots (B) Shoots (C) Leaves (D) All of these

2. What is the main function of the roots?
(A) Photosynthesis (B) Transpiration
(C) Absorption of water and minerals (D) Reproduction

3. What is the main function of a flower?
(A) Photosynthesis (B) Absorption of water (C) Storage of food (D) Reproduction

4. The upermost layer of leaf is made up of :
(A) Epidermal tissue (B) Vascular tissue (C) Mesophyll tissue (D) Epithelial tissue

5. Guard cells present in epidermal tissue rregulates:
(A) Ion concentration (B) Gas exchange (C) Water content (D) Diffusion of gas

6. Which type of vascular tissue transports sugars and other organic compounds from leaves to roots?
(A) Xylem (B) Phloem (C) Collenehyma (D) Sclerenchyma

7. Organ system level is more complex in:
(A) Plants (B) Fungi (C) Animals (D) Algae

Answers **1.** All of these **2.** Transpiration **3.** Reproduction **4.** Epidermal tissue
5. Gas exchange **6.** Phloem **7.** Animals

5.3 + 5.4 Organs and Organ Systems in Human + Homeostasis

1. The lungs are responsible for the exchange of:
(A) Oxygen (B) Carbon dixoide (C) Nitorgen (D) Both A and B

2. **Which organ in human body is called the control centre?**
(A) Heart (B) Lungs (C) Brain (D) Kidneys

3. **The kidneys are responsible for :**
(A) Excretion of waste (B) Storage of food (C) Filtering of waste (D) Breakdown of food

4. **What is the main type of tissue that lines the stomach?**
(A) Epithelial tissue (B) Muscle tissue (C) Connective tissue (D) Nervous tissue

5. **What is the precursor to the enzyme pepsin?**
(A) Pepsin (B) Gastric amyalse (C) Trypsin (D) Pepsinogen

6. **How many layers of muscle tissue present in stomach?**
(A) Two (B) Three (C) Four (D) Five

7. **Which organs system of human body is reponsible for the exchange of gasses between body and the environment?**
(A) Skeletal system (B) Digestive system (C) Muscular system (D) Respiratory system

8. **Skeleton system consist of:**
(A) Bones (B) Cartilages (C) Tendons (D) All of these

9. **Which organ system allows movement to the body?**
(A) Skeletal system (B) Digestive system (C) Muscular system (D) Respiratory system

10. **The body's ability to maintain a stable internal environment despite the changes in external enviornment is called:**
(A) Thermoregulation (B) Guttation (C) Osmoregulation (D) Homeostasis

11. **What happens when body temperature falls bellow 37°C?**
(A) Sweat produce (B) Cardiac arrest (C) Respiratory failure (D) Shivering

12. **Which organ system is responsible for the regulation of body temperature and pH?**
(A) Respiratory system (B) Nervous system
(C) Digestive system (D) Cardiovascular system

13. **Integumentary system acts as a barriers to protect the body from:**
(A) Abiotic Factors (B) Biotic Factors (C) Internal Factors (D) External Factors

14. **Which system works for the proper distribution of nutrients to cells?**
(A) Cardiovascular system (B) Digestive system
(C) Urinary system (D) Integumentary system

15. **The organ performs many vital functions including filtering blood, producing bile and storing glucose.**
(A) Brain (B) Heart (C) Liver (D) Stomach

16. **Which organ is responsible for coordination among other organs, thinking and decision making?**
(A) Liver (B) Pancrease (C) Heart (D) Brain

17. **A muscular organ that pumps blood throughout the body.**
(A) Brain (B) Intestine (C) Liver (D) Heart

Answers

1. Both A and B **2.** Brain **3.** Filtering of waste **4.** Epithelial tissue
5. Pepsinogen **6.** Three **7.** Respiratory system **8.** All of these
9. Muscular system **10.** Homeostasis **11.** Shivering **12.** Cardioscular system
13. External Factors **14.** Digestive system **15.** Liver **16.** Brain **17.** Heart

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. **A higher level of organization exhibits emergent properties when:**
a) Its parts function independently.
b) The sum of its parts is greater than the whole.
c) The individual parts are more important than the whole.
d) Its parts interact to perform more functions.

2. Which of the following demonstrates the levels of organization of the body, from simplest to most complex?

a) Cell → Organ → Tissue → Organelle → Organ system
b) Organelle → Cell → Tissue → Organ → Organ system
c) Tissue → Cell → Organelle → Organ → Organ system
d) Organ system → Tissue → Cell → Organelle → Organ

3. At which level of organization gas exchange occurs between body and environment?

a) Organelle level in mitochondria b) Cellular level in alveolar cells
c) Tissue level in epithelial tissues d) Organ system level in the respiratory system

4. The epithelial tissue in the stomach wall is responsible for producing:

a) Mucus b) Pepsinogen c) Hydrochloric acid d) All of these

5. In the wall of stomach; which tissue also contains blood vessels and nerves?

a) Epithelial b) Muscle c) Inner connective d) Outer connective

6. In a leaf, which tissue is responsible for photosynthesis?

a) Xylem b) Mesophyll c) Epidermis d) Phloem

7. What is the primary function of the xylem tissue in a leaf?

a) To transport sugars to other parts b) To transport water to parts of leaf
c) To synthesize chlorophyll d) To control the opening and closing of stomata

8. Which of these is a function of the human skeletal system?

a) Storing minerals and producing blood cellsb) Removing carbon dioxide from blood
c) Filtering blood to remove waste products
d) Breaking down food for energy

9. Which structures are responsible for the transport of food in plant body?

a) Xylem tissue b) Palisade mesophyll
c) Phloem tissue d) Spongy mesophyll

10. In a plant, which of the following is the primary function of the flower?

a) Transporting water and minerals b) Supporting leaf growth
c) Facilitating reproduction through pollination
d) Regulating gas exchange

Answers

1.	(d)	**2.**	(b)	**3.**	(d)	**4.**	(d)	**5.**	(c)
6.	(b)	**7.**	(b)	**8.**	(a)	**9.**	(c)	**10.**	(c)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

5.1 + 5.2 Levels of Organization + Ogans and Ogran System in Plants

1. What do you know about animal tissues?

Ans. In animal two types of tissues are present.

i. Epithelial tissue: Epithelial tissue covers body surfaces and lines cavities (e.g., skin)

ii. Muscle tissue: Muscle tissue enable movement (e.g., cardiac muscle in the heart).

2. Write down the names of organs of a plant.

Ans. The organs of a plant are as follow:

i. Roots **ii.** Stem **iii.** Leaves **iv.** Flowers

3. What is the main function of a flower?

Ans. Flower is reproductive part of a plant. It plays a crucial role in plants sexual reproduction.

4. What is meant by organ system?

Ans. **Organ system:** An organ system consists of multiple organs that work together to perform related functions.

Examples: Circulatory system and digestive system are the examples of organ system.

5.3 + 5.4 Levels of Organization + Ogans and Ogran System in Plants

1. Name some organs present in human body.

Ans. Heart, lungs, brain, liver, kidneys stomach, intestines and pancreas are some organs present in human body.

2. What is importance of heart in the body?

Ans. Heart pumps blood throughout the body. It is essential for delivering oxygen and nutrients to cells and removing waste products.

3. Discuss the importance of lungs in the body.

Ans. The lungs are responsible for breathing, allowing the exchange of oxygen and carbon dioxide between the body and the environment.

4. What functions does the liver perform?

Ans. The liver performs many vital functions including filtering blood, producing bile and storing glucose.

5. What type of tissue is the stomach composed of?

Ans. The stomach is composed of many tissues such as epithelial tissue, connective tissue, muscle tissue and outer connective tissue.

6. What inner wall of stomach is made up of?

Ans. The inner wall of stomach is made up of epithelial tissue.

7. What does gastric juice contain?

Ans. Gastric juice contains enzyme pepsinogen for protein digestion and hydrochloric acid for activating pepsinogen to pepsin in enzyme.

8. What is the advantage of mucus in stomach?

Ans. The mucus lines the inner wall of the stomach and protects it from acids.

9. Give few examples of organ systems that form the human body.

Ans. Skeletal system, digestive system, respiratory system, muscular system, nervous system and blood circulatory system are few examples of organ systems that form the human body.

10. What is the function of skeletal system?

Ans. Functions of skeletal system:

The skeletal system.

- Provides structure, support and protection to the body.
- Serves as a framework for muscles to attach, allowing movements.
- Stores minerals and produces blood cells.

11. What does digestive system consist of?

Ans. The digestive system consists of organs such as mouth, oesophagus, stomach, small intestine and large intestine.

12. Define the term homeostasis.

Ans. Homeostasis is defined as the body's ability to maintain stable internal environment despite the changes in the external environment.

Examples: Regulating the temperature, blood pressure, blood sugar and pH levels.

13. How does sweating occur?

Ans. After hard work when our muscles produce heat, the temperature of the body increases. In this situation, the temperature regulating Centre in the brain sends message to sweat glands. As a result, sweating occurs to cool down the body.

14. What does happen when the body temperature fall?

Ans. When the body temperature falls, the temperature regulatory center sends message to muscles. As a result, shivering occurs to generate heat.

15. What is importance of integumentary system?

Ans. Integumentary system acts as a barrier to protect the body from external factors. It also helps regulate temperature through sweating.

Exercise (Short Answer Questions)

B. Write short answers.

1. Enlist the levels of organization from cells to organ systems.

Ans. The levels of organization from cells to organ systems are:

Cell ⟶ Tissue ⟶

Organ ⟶ Organ system

2. What are the major roles of the epithelial tissue present in the stomach?

Ans. Roles of epithelial tissue in stomach:

- It secretes mucus that lines the inner wall of the stomach protecting it from acids.
- It secretes gastric juice that helps in protein digestion.
- It also secretes hydrochloric acid for activating pepsinogen to pepsin enzyme.

3. How do the smooth muscles contribute to the stomach's function?

Ans. Smooth muscles in the stomach contribute to the stomach's function by contracting and relaxing to mix and move food through the stomach.

4. What is the function of the palisade mesophyll in the leaf?

Ans. The palisade mesophyll is a layer of cells in the mesophyll of a leaf that is located just beneath the upper epidermis. It consists of tightly packed elongated cells. The function of palisade mesophyll in the leaf is to perform photosynthesis.

5. What is the role of the shoot system in plants?

Ans. Shoot system in plants includes stem, leaves and reproductive structure like flowers. All components of shoot system work together to enable processes like photosynthesis and reproduction.

6. What is homeostasis? And why is it important for organisms? .

Ans. Homeostasis is the body's ability to maintain a relatively stable internal environment despite the changes in the external environment.

Importance of Homeostasis: Homeostasis is a vital process that allows organisms to maintain a stable internal environment, that is essential for survival, overall health and well-being of the organisms.

7. How does the human body maintain a stable internal temperature?

Ans. When the body temperature falls, the temperature regulatory centre sends message to muscles. As a result, shivering occurs to generate heat. In this way the human body maintains a stable internal temperature.

8. Differentiate between the following:

i. Tissue and organ:

Ans. Difference between tissue and organ:

Tissue	Organ
A tissue is a group of similar cells that work together to perform one or more specific functions. **Examples:** Epithelial tissue, muscle tissue, epidermal tissue, vascular tissue, etc.	An organ is a structure made up of related tissues working together to perform specific functions. **Examples:** In animals; Heart (pumps blood through circulatory system) and lungs (facilitate gas exchange).

ii. Root system and shoot system:

Ans. Difference between Root system and shoot system:

Root System	Shoot System
The root system is a plant's network of roots that anchors the plant and absorbs water and nutrients for growth.	The shoot system includes stem, leaves and reproductive structures like flowers. These components work together to enable processes like photosynthesis and reproduction.

iii. Epidermal and mesophyll tissue:

Ans. Difference between Epidermal and mesophyll tissue:

Epidermal tissue	Mesophyll tissue
● It is the outermost layer consisting of the upper and lower epidermis. ● It reduces water loss and provides protection. It also regulates gas exchange and water vapour loss.	● It lies between the upper and lower epidermis. ● It is the site of photosynthesis.

iv. Palisade and spongy mesophyll:

Ans. Difference between Palisade and spongy mesophyll:

Palisade mesophyll	Spongy mesophyll
• It is located just beneath the upper epidermis. • It consists of tightly packed elongated cells. • It performs photosynthesis.	• It is present below the palisade mesophyll. • It is composed of loosly arranged cells with air spaces between them. • It allows diffusion of gases throughout the leaf.

Exercise (Essay Type Questions)

1. **Explain the levels of organization in multicellular organism. How does each level contribute to the overall functioning of an organism?**
2. **What is a tissue level? Explain plant and animal tissues.**
3. **Describe the tissue composition of the stomach. How does each tissue contribute to the digestive function of the stomach?**
4. **Describe the tissue composition of the leaf. How does each tissue contribute to the functions of the leaf?**
5. **How do the organ systems come together to form the human body?**
6. **Describe the roles of the digestive system and the excretory system in homeostasis.**
7. **Explain the functions of various plant organs.**
8. **Describe the structure and function of the plant root system.**
9. **Define homeostasis and explain its importance. Discuss how different organ systems work together to maintain homeostasis.**
10. **Describe how the respiratory and circulatory systems work together to maintain homeostasis of oxygen and carbon dioxide, levels in the body.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 05 **BIOLOGY** CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:05 Marks: 12

Tissues, Organs, And Organ Systems

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions. 12

1. Molecules combine in a specific way and make:
(A) Organ system (B) Organism (C) Organ (D) Organelle

2. Unicellular organisms are made up of:
(A) Many cells (B) Two cells (C) One cell (D) Three cells

3. What is the function of leaves?
(A) Cellular respiration (B) Conduct photosynthesis
(C) Transport water (D) Store substances

4. What is emergent property?
(A) Single component (B) Interaction of components
(C) Living organisms only (D) Non-living organisms only

5. Which plant organ is responsible for photosynthesis?
(A) Root (B) Stem (C) Leaf (D) Flower

6. Xyelm and phloem are present in:
(A) Root (B) Stem (C) Leaves (D) Flower

7. At which level of organization gaseous exchange occurs between body and environment?
(A) Organelle level in mitochondria (B) Cellular level in alveolar cells
(C) Tissue level in epithelial tissues
(D) Organ system level in the respiratory system

8. Insulin and glucagon are present in:
(A) Stomach (B) Liver (C) Kidneys (D) Pancreas

9. Which organ system is responsible for coordination and control of body functions?
(A) Blood circulatory system (B) Digestive system
(C) Nervous system (D) Respiratory system

10. The normal body temperature of a human is:
(A) 39°C (B) 37°C (C) 38°C (D) 32°C

11. Which hormone lowers the blood glucose level to normal?
(A) Glucagon (B) Insulin (C) Oxytocin (D) Cortisol

12. Which of the following organ is responsible for breathing?
(A) Kidneys (B) Heart (C) Lungs (D) Liver

Roll No.(in figures): ..... (in words): .....

Chapter:05
Tissues, Organs, And Organ Systems

SUBJECTIVE TYPE
(PART - I)

Marks: 48
Time:1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Which is the smallest unit of matter? Define it.
(ii) Define organelle with example.
(iii) Write down any two names of organs of plants and animals.
(iv) What is meant by an organisms?
(v) Differentiate between palisade mesophyll and spongy mesophyll.
(vi) Write down the function of xylem and phloem leaf.
(vii) What is stomata?
(viii) What is the role of upper epidermis in leaf?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Describe the difference between tissue and cell.
(ii) Define organ also given examples.
(iii) What does happen when organelles interact within cells?
(iv) What is the importance of leaf?
(v) What is transpiration?
(vi) Write a short note on epidermal tissue.
(vii) How brain acts as an organ?
(viii) How do the smooth muscles contribute to the stomach's function?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by nervous system?
(ii) Why homeostasis is important for living organisms?
(iii) How does the human body maintains its body temperature?
(iv) Why shivering produced in body?
(v) Which hormones are responsible for lowering and raising blood sugar level?
(vi) How respiratory system maintain homeostasis?
(vii) What is the importance of integumentary system?
(viii) Describe how cardiovascular system regulates homeostasis?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Explain the levels of organization in multicellular organism. How does each level contribute to the over all functioning of an organism? 4

(b) What are the emergent properties when lower levels make higher levels? 5

Q6. (a) Explain organ systems in plants. 4

(b) Write a note on organs in human body. 5

Q7. (a) Describe the tissue composition of the stomach. How does each tissue contribute to the digestive function of the stomach? 4

(b) Define homeostasis and explain its importance. 5

Chapter 05: Tissues, Organs and Organ Systems	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Which is the smallest unit of life?

(A) Atom (B) Tissue (C) Molecule (D) Cell

2. Who said: "The whole is greater than the sum of its parts."

(A) Jabir Bin Hayan (B) Bu Ali Sina (C) Aristotle (D) Abdul Malik Asmai

3. Which of the following are the organs of plants?

(A) Roots (B) Shoots (C) Leaves (D) All of these

4. The upermost layer of leaf is made up of :

(A) Epidermal tissue (B) Vascular tissue (C) Mesophyll tissue (D) None of these

5. Guard cells present in epidermal tissue regulates:

(A) Ion concentration (B) Gas exchange (C) Water content (D) Diffusion of gas

6. Organ system level is more complex in:

(A) Plants (B) Fungi (C) Animals (D) Algae

7. The lungs are responsible for the exchange of:

(A) Oxygen (B) Carbon dixoide (C) Nitorgen (D) Both A and B

8. What is the main type of tissue that lines the stomach?

(A) Epithelial tissue (B) Muscle tissue (C) Connective tissue (D) Nervous tissue

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Enlist the level of organization from cell to organ system.

(ii) What do you know about animal tissues?

(iii) Write down the names of organs of a plant.

(iv) What is the main function of a flower?

(v) What is meant by organ system?

(vi) Enlist the levels of organization from cells to organ systems.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: What is a tissue level? Explain plant and animal tissues.

Chapter 05: Tissues, Organs and Organ Systems	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. What is the precursor to the enzyme pepsin?
(A) Pepsin (B) Gastric amyalse (C) Trypsin (D) Pepsinogen

2. How many layers of muscle tissue present in stomach?
(A) Two (B) Three (C) Four (D) Five

3. Skeletal system consist of:
(A) Bones (B) Cartilages (C) Tendons (D) All of these

4. The body's ability to maintain a stable internal environment despite the charges in external enviornment is called:
(A) Thermoregulation (B) Guttation (C) Osmoregulation (D) Homeostasis

5. Which helps to control the pH and temperature of body.
(A) Respirator system (B) Nervous system
(C) Digestive system (D) Cardiorascular sysem

6. Which system works for the proper distribution of nutrients to cells?
(A) Cardiovascular system (B) Digestive system
(C) Urinary system (D) Integumentary system

7. The organ performs many vital functions including filtering blood, producing bile and storing glucose.
(A) Brain (B) Heart (C) Liver (D) Stomach

8. A muscular organ that pumps blood throughout the body.
(A) Brain (B) Intestine (C) Liver (D) Heart

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) What are the major roles of the epithelial tissue present in the stomach?
(ii) How do the smooth muscles contribute to the stomach's function?
(iii) What is the function of the palisade mesophyll in the leaf?
(iv) What is the role of the shoot system in plants?
(v) What is homeostasis, and why is it important for organisms? .
(vi) How does the human body maintain a stable internal temperature?

(PART - II)

☆ **Attempt the following question..** **(5)**

Q.3: Describe the roles of the digestive system and the excretory system in homeostasis.

Chapter 06

Biomolecules

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

6.1 Biomolecules

1. What we study in the biochemistry?
(A) Physical processes (B) Biological processes
(C) Chemical process (D) Environmental Process

2. Which of the following is not a macromolecule?
(A) Carbohydrates (B) Proteins (C) Lipids (D) Water

3. Which of the following is a major component of the dry mass of protoplasm?
(A) Water (B) Biomolecules (C) Vitamins (D) Salts

4. What is the primary purpose of cellular metabolism?
(A) To synthesize new molecules (B) To breakdown existing molecules
(C) To maintain cellular homeostasis (D) To generate energy for the cell

Answers **1.** Chemical process **2.** Water **3.** Biomolecules **4.** To generate energy for the cell

6.2 Carbohydrates

1. The carbohydrates are the organic compounds in which the ratio of H and O is:
(A) 2:1 (B) 1:2 (C) 1:1 (D) 2:2

2. On the basis of the sugar molecules carbohydrates are divided into how many classes?
(A) Two (B) Three (C) Four (D) Six

3. Which class of carbohydrate is less soluble in water and less sweet in taste?
(A) Monosaccharides (B) Polysaccharides (C) Disaccharides (D) Trisaccharides

4. All of the following are polysaccharides except:
(A) Starch (B) Sucrose (C) Glycogen (D) Cellulose

5. Which of the following is a type of polysaccharide found in plant cell wall?
(A) Chitin (B) Starch (C) Glycogen (D) Cellulose

6. The most abundant carbohydrates in nature are:
(A) Monosaccharides (B) Polysaccharides (C) Disaccharides (D) Trisaccharides

7. Pentoses are the essential parts of:
(A) Proteins (B) RNA (C) Lipids (D) RNA and DNA

Answers **1.** 2:1 **2.** Three **3.** Disaccharides **4.** Sucrose **5.** Cellulose **6.** Polysaccharides **7.** RNA and DNA

6.3 Proteins

1. Which of the following is the most abundant biomolecules is cell?
(A) Carbohydrates (B) Proteins (C) Lipids (D) Nucleic acid

2. How many types of amino acids are present in organisms?
(A) 160 (B) 170 (C) 150 (D) 180

3. The R-group for alanine is:
(A) H (B) CH_2 (C) CHO (D) CH_3

4. Which of the following proteins is involved in oxygen transport?
(A) Insuline (B) Haemoglobin (C) Collagen (D) Keratin

5. Actin and myosin proteins are responsible for:
(A) Regulate processes in body (B) Transports oxygen
(C) Muscular contraction (D) Protection from pathogens

6. Which is a blood clotting protein.
(A) Actin (B) Myosin (C) Keratin (D) Fibrin

Answers **1.** Proteins **2.** 170 **3.** CH_3 **4.** Haemoglobin
5. Muscular contraction **6.** Fibrin

6.4 Lipids

1. What is the main components of cell membrane?
(A) Carbohydrates (B) Protein (C) Lipid (D) Nucleic acid

2. Which of the following is the basic structural unit of most lipids?
(A) Amino Acids (B) Fatty acids and glycerol
(C) Nucleotides (D) Simple sugars

3. How do unsaturated fatty acids differ from saturated fatty acids?
(A) They can move H-atoms. (B) They contain double bonds.
(C) They are solid at room temperature. (D) They are only found in animal fat.

4. Fats and oils are the lipids which contains?
(A) One glycerol and three fatty acids. (B) Two glycerol and two fatty acids.
(C) Three glycerol and one fatty acids. (D) One glycerol and one fatty acid.

Answers **1.** Lipid **2.** Fatty acids and glycerol
3. They contain double bonds. **4.** One glycerol and three fatty acids.

6.5 Nucleic Acids

1. Which components make up a nucleotide?
(A) Sugar, phosphate, nitrogenous base (B) Amino acid, sugar, nitrogenous base
(C) Fatty acid, phosphate, nitrogenous base (D) Protein, sugar, nitrogenous base

2. Watson and Crick received Nobel prize for the discovery of:
(A) Proteins (B) Nucleic acids (C) Lipids (D) DNA

3. When Watson and Crick proposed the double helix of DNA?
(A) 1963 (B) 1973 (C) 1953 (D) 1962

4. Which of the following is the type of RNA?
(A) Messenger RNA (mRNA) (B) Ribosomal RNA (rRNA)
(C) Transfer RNA (tRNA) (D) All of the above

5. Which type of RNA is responsible for carries genetic information from DNA to ribosomes?
(A) mRNA (B) tRNA (C) rRNA (D) None of these

6. How many bonds are present between cytosine and guanine?
(A) two (B) three (C) four (D) one

7. Which process occurs first, transcription or translation?
(A) Transcription (B) Translation
(C) Occurs simultaneously (D) Depends on the cell type

8. The process of building a protein from a sequence of amino acids called:
(A) Transcription (B) Translation (C) Replication (D) Mutation

9. Specific segments of the DNA called:
(A) Allele (B) Gene (C) Genotype (D) Phenotype

Answers **1.** Sugar, phosphate, nitrogenous base **2.** DNA **3.** 1953
4. All of the above **5.** mRNA **6.** three **7.** Transcription **8.** Translation
9. Gene

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. What is the primary function of carbohydrates?
a) Provide energy b) Act as enzymes c) Regulate processes d) Make membranes

2. How will you differentiate between monosaccharides and polysaccharides?
a) Monosaccharides are single sugars. b) Polysaccharides are sweet in taste.
c) Monosaccharides are present in plant cell wall.
d) Polysaccharides dissolve easily.

3. What is true about cellulose?
a) It is sweet in taste.
b) It is digestible by human digestive system.
c) It provides structural support in plants.
d) It is soluble in water.

4. Which of the following proteins is involved in oxygen transport?
a) Insulin b) Haemoglobin c) Collagen d) Keratin

5. Which component of an amino acid determines its unique properties?
a) Amino group b) Carboxyl group c) R group (side group) d)Hydrogen group

6. Which proteins are involved in defence against pathogens?
a) Antibodies b) Myosin c) Fibrinogen d) Haemoglobin

7. Which of the following are the units of most lipids?
a) Amino acids b) Fatty acids and glycerol c) Nucleotides d) Simple sugars

8. How do unsaturated fatty acids differ from saturated fatty acids?
a) They have more hydrogen atoms.
b) They contain double bonds in their hydrocarbon chains.
c) They are solid at room temperature.
d) They are found only in animal fats.

9. Which of the following is NOT a function of proteins?
a) Transport oxygen in the blood. b) Carry genetic information.
c) Help in digesting food. d) Fight against pathogens.

10. Which components make up a nucleotide?
a) Sugar, phosphate, nitrogenous base b) Amino acid, sugar, nitrogenous base
c) Fatty acid, phosphate, nitrogenous base d) Protein, sugar, nitrogenous base

11. Which nitrogenous base is found in RNA but not in DNA?
a) Adenine b) Thymine c) Uracil d) Guanine

Answers

1. (a)	**2.** (a)	**3.** (c)	**4.** (b)	**5.** (c)	**6.** (a)
7. (b)	**8.** (c)	**9.** (b)	**10.** (a)	**11.** (c)	

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

6.1 + 6.2 Biomolecules + Carbohydrates

1. What is biochemistry?
Ans. Biochemistry is the study of the chemical processes that occur within living organisms (e.g photosynthesis, cellular respiration).

2. What are biomolecules?
Ans. The molecules produced by organisms are called biomolecules or biological molecules. They include carbohydrates, lipids, proteins and nucleic acids (DNA and RNA).

3. What is location of carbohydrates in the cell?
Ans. The location of carbohydrates in the cell are cytoplasm and cell membrane.

4. Explain main functions of carbohydrates.
Ans.
- Carbohydrates act as source of energy.
- They also act as energy storage molecules.

5. Enlist main functions of proteins.
Ans. Main functions of Proteins:
- Many proteins act as enzymes.
- Some hormones are proteins.
- Make membranes and many other structures in cell.
- Control cellular traffic.

6. What is the percentage of biomolecules in the dry mass of protoplasm?

Ans. Protein is 50% nucleic acids is 18%, carbohydrate is 15% and lipids is 10% of the dry mass of protoplasm.

7. Define metabolism.

Ans. **Metabolism:** All the chemical reactions that occur in an organism are collectively called metabolism.

8. Differentiate between anabolism and catabolism.

Ans. **Anabolism:** It is the type of metabolism in which simpler substances are combined to form complex substances. Energy is used in anabolism.

Catabolism: It is the type of metabolism in which complex molecules are broken down into simpler ones. Energy is released in catabolism.

9. What are carbohydrates?

Ans. Carbohydrates are the organic compounds in which the ratio of H and O is 2:1 (same as in water). They are also known as saccharides (meaning sugar). They have general formula $Cn(H_2O)_n$ where n is the number of carbon atoms.

10. What are characteristics of monosaccharides?

Ans.
- Monosaccharides (simple sugars) are made of single sugar molecule.
- They are easily soluble in water.
- They have sweet taste.

11. How many carbon atoms do monosaccharides have?

Ans. Monosaccharides may have 3 to 7 carbon atoms.

12. What are characteristics of disaccharides?

Ans.
- They are less soluble in water.
- They are less sweet in taste.

6.3 + 6.4 Proteins + Lipids

1. Which is the most abundant biomolecules in the cell?

Ans. Proteins are the most abundant biomolecules in the cells.

2. How many amino acids does haemoglobin have?

Ans. Haemoglobin has 574 amino acids.

3. What are essential amino acids?

Ans. These are the 09 amino acids which cannot be synthesized by our body and are supplied by foods.

4. What is an amino acid?

Ans. An amino acid is an organic molecule made of an amino group (NH_2), a carboxyl group (COOH), a hydrogen group (H) and a side group (R) which are attached to a central carbon atom.

5. What are sources of protein?

Ans. Sources of protein include meat (mutton, beef, chicken), fish, eggs, milk, pulses and beans.

6. What is fibrin?

Ans. Fibrin is a blood clotting protein that makes blood clot to prevent the loss of blood after an injury.

7. What are actin and myosin?

Ans. Actin and myosin proteins are the main components of muscle cells. They are responsible for muscular contractions.

8. What are antibodies?

Ans. Antibodies are proteins that are part of our immune system. They defend the body against harmful pathogens.

9. What are lipids?

Ans. Lipids are organic compounds that are insoluble in water but are soluble in organic solvents (e.g: alcohol, ether, benzene).

10. What are lipids composed of?

Ans. Lipids are composed of glycerol and fatty acids.

11. Differentiate between saturated fatty acids and unsaturated fatty acids.

Ans. **Saturated fatty acids:** Saturated fatty acids do not have double bonds between carbon atoms. They are solid at room temperature.

Unsaturated fatty acids: Unsaturated fatty acids have one or more double bonds between carbon atoms. They are liquid at room temperature.

12. What are phospholipids?

Ans. Phospholipids are lipids make the core of all membranes. A phospholipid molecule consists of one glycerol, two fatty acids and a phosphate group.

13. Which are the most energy rich biomolecules?

Ans. Lipids are the most energy rich biomolecules.

6.5 + 6.6 Nucleic Acids + The Working of DNA and RNA

1. What are nucleic acids?

Ans. Nucleic acids are the biomolecules that are composed of units called nucleotides.

2. What a nucleotide is made up of?

Ans. A nucleotide is made up of three components:

- Pentose sugar (ribose or deoxyribose)
- Nitrogenous base
- Phosphate group (PO_4)

3. What DNA is made of?

Ans. DNA is made of deoxyribonucleotide. In this nucleotide, the pentose sugar is deoxyribose while the nitrogenous base may be adenine (A), thymine (T), cytosine (C) or guanine (G).

4. Who proposed the double helix model of DNA?

Ans. James Watson and Frincis Crick proposed the double helix model of DNA.

5. When did James Watson and Francise Crick receive Nobel prize for the discovery of the double helix structure of DNA?

Ans. In 1962, James Watson and Francis Crick received Nobel prize for the discovery of the double helix structure of DNA.

6. Define gene.

Ans. The segment of DNA in which the sequence of nucleotides determines the synthesis of a protein is called a gene.

7. What is RNA?

Ans. Ribonucleic acid (RNA) is single stranded nucleic acid. Its strand consists of ribonucleotides. A ribonucleotide contains ribose sugar instead of deoxyribose. In a ribonucleotide, the nitrogenous base may be adenine (A), Uracil (U), Cytosine (C) or guanine (G).

8. How many types of RNA are there? Name them.

Ans. There are three types of RNA:

- Messenger RNA (mRNA)
- Transfer RNA (tRNA)
- Ribosomal RNA (rRNA)

9. What is the function of transfer RNA?

Ans. Transfer RNA transfers specific amino acids to the ribosomes, ensuring the correct sequence during protein synthesis.

10. What is transcription?

Ans. During the working of a gene, the specific sequence of DNA nucleotides is copied in the form of messenger RNA (mRNA). This process is called transcription.

11. What is translation?

Ans. The mRNA carries the sequence of its nucleotides to the ribosome. The ribosome reads this sequence and joins specific amino acids, according to it, to form protein. This step is called translation.

Exercise (Short Answer Questions)

B. Write short answers.

1. What are the main functions of carbohydrates in the body?

Ans. Functions of Carbohydrates:

- Carbohydrates are the primary source of energy. Glucose is used by cells to produce energy through cellular respiration.
- Dietary fibre contains undigestible carbohydrates e.g., cellulose. It helps to maintain the proper bowel movements.

2. How do the three group of carbohydrates differ in taste?

Ans. Monosaccharides (simple sugars) is a group of carbohydrate that has sweet taste. Disaccharides is a group of carbohydrate that has less sweet in taste. While polysaccharides is a group of carbohydrate that is tasteless.

3. Name two common monosaccharides and two disaccharides.

Ans. Two common monosaccharides include Ribose and Glucose. Two common disaccharides include Sucrose and Maltose.

4. Which monosaccharides make a sucrose molecule?

Ans. Sucrose (table sugar) is made of two monosaccharides i.e.; glucose and fructose.

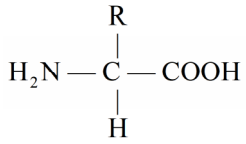
5. Give an example of a storage polysaccharide in plants.

Ans. Starch is a storage polysaccharide found in plants. It is composed of glucose units.

6. Define amino acid and draw its structure.

Ans. Amino acid: Amino acids are the organic molecules that join in specific number and sequence to make proteins.

Structure of Amino acid:

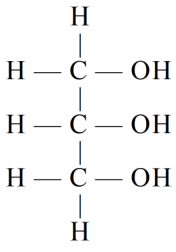


7. What are the basic components of lipids? Draw their structures.

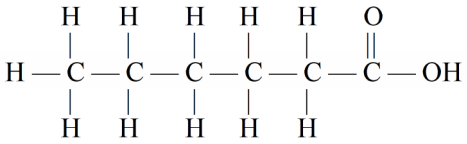
Ans. Basic components of Lipids:

Lipids are organic compounds that are insoluble in water but are soluble in organic solvents (e.g.; alcohol, ether, benzene). They are composed of glycerol and fatty acids.

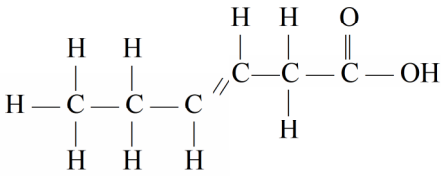
Structure of Basic components of Lipids:



Glycerol



Saturated fatty acid



Unsaturated fatty acid

8. What are the types of RNA? Write their functions.

Ans. Types of RNA: There are three types of RNA:

- Messenger RNA (mRNA)
- Transfer RNA (tRNA)
- Ribosomal RNA (rRNA)

Functions of Messenger RNA (mRNA):

Carries the genetic information from DNA to the ribosomes during protein synthesis.

Functions of Transfer RNA (tRNA):

Transfer specific amino acids to the ribosomes, ensuring the correct sequence during protein synthesis.

Functions of Ribosomal RNA (rRNA):

Constitutes the structural and functional components of ribosomes, the cellular machinery for protein synthesis.

9. Briefly describe the function of DNA.

Ans. Function of DNA: DNA carries the heredity information to the next generation.

Exercise (Essay Type Questions)

C. Write answers in detail.

1. **Write a comprehensive note on the structures and roles of the three classes of carbohydrates.**
2. **Discuss the functions of proteins.**
3. **What are fatty acids? Explain their types.**
4. **Describe the basic structure of fats and oils. Explain how lipids play role in energy storage.**
5. **Explain the double helix structure of DNA, and discuss the base pairing in this structure.**
6. **Explain how the information in DNA is converted to information on RNA and then to proteins.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 06 **BIOLOGY** CHAPTER WISE

Roll No.(in figures): ..... **(in words):** .....

Chapter:06 **Marks: 12**

Biomolecules **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Qeustions: **12**

1. What percentage of the dry mass of protoplasm is compose of biomolecules?

(A) 50% (B) 93% (C) 70% (D) 99%

2. Percentage of carbohydrates in the dry mass of protoplasm is:

(A) 18% (B) 15% (C) 10% (D) 50%

3. In which reactions energy is used?

(A) Catabolism (B) Metabolism (C) Anabolism (D) Homeostasis

4. What is the general formula used for carbohydrates?

(A) $(C_2HO)_n$ (B) $(CH_2O)_{n2}$ (C) $(CHO)_n$ (D) $Cn(H_2O)_n$

5. How many carbon atoms are present in hexoses?

(A) 5 (B) 8 (C) 7 (D) 6

6. Which of the following disaccharides is composed of two glucose molecules?

(A) Sucrose (B) Lactose (C) Maltose (D) Starch

7. Which of the following types of bond is responsible for the primary structure of a protein?

(A) Hydrogen bond (B) Ionic bond (C) Peptide bond (D) Disulfide bond

8. How many amino acid are present in insulin protein?

(A) 51 (B) 72 (C) 332 (D) 574

9. The core of all the membranes are formed by:

(A) Fats (B) Oils (C) Phospholipids (D) Amino acids

10. What is the shape of the DNA?

(A) Linear (B) Circular (C) Helical (D) Branched

11. What is the process by which genetic information is copied from DNA to RNA?

(A) Transcription (B) Translation (C) Replication (D) Mutation

12. What is the primary function of carbohydrates?

(A) Provide energy (B) Act as enzymes

(C) Regulate processes (D) Make membranes

Roll No.(in figures): ..... (in words): .....

Chapter:06 **SUBJECTIVE TYPE** Marks: 48

Biomolecules **(PART - I)** Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) How catabolism is different from anabolism?

(ii) What is meant by metabolism? Write the name of its types.

(iii) How do the three groups of carbohydrates differ in taste?

(iv) Which monosaccharides make a sucrose molecule?

(v) Which are the most abundant carbohydrate define it.

(vi) Write about the polysaccharides stored in plants and animals.

(vii) From which sources disaccharides are obtained?

(viii) Compare essential and non-essential amino acids.

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) How glycine is different from alanine?

(ii) Discuss about the sources of proteins.

(iii) How would you differentiate between saturated fatty acid and unsaturated fatty acids?

(iv) Draw the general structure of phospholipids.

(v) In which ways oils are different from fats?

(vi) Write the sources of lipids obtained from plants and animals.

(vii) Write the use of lipids as an insulator.

(viii) What are the base pairing rules in DNA according to Watson Crick model?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Why did the G-C base pair more stable than A-T?

(ii) How does DNA passes genetic traits to offsprings?

(iii) Give comparison between DNA and RNA.

(iv) What are the types of RNA? Write their functions.

(v) How proteins are formed?

(vi) Discuss the process of transcription.

(vii) What do you known about the concept of central dogma?

(viii) Why vitamins are not considered as food components.

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Define the following terms biomolecules, Biochemistry, fatty acids and Molecular biology. 4

(b) Write percentage of biomolecules in dry mass of protoplasm. 5

Q6. (a) What is meant by metabolisms? Describe its types. 4

(b) What are different sources and functions of carbohydrates? 5

Q7. (a) What are proteins? Describe its structure. 4

(b) Write a note on lipids. 5

Chapter 06: Biomolecules	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. Which of the following is not a macromolecule?

(A) Carbohydrates (B) Proteins (C) Lipids (D) Water

2. The carbohydrates are the organic compounds in which the ratio of H and O is:

(A) 2:1 (B) 1:2 (C) 1:1 (D) 2:2

3. Which class of carbohydrate is less soluble in water and less sweet in taste?

(A) Monosaccharides (B) Polysaccharides (C) Disaccharides (D) Trisaccharides

4. Which of the following is a type of polysaccharide found in plant cell wall?

(A) Chitin (B) Starch (C) Glycogen (D) Cellulose

5. Pentoses are the essential parts of:

(A) Proteins (B) RNA (C) Lipids (D) RNA and DNA

6. Which of the following is the most abundant biomolecules in cell?

(A) Carbohydrates (B) Proteins (C) Lipids (D) Nucleic acid

7. The R-group for alanine is:

(A) H (B) CH_2 (C) CHO (D) CH_3

8. Actin and myosin proteins are responsible for:

(A) Regulate processes in body (B) Transports oxygen

(C) Muscular contraction (D) Protection from pathogens

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) What are the main functions of carbohydrates in the body?

(ii) Name two common monosaccharides and two disaccharides.

(iii) Give an example of a storage polysaccharide in plants.

(iv) Define amino acid and draw its structure.

(v) What are the types of RNA? Write their functions.

(vi) Briefly describe the function of DNA.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Write a comprehensive note on the structures and roles of the three classes of carbohydrates.

Chapter 06: Biomolecules	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. What is the main components of cell membrane?

(A) Carbohydrates (B) Protein (C) Lipid (D) Nucleic acid

2. Which of the following is the basic structural unit of most lipids?

(A) Amino Acids (B) Fatty acids and glycerol

(C) Nucleotides (D) Simple sugars

3. Watson and Crick received Nobel prize for the discovery of:

(A) Proteins (B) Nucleic acids (C) Lipids (D) DNA

4. When Watson and Crick proposed the double helix of DNA?

(A) 1963 (B) 1973 (C) 1953 (D) 1962

5. What is true about cellulose?

(A) It is sweet in taste. (B) It is digestible by human digestive system.

(C) It provides structural support in plants. (D) It is soluble in water.

6. Which type of RNA is responsible for carries genetic information from DNA to ribosomes?

(A) mRNA (B) tRNA (C) rRNA (D) None of these

7. The process of building a protein from a sequence of amino acids called:

(A) Transcription (B) Translation (C) Replication (D) Mutation

8. Specific segments of the DNA called:

(A) Allele (B) Gene (C) Genotype (D) Phenotype

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) How many carbon atoms in monosacharides?

(ii) Write characteristics of diasacharides?

(iii) How lipids work as insulator?

(iv) What is gene?

(v) What is biochemistry?

(vi) Define translation.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Explain the double helix structure of DNA, and discuss the base pairing in this structure.

Chapter 07

Enzymes

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

7.1 + 7.2 Metabolism + Enzymes

1. The sum of all chemical reactions that occur within an organisms is called:
(A) Metabolism (B) Catabolism (C) Anabolism (D) Mutualism

2. Which of the following bird have high metabolic rate?
(A) Sparrows (B) Humming birds (C) Hawks (D) Eagles

3. Energy is consumed in a process called:
(A) Catabolism (B) Anabolism (C) Commenalism (D) Metabolism

4. Photosynthesis is the convection of which compounds:
(A) Oxygen and glucose (B) Oxygen and carbon
(C) Carbon dioxide and water (D) Water amd oxygen

5. In metabolism which compounds acts as a catalyst:
(A) Enzymes (B) Proteins (C) Vitamins (D) Lipids

6. How do enzymes speed up chemical reaction?
(A) By increasing activation (B) By decreasing activation energy
(C) By changing the products (D) By increasing temperature

7. Typically enzymes contains amino acids:
(A) 50-1000 (B) 200-1000 (C) 100-1000 (D) 300-3000

8. Ribozymes are found in:
(A) Lysosomes (B) Mitochondria (C) Plastids (D) Ribosomes

9. The non-protein molecules of the enzymes are:
(A) Co-factors (B) Co-enzymes (C) Apoenzymes (D) Active site

10. When organic co-factors are tightly bound to enzymes, they are called:
(A) Co-enzyme (B) Co-factors (C) Apo enzyme (D) Prosthetic group

11. Biotin is the example of:
(A) Apoenzymes (B) Cofactors (C) Coenzymes (D) Prosthetic group

12. Which enzyme is used as biological detergent?
(A) Pepsin (B) Protease (C) Glycogen (D) Trypsin

13. What is the primary function of enzymes in fermentation?
(A) To break down proteins (B) To synthesize fats
(C) To convert sugars into energy (D) To degrade nucliec acid

Answers
1. Metabolism **2.** Humming birds **3.** Anabolism
4. Carbon dioxide and water **5.** Enzymes **6.** By decreasing activation energy
7. 100-1000 **8.** Ribosomes **9.** Co-factors **10.** Prosthetic group
11. Prosthetic group **12.** Protease **13.** To convert sugars into energy

7.3 Mechanism of Enzyme Action

1. One or more packets or clefts on the surface of enzyme is called:
(A) Substate (B) Active site (C) Cofactors (D) Coenzyme

2. When lock and key model was proposed?
(A) 1894 (B) 1898 (C) 1896 (D) 1987

3. Emil fischer was:
(A) American chemist (B) German chemist (C) British chemist (D) Egyptian chemist

4. Who proposed induced fit model?
(A) Emil Fischer (B) Danial Koshland (C) Ibn-e-Nafees (D) Jabir Bin Hayan

5. According to induced fit model active site is:

(A) Rigid (B) Flexible (C) Soft (D) Hard

Answers

1. Active site **2.** 1894 **3.** German chemist
4. Danial Koshland **5.** Flexible

7.4 Factors that affect the activity of enzymes

1. The optimum temperature for the human enzymes is:

(A) 36 °C (B) 37°C (C) 42 °C (D) 39 °C

2. What happens if the temperature is raised well above the optimum temperature?

(A) Inactivation (B) Renaturation
(C) Denaturation (D) Rate of reaction reduced

3. Trypsin enzyme works in:

(A) Large Intestine (B) Small intestine (C) Stomach (D) Heart

4. pH for the maximum working of pepsin enzyme.

(A) 1-1.5 (B) 1.5-2 (C) 2-2.5 (D) 0.5-1

Answers

1. 37°C **2.** Denaturation **3.** Small intestine **4.** 1.5-2

7.5 Enzyme Inhibition

1. The substrates which reduces enzyme activity are called:

(A) Regulators (B) Inhibitors (C) Promoters (D) Catalysts

2. What type of inhibition occurs when an inhibitor competes with the substrate for in the active site of enzyme?

(A) Competitive inhibition (B) Non-competitive inhibition
(C) Allosteric inhibition (D) Substrate

3. How does competitive inhibitor affect enzyme action?

(A) Attaches with substrate (B) Changes the enzyme shape
(C) Attaches and blocks the active site (D) Blocks the cofactors

Answers

1. Inhibitors **2.** Competitive inhibition
3. Attaches and blocks the active site

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. Primarily all enzymes are;

a) Nucleic acids b) Proteins c) Carbohydrates d) Lipids

2. Which best defines an enzyme?

a) A chemical that breaks down food. b) A hormone that regulates metabolism.
c) A protein that speeds up reactions. d) A molecule that stores energy.

3. What can happen if an enzyme is exposed to temperature that is higher than its optimal temperature?

a) Enzyme activity rate will increase.
b) Enzyme's shape will change, potentially reducing its activity.
c) Enzyme will speed up the reaction and remain stable.
d) Enzyme will become a substrate itself.

4. Enzymes are specific in their action because:

a) Their active sites fit specific substrates.
b) They are always proteins.
c) They are consumed in reactions.
d) They work only at high temperatures.

5. Prosthetic groups are;

a) Required by all enzymes. b) Proteins in nature.
c) Loosely attached with enzymes. d) Tightly bound to enzyme.

6. How does increasing temperature affect enzyme activity?

a) Increases activity to a point b) Always decreases activity
c) Makes enzymes non-functional d) No effect on enzyme

7. How does competitive inhibitor affect enzyme action?

a) Attaches with the substrate. b) Changes enzyme shape.
c) Attaches and blocks the active site. d) Blocks the cofactors.

8. An enzyme works best at a pH of 7.4. It is placed in an acidic solution with a pH of 4.0. How will this affect the enzyme?

a) The active site will be modified, reducing substrate binding.
b) The enzyme will catalyse reactions faster due to increased H ions.
c) The enzyme will gain additional active sites.
d) The substrate will become inactive in an acidic environment.

9. What is true according to the induced fit model of enzyme action?

a) Enzyme's active site changes shape to bind the substrate.
b) Substrate changes shape to bind to active site.
c) No shape changes occur in active site or substrate
d) Substrate attaches the enzyme at a site other that active site.

10. What is true about the optimum pH values of the following enzymes of digestive system?

a) Pepsin works at low pH while trypsin works at high pH
b) Both work at high pH
c) Both work at low pH
d) Pepsin works at high pH while trypsin works at low pH

Answers

1.	(b)	**2.**	(c)	**3.**	(b)	**4.**	(a)	**5.**	(d)
6.	(a)	**7.**	(c)	**8.**	(a)	**9.**	(a)	**10.**	(a)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

7.1 + 7.2 + 7.3 Metabolism + Enzymes + Mechanism of Enzyme Action

1. What is metabolism?

Ans. Metabolism is the sum of all chemical reactions that occur within an organism to sustain life.

2. What are enzymes?

Ans. Enzymes:

Enzymes are proteins that speed up chemical reactions in living organisms without being consumed in the process.

3. What is anabolism? Give two examples.

Ans. Anabolism:

It is a type of metabolism that involves building up complex molecules from simpler ones, Consuming energy.

Examples:

- Photosynthesis
- Protein Synthesis

4. Differentiate between intracellular enzymes and extracellular enzymes.

Ans. Intracellar enzymes:

Intracellar enzymes operate within cells.

Example: Enzymes of cellular respiration.

Extra cellular enzymes are secreted outside the cell to catelyzl reactions. e.g, enzymes secreted by cells of stomach walls into stomach cavity for digestion food.

5. What are cofactors?

Ans. Cofactors:

Cofactors are the non-protein molecules that are required by enzymes to be fully active.

6. What are prosthetic groups? Give examples.

Ans. Prosthetic groups:

These are the organic cofactors which are tightly bind with the enzymes.

Examples: Certain Vitamins (e.g; biotin) and the haem group.

7. What is Lipolysis?

Ans. Lipolysis:

It is the breakdown of lipids (fats) into fatty acids and glycerol, which can be used for energy production.

8. What are uses of enzymes in food industry?

Ans. Use of enzymes in food industry:

- Enzymes that break starch into simple sugars are used in production of white bread, buns, and rolls.
- Enzymes are also used for the production of cheese.

9. Which enzymes are used for the removal of protein stains from clothes?

Ans. Protease enzymes are used for the removal of protein stains from clothes

10. Discuss use of enzymes in fermentation industry.

Ans. Use of enzymes in fermentation industry:

Enzymes degrade starch and proteins to produce simple sugars, amino acids and peptides that are used by yeast for fermentation.

11. What two models have been proposed to explain the mechanism of enzyme action?

Ans. Following two models have been proposed to explain the mechanism of enzyme action.

- Lock and key model of enzyme action
- Induced fit model

12. Who proposed Lock and key model of enzyme action?

Ans. A German chemist, Emil Fischer proposed the Lock and Key model of enzyme action in 1894.

13. Differentiate between substrates and products.

Ans. Substrates: The molecules at which enzymes act are called substrates.

Products: The molecules which are formed as the result of enzymatic reaction. are called products.

14. Who proposed Induced Fit model of enzyme action?

Ans. An American biologist. Daniel Koshland in 1958 proposed Induced Fit model of enzyme action.

7.4 + 7.5 Factors that Affect the Activity of Enzymes + Enzyme Inhibition

1. Which factors do affect the activity of enzymes?

Ans. The activity of an enzyme is affected. by the following factors.

- Temperature
- pH
- Substrate concentration

2. What is the optimum temperature for most of the human enzymes?

Ans. The optimum temperature for most of the human enzymes is 37°C.

3. Define the term optimum pH.

Ans. Optimum pH:

Enzymes show maximum activity at a specific pH, it is called their optimum pH.

4. What is the affect of increase in substrate concentration on the rate of reaction?

Ans. An increase in substrate concentration increases the rate of reaction.

5. What is enzyme Inhibition?

Ans. Enzyme Inhibition:

The process in which enzyme inhibitors, bind to enzyme and decrease its activity.

Exercise (Short Answer Questions)

B. Write short answers.

1. Define metabolism. Differentiate between catabolism and anabolism.

Ans. **Metabolism:** Metabolism is the sum of all chemical reactions that occur, within an organism to sustain life.

Difference between catabolism and anabolism:

Catabolism: Catabolism involves the breakdown of complex molecules into simpler ones, releasing energy in the process. For example, cellular respiration.

Anabolism: Anabolism involves building up complex molecules from simpler ones. This process consumes energy. For example cellular respiration.

2. Which type of metabolism demands input of energy? Give an example.

Ans. Anabolism is the type of metabolism that demands input of energy.

For example: Photosynthesis i.e. conversion of carbon dioxide and water into glucose and oxygen using sunlight.

3. Define an enzyme. What is its role in metabolism?

Ans. **Enzyme:** Enzymes are proteins that catalyze (i.e. speed up) biochemical reactions.

Role of enzyme in metabolism: Enzyme helps in speed up metabolism. For example, lipolysis. It breaks down lipids (fats) into fatty acids and glycerol, which can be used for energy production.

4. What is the active site of enzyme? State its importance in enzyme specificity.

Ans. **Active site of enzyme:** The catalytic region of enzyme molecule is known as active site of enzyme.

Importance of active site in enzyme specificity: The active site of an enzyme is important for enzyme specificity because it is the part of the enzyme that binds to a specific substrate and catalyzes a chemical reactions.

5. Provide an example of a specific enzyme-substrate pair.

Ans. **Example of a specific enzyme substrate pair:**

- Lipase helps our body to digest fats.
- Amylase breaks down starch.
- Trypsin converts proteins into amino acids.

6. What is the effect of substrate concentration on enzyme activity?

Ans. **Substrate Concentration:** An increase in substrate concentration increases the rate of reaction. At high substrate concentration, all active sites of the enzymes are occupied. In this condition, any more substrate molecules do not find free active sites. This state is called saturation of active sites and reaction rate does not increase.

7. Provide two examples of enzymes that operate optimally at specific pH.

Ans. Following are the examples of enzymes that operate optimally at specific pH.

- **Pepsin:** Breaks down proteins in the stomach with an optimum pH of around 2.
- **Amylase:** Breaks down carbohydrates in the mouth, with an optimum pH of around 7.

8. What do you mean by optimum temperature and pH?

Ans. **Optimum temperature:** It is a specific temperature at which each enzyme works at maximum rate. The optimum temperature for most of the human enzyme is 37°C.

Optimum pH: It is a specific pH at which each enzyme shows maximum activity. The optimum pH for pepsin is 1.5 to 2.0

9. Which type of enzyme inhibitors inhibit the enzymes without attaching to the active site?

Ans. Non-competitive enzyme inhibitors do no attach to the active site of enzyme. Rather, they attach

to some other location of enzyme. This attachment changes the overall shape of enzyme and also the shape of active site. So, this changed active site does not fit substrate and enzyme is inhibited.

10. Differentiate between competitive and non-competitive inhibition.

Ans. Competitive Inhibition: Some inhibitors resemble the enzyme's substrate. They compete with the substrate to attach to the active site of enzyme. When the inhibitor is attached to the active site, it blocks it and does not allow the substrate to attach.

Non-Competitive inhibition: Some enzyme inhibitors do not have similarity to the substrate. They do not attach to the active site of enzyme. Rather, they attach to some other location of enzyme. This attachment changes the overall shape of enzyme and also the shape of active site. So, this changed active site does not fit substrate and enzyme is inhibited.

Exercise (Essay Type Questions)

1. **Describe the characteristics of enzymes.**
2. **Describe how temperature extremes can inhibit enzyme activity and lead to enzyme denaturation.**
3. **How does pH affect enzyme activity?**
4. **Briefly describe the factors that affect the activity of enzymes.**
5. **Compare the Lock-and-Key and Induced Fit models of enzyme action.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 07 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... **(in words):** .....

Chapter: 07 **Marks: 12**

Enzymes **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. Lipolysis is the breakdown of:
(A) Fats (B) Proteins (C) Lipids (D) Carbohydrates

2. The unique property of enzymes is that they are:
(A) Reactive (B) Specific (C) Non-specific (D) distinct

3. The specific region of an enzymes where the substrate binds is called:
(A) Active site (B) Allosteric site (C) Catalytic site (D) Binding site

4. Which of the following is an example of an extracellular enzyme?
(A) DNA polymerase (B) Amylase (C) Apoenzyme (D) Catalyse

5. RNA molecules which acts as enzymes are called:
(A) Pepsin (B) Trypsin (C) Coenzyme (D) Ribozyme

6. Which enzyme is used as dish washing:
(A) Trypsin (B) Coenzyme (C) Pepsin (D) Amylase

7. Who proposed the lock and key model?
(A) Emil Fisher (B) Daniel Kashland (C) William (D) Calvin

8. When was induced fit model presented?
(A) 1956 (B) 1958 (C) 1957 (D) 1959

9. When temperature increases the rate of enzyme:
(A) Decreases (B) Remain same (C) Increases (D) become double

10. In which medium trypsin enzyme works?
(A) Acidic (B) Alkaline (C) Neutral (D) Slightly basic

11. Pepsin enzyme works in:
(A) Small intestine (B) Stomach (C) Heart (D) Kidney

12. Which type of the enzyme inhibition changes the shape of enzyme and its active site?
(A) Competitive (B) Non-competitive (C) Allosteric inhibitors (D) Allosteric activators

Roll No.(in figures): ..... (in words): .....

Chapter: 07

Enzymes

SUBJECTIVE TYPE
(PART - I)

Marks: 48

Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Why do humming birds have high metabolic rates?

(ii) What do you mean by optimum temperature and pH?

(iii) How would you define the term "enzyme"?

(iv) Write about the structure of enzymes.

(v) How can you point out about extra cellular and intracellular enzymes?

(vi) How the prosthetic group differ from co-enzyme?

(vii) Name the two main groups of cofactors.

(viii) How enzymes are used in paper industry?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What are the uses of protease and amylase enzymes?

(ii) Why enzymes degrade starch and proteins?

(iii) Define Active site.

(iv) What is meant by enzyme-substrate complex?

(v) Why induced fit model is more acceptable than lock and key model?

(vi) What do you mean by De-naturation of enzyme?

(vii) How does high temperature affect enzymes?

(viii) Write the optimum pH for pepsin and trypsin.

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) How does substrate concentration affect reaction rate?

(ii) Name the factors that affect the activity of enzymes.

(iii) What is saturation of active sites?

(iv) What is meant by inhibitors?

(v) Differentiate between inhibitors and activators.

(vi) How non-competitive inhibition occurs?

(vii) Discuss competitive inhibition.

(viii) Write down the examples of competitive inhibitors and non-competitive inhibitors.

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Write a note on metabolism. **4**

(b) Describe the characteristics of enzymes. **5**

Q6. (a) Write uses of enzsymes in different industries. **4**

(b) Explain lock and key and induce fit model of enzyme action. **5**

Q7. (a) Describe factors that affect enzyme activity. **4**

(b) Write note on enzyme inhibition. **5**

Chapter 07: Enzymes	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. Which of the following bird have high metabolic rate?

(A) Sparrows (B) Humming birds (C) Hawks (D) Eagles

2. Energy is consumed in a process called:

(A) Catabolism (B) Anabolism (C) Commenalism (D) Metabolism

3. In metabolism which compounds acts as a catalyst:

(A) Enzymes (B) Proteins (C) Vitamins (D) Lipids

4. Typically enzymes contains amino acids:

(A) 50-1000 (B) 200-1000 (C) 100-1000 (D) 300-3000

5. The non-protein molecules of the enzymes are:

(A) Co-factors (B) Co-enzymes (C) Apoenzymes (D) Active site

6. Biotin is the example of:

(A) Apoenzymes (B) Cofactors (C) Coenzymes (D) Prosthetic group

7. Ribozymes are found in:

(A) Fungi (B) Plants (C) Animals (D) Viruses

8. What is the primary function of enzymes in fermentation?

(A) To break dwo proteins (B) To synthesize fats

(C) To convert sugars into energy (D) To degrade nucleic acid

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Define metabolism. Differentiate between catabolism and anabolism.

(ii) Define an enzyme. What is its role in metabolism?

(iii) What is the active site of enzyme? State its importance in enzyme specificity.

(iv) What is the effect of substrate concentration on enzyme activity?

(v) What do you mean by optimum temperature and pH?

(vi) Differentiate between competitive and non-competitive inhibition.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe how temperature extremes can inhibit enzyme activity and lead to enzyme denaturation.

Chapter 07: Enzymes	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. One or more packets or clefts on the surface of enzyme is called:

(A) Substate (B) Active site (C) Cofactors (D) Coenzyme

2. When lock and key model was proposed?

(A) 1894 (B) 1898 (C) 1896 (D) 1987

3. Who proposed induced fit model?

(A) Emil Fischer (B) Danial Koshland (C) Ibn-e-Nafees (D) Jabir Bin Hayan

4. The optimum temperature for the human enzymes is:

(A) 36 °C (B) 37 °C (C) 42 °C (D) 39 °C

5. Trypsin enzyme works in:

(A) Large Intestine (B) Small intestine (C) Stomach (D) Heart

6. Enzymes are chemically:

(A) Lipids (B) Proteins (C) Nucleic Acids (D) Hydro carbons

7. The substrates which reduces enzyme activity are called:

(A) Regulators (B) Inhibitors (C) Promoters (D) Catalysts

8. What type of inhibition occurs when an inhibitor competes with the substrate for in the active site of enzyme?

(A) Competitive inhibition (B) Non-competitive inhibition

(C) Allosteric inhibition (D) None of these

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Write uses of enzyme in food industry.

(ii) Define cofactor.

(iii) How enzymes different than hormones?

(iv) How enzymes are used as medicine?

(v) Who presented induced fit model?

(vi) Write name of any two enzymes.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe Lock-and-Key model of anzyme action.

Chapter 08

Bioenergetics

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

8.1 ATP: The Cell's Energy Currency

1. What is the primary source of energy?
(A) Plants (B) Animals (C) ATP (D) Sun

2. The lose of electron from atom is called:
(A) Reduction (B) Oxidation (C) Anabolism (D) Catabolism

3. The energy currency of all cells is:
(A) Glucose (B) AMP (C) ADP (D) ATP

4. ATP is an example of:
(A) Amino acid (B) Fatty acid (C) Nucleic acid (D) Nucleotide

5. Who discovered ATP?
(A) Fritz Lipmann (B) Kelvin (C) Karl Loman (D) None of these

6. How many sub-units combine to from ATP?
(A) 2 (B) 4 (C) 3 (D) 8

7. The breaking of one phosphate bond releases energy.
(A) 7.5 kcal (B) 7.8 kcal (C) 8.7 kcal (D) 7.3 kcal

8. Nitrogenous base of ATP molecule is:
(A) Adenine (B) Thyamine (C) Cytocine (D) Guanine

9. In ribose sugar number of carbon atoms is:
(A) 3 (B) 4 (C) 5 (D) 6

Answers **1.** Sun **2.** Oxidation **3.** ATP **4.** Nucleotide
5. Fritz Lipmann **6.** 3 **7.** 7.3 kcal **8.** Adenine **9.** 5

8.2 Photosynthesis

1. What is the by-product of photosynthesis?
(A) Oxygen and glucose (B) Carbon dioxide and water
(C) Chlorophyll and sunlight (D) ATP and NADPH

2. NAD is a:
(A) Cofactor (B) Coenzyme (C) Activator (D) Inhibitor

3. The products of light reactions are:
(A) Glucose (B) ATP and NADPH (C) Oxygen and water (D) Chlorophyll

4. What is the role of light in the light reaction?
(A) To provide energy (B) To convert CO_2 (C) To release oxygen (D) To absorb water

5. The ultimate electron acceptor in the light reaction:
(A) $NADP^+$ (B) ATP (C) H_2O (D) O_2

6. Dark reactions are also called as:
(A) Water cycle (B) Nitrogen cycle (C) Carbon cycle (D) Calvin cycle

7. What is the primary function of calvin cycle?
(A) To generate ATP and NADPH (B) To fix CO_2 into glucose
(C) To release oxygen (D) To absorb water

8. Pigments are the substances that absorbs:
(A) Infrared light (B) Visible light (C) UV-light (D) LED light

9. Light absorbed by the leaf surface. (A) 01 % (B) 03 % (C) 02 % (D) 04 %

10. Which light "absorbed by the chlorophyll-a?

(A) Red (B) Blue (C) Both (A) and (B) (D) None of these

Answers **1.** Oxygen and glucose **2.** Coenzyme **3.** ATP and NADPH
4. To provide energy **5.** $NADP^+$ **6.** Calvin cycle
7. To fix CO_2 into glucose **8.** Visible light **9.** 01 % **10.** Both (A) and (B)

8.3 Cellular Respiration

1. In cellular respiration food is oxidized to:

(A) O_2 (B) CO_2 (C) H_2 (D) H_2O

2. Through which process organisms get energy?

(A) Photosynthesis (B) Respiration (C) Transpiration (D) Evaporation

3. Cellular respiration occurring in the presence of oxygen is called:

(A) Anaerobic respiration (B) Fermentation
(C) Aerobic respiration (D) Glycolysis

4. In first phase of aerobic respiration one molecule of glucose is broken down in how many molecules of pyruvic acids.

(A) Two (B) Three (C) Five (D) Six

5. Necessary for aerobic respiration:

(A) Carbon dioxide (B) Oxygen (C) Water (D) Hydrogen

6. Conversion of pyruvic acid into ethyl alcohol is:

(A) Alcoholic fermentation (B) Lactic acid fermentation
(C) aerobic respiration (D) None of these

7. Each $FADH_2$ produces ATP.

(A) 2 (B) 4 (C) 6 (D) 8

8. In yeast cells, anaerobic respiration leads to the production of:

(A) Lactic acid (B) Ethanol (C) Acetic acid (D) Glucose

9. What was the primary energy-yielding process for early life forms on Earth?

(A) Aerobic respiration (B) Anaerobic respiration
(C) Photosynthesis (D) Chemosynthesis

10. Fermentation in bacteria is utilized in the production of:

(A) Bread and beer (B) Cheese and yogurt (C) Wine (D) All of the above

11. Which of the following is not a product of fermentation?

(A) Lactic acid (B) Ethanol (C) Carbon dioxide (D) Pyruvic acid

12. First step of cellular respiration is:

(A) Glycolysis (B) Krebs cycle (C) Electron transport chain (D) Fermentation

13. Process of glycolysis is found in:

(A) Ribosomes (B) Cytoplasm (C) Golgi complex (D) Vacuole

14. Which of the following is not a product of glycolysis?

(A) ATP (B) NADH (C) Pyruvate (D) Acetyl-CoA

15. Primary molecule that enters the kerbs cycle?

(A) Glucose (B) Pyruvate (C) Acetyl-CoA (D) Oxaloacetate

16. Number of ATP molecules produced directly by one turn of krebs cycle.

(A) 1 (B) 2 (C) 3 (D) 4

17. The final electron accepter in the electron transport chain is reduced to form:

(A) Water (B) Carbon dioxide (C) NADH (D) $FADH_2$

18. ATP is used in:

(A) Muscle Contraction (B) Active transport (C) Replication of DNA (D) All of the above

Answers

1. CO_2	**2.** Respiration	**3.** Aerobic respiration	**4.** Two	
5. Oxygen	**6.** Alcoholic fermentation	**7.** 2	**8.** Ethanol	
9. Anaerobic respiration	**10.** Cheese and yogurt		**11.** Pyruvic acid	
12. Glycolysis	**13.** Cytoplasm	**14.** Acetyl-CoA	**15.** Acetyl-CoA	**16.** 1
17. Water	**18.** All of the above			

Exercise (Multiple Choice Questions)

Select the correct answers for the following questions.

1. When we get energy from ATP, which bonds are broken?

a) P-P bonds b) C-H bonds c) C-N bonds d) C-O bonds

2. Light reactions of photosynthesis occur in;

a) Plasma membrane of cell b) Cytoplasm of cell
c) Stroma of chloroplasts d) Thylakoids of chloroplasts

3. Which type of chlorophyll is most common in plants?

a) Chlorophyll a b) Chlorophyll b c) Chlorophyll c d) Chlorophyll d

4. Which wavelengths of light are absorbed to maximum by chlorophylls?

a) Green and blue b) Green and red c) Red and blue d) Only green

5. When yeast ferments glucose, the products are;

a) Alcohol and CO_2 b) Alcohol and water
c) Lactic acid d) CO_2 and H_2O

6. Where do the dark reactions of photosynthesis occur?

a) Stroma of chloroplast b) Thylakoids of chloroplast
c) Outer membrane d) Cytoplasm

7. Which molecule donates electrons in the light-dependent reactions of photosynthesis?

a) NADPH b) Water c) Oxygen d) Carbon dioxide

8. Which process in aerobic respiration produces the more ATP?

a) Glycolysis b) Krebs cycle
c) Electron transport chain d) Fermentation

9. How many ATP molecules are the net profit from one glucose molecule during anaerobic respiration?

a) 2 b) 4 c) 12 d) 36

10. What is a common byproduct of anaerobic respiration in animal cells?

a) Oxygen b) Water c) Lactic acid d) Carbon dioxide

Answers

1. (a)	**2.** (d)	**3.** (a)	**4.** (c)	**5.** (a)
6. (a)	**7.** (b)	**8.** (c)	**9.** (a)	**10.** (c)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

8.1 ATP: The cell's Energy Currency

1. Why ATP is considered as a energy currency of a cell?

Ans. ATP is called the energy currency of the cell because it stores and releases energy through its high energy phosphate bonds, powering various cellular processes.

2. How much energy is released from one mole of ATP?

Ans. The breaking of one phosphate bond releases about 7.3 kcal per mole of ATP.

$ATP + H_2O \rightarrow ADP + Pi + energy\ (7.3\ kcal/mole)$

8.2 Photosynthesis

1. What is photosynthesis? Write its chemical equation.

Ans. Photosynthesis is the synthesis of glucose from carbon dioxide and water in the presence of sunlight (and chlorophyll), with oxygen as a by-product. All life depends on photosynthesis.
Chemical equation:
$6CO_2 + 12H_2O + \text{Photons} \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$

2. What products are produced during photosynthesis?

Ans. Glucose, oxygen and water are the products produced during photosynthesis.
$6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$

3. Write the summary of dark reactions.

Ans. **1.** CO_2 molecule combine with 5-carbon compounds to from 6-carbon compounds.
2. The 3-carbon compounds are reduced to 3-carbon carbohydrates by using ATP and hydrogen from NADPH. The 3-carbon carbohydrates are used to make glucose.

8.3 Cellular Respiration

1. Photosynthesis and respiration are opposite to each other. How?

Ans. Photosynthesis and respiration are opposite as:
i. Photosynthesis stores energy from sunlight in glucose, while respiration releases energy from glucose.
ii. Oxygen produced in Photosynthesis is consumed in respiration.

2. Compare aerobic and anaerobic respiration.

Ans. **Aerobic Respiration:**
- Cellular respiration occurring in the presence of oxygen is called aerobic respiration.
- Glucose is completely oxidized in it.
- More energy is produced.
- 36 ATPs.

Anaerobic Respiration:
- Cellular respiration that occurs in the absence of oxygen is called anaerobic respiration.
- Glucose is incompletely oxidized.
- Less energy is produced.
- 2 ATPs.

3. Name the main steps of aerobic respiration.

Ans. There are three main steps of aerobic respiration.
i. Glycolysis **ii.** Krebs cycle **iii.** Electron transport chain

4. Write the uses of ATP.

Ans. Respiratory energy (ATP) produced during cellular respiration is used in various ways:
i. Muscle contractions and movement.
ii. Replication of DNA and mitosis.
iii. Synthesis of biomolecules.

Exercise (Short Answer Questions)

Write short answers.

1. Write the importance of oxidation-reduction reactions.

Ans. Oxidation-reduction (redox) reactions are fundamental to the metabolism of organisms. In these reactions, electrons are transferred between molecules. In oxidation, molecule loses electrons and in reduction, it gains electrons. This electron flow is essential for generating energy in the form of ATP during processes like cellular respiration and photosynthesis.

2. What do ATP and ADP mean? What are the roles of these molecules for the cellular metabolism?

Ans. "ATP" means Adenosine triphosphate while "ADP" means Adenosine diphosphate.

Role of ATP and ADP for cellular metabolism:

ATP and ADP are molecules that work together to provide energy for cellular metabolism.

The main energy molecule in cells is ATP that stores energy. When cells need energy, they break ATP. ATP becomes ADP and releases energy.

ADP is low energy molecule. When cells have extra energy, they store this energy by combining ADP with Pi to form ATP.

So, we can summarize that ATP is made during energy releasing process and is broken down during energy consuming processes. In this way ATP transfers energy between metabolic reactions.

3. Write down the word equation for photosynthesis.

Ans. The word equation for photosynthesis is:

Carbon dioxide + Water + Light energy $\longrightarrow$ Glucose + Oxygen + Water

4. Why is chlorophyll important for photosynthesis?

Ans. Chlorophyll is the green pigment located in the chloroplasts that are the site for the photosynthesis. Chlorophyll-a absorbs light of blue and red wavelength and converts it to make high energy molecules (ATP and NADPH) that is used to make the food of the plants.

5. How is oxygen produced during photosynthesis?

Ans. During photosynthesis, sunlight absorbed by chlorophyll breaks water molecule. When hydrogen atoms give electrons to chlorophyll and becomes hydrogen ions, then oxygen is produced.

6. Which organisms carry out photosynthesis? Which cell organelle is responsible for the absorption of light for photosynthesis?

Ans. The organisms that carry out photosynthesis are plants, algae and some bacteria. Chloroplasts are the cell organelles that are responsible for the absorption of light for photosynthesis.

7. State the main purpose of cellular respiration?

Ans. The purpose of cellular respiration is to provide cells with the energy (ATP) they need to function.

8. State the equation (in words or symbols) for aerobic respiration.

Ans. $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + Energy$

Glucose + Water Carbon dioxide + Water + Energy

9. Write a brief note on the role of oxygen in aerobic respiration.

Ans. Oxygen is required for aerobic respiration. It is the end electron acceptor in the electron transport chain. It is necessary to maintain the flow of electrons and thus create the hydrogen ion gradient needed for ATP synthesis to function.

10. Define anaerobic and aerobic respiration.

Ans. **Aerobic Respiraiton:** Cellular respiration occurring in the presence of oxygen is called aerobic respiration.

Anaerobic Respiration: Cellular respiration that occurs in the absence of oxygen is called anaerobic respiration.

11. What are the end products of anaerobic respiration in animals and yeast?

Ans. **End products of anaerobic respiration in animals:** Lactic acid is an end product of aerobic respiration in animals.

End products of anaerobic respiration in Yeast: Ethyl alcohol and carbondioxide are the end product of anaerobic respiration in yeast.

12. How do muscles respond to oxygen deficiency during intense exercise?

Ans. During intense exercise, in the deficiency of oxygen, the skeletal muscles carry out anaerobic respiration to get energy.

13. List ways in which respiratory energy is used in the body.

Ans. Use of respiratory energy in the body:

Respiratory energy (ATP), produced during cellular respiration is used in various ways:

1. Muscle contractions and movement
2. Active transport of substances
3. Synthesis of biomolecules
4. Replication of DNA and mitosis
5. Transmission of nerve impulse

Exercise (Essay Type Questions)

1. **Explain ATP as a molecule that is the chief energy currency of all cells.**
2. **Outline the processes involved in photosynthesis?**
3. **Write a note on the intake of carbon dioxide and water by plants.**
4. **Explain the types and importance of anaerobic respiration.**
5. **Outline the mechanism of aerobic respiration.**
6. **Compare the processes of respiration and photosynthesis.**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 08 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter:08 **Marks: 12**

Bioenergetics

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. The study of energy transformation in living organisms is called:

(A) Phosphorylation (B) Fermentation (C) Bioenergetics (D) Metastasis

2. Number of Phosphate groups in ATP molecule is:

(A) 2 (B) 3 (C) 5 (D) 5

3. 7.3 kilo calories/mole energy is equal to:

(A) 73000 cal/mol (B) 73 cal/mol (C) 7300 cal/mol (D) 730 cal/mol

4. What is the primary function of photosynthesis?

(A) To release oxygen (B) To produce glucose (C) To absorb water (D) To release CO_2

5. In which part of chloroplast, light reactions of photosynthesis take place?

(A) Outer membrane (B) Inner membrane (C) Stoma (D) Thylakoid membrane

6. The main photosynthetic pigment is:

(A) Carotenoids (B) Chlorophyll-b (C) Chlorophyll-a (D) Chlorophyll-ab

7. Where do the dark reactions take place in a plant cell?

(A) Stroma (B) Thylakoids (C) Cytosal (D) Mitochondria

8. Number of carbon atoms in pyruvic acids is:

(A) 03 (B) 07 (C) 09 (D) 30

9. In which bonds of food are left unbroken in anaerobic process?

(A) P-P bonds (B) C-H bonds (C) C-N bonds (D) C-O bonds

10. Chemical Formula of ethyl alcohol:

(A) C_3H_8OH (B) CH_3OH (C) C_2H_5OH (D) D_{20}

11. Which of the following organisms still utilize anaerobic respiration today?

(A) Plants (B) Animals

(C) Some bacteria and fungi (D) All of the above

12. Where does the krebs cycle take place in eukaryotic cells?

(A) Cytoplasm (B) Mitochondria

(C) Endoplasmic reticulum (D) Golgi apparatus

Roll No.(in figures): ..... (in words): .....

Chapter:08

Bioenergetics

SUBJECTIVE TYPE
(PART - I)

Marks: 48

Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by bioenergetics?

(ii) What is the difference between oxidation and reduction?

(iii) Describe the molecular structure of ATP.

(iv) Write the function of ATP in a cell.

(v) Write the contributions of Firtz Lipmann regarding ATP.

(vi) What is the key pigment involved in light absorption?

(vii) What are the products of light reactions?

(viii) What do you know about NAD?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Discuss about dark reactions.

(ii) What is the role of accessory pigments.

(iii) Define cellular respiration.

(iv) Write the process of aerobic respiration.

(v) Define fermentation. Name its two types.

(vi) What is meant by lactic acid fermentation?

(vii) How many ATPs are produced during aerobic and anaerobic respiration?

(viii) What is meant by anaerobes?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write uses of fermentation in bacteria and yeast.

(ii) What is glycolysis and where it occurs?

(iii) What are the end product of anaerobic respiration in animals and yeasts?

(iv) How do muscles respond to oxygen deficiency during intense exercise?

(v) Write the summary of krebs cycle?

(vi) Which compound enters into kerb's cycle?

(vii) Describe the role of electron transport chain during cellular respiration.

(viii) Write about the site and time of occurance of photosynthesis and respiration.

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) What do you know about Bioenergetics. 4

(b) Describe the importance of oxidation reduction reactions. 5

Q6. (a) Explain ATP as a molecule that is the chief energy currency of all cells. 4

(b) Outline the processes involved in Photosynthesis. 5

Q7. (a) What is cellular respiration? Explain its types. 4

(b) Describe Importance of Fermentation (Anaerobic Respiration). 5

Chapter 08: Bioenergetics	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. The lose of electron from atom is called:

(A) Reduction (B) Oxidation (C) Anabolism (D) Catabolism

2. ATP is an example of:

(A) Amino acid (B) Fatty acid (C) Nucleic acid (D) Nucleatide

3. Who discovered ATP?

(A) Fritz Lipman (B) Kelvin (C) Karl Loman (D) None of these

4. The breaking of one phosphate bond releases energy.

(A) 7.5 kcal (B) 7.8 kcal (C) 8.7 kcal (D) 7.3 kcal

5. NAD is a:

(A) Cofactor (B) Coenzyme (C) Activator (D) Inhibitor

6. What is the role of light in the light reaction?

(A) To provide energy (B) To convert CO_2 (C) To release oxygen (D) To absorb water

7. Dark reactions are also called as:

(A) Water cycle (B) Nitrogen cycle (C) Carbon cycle (D) Calvin cycle

8. Light absorbed by the leaf surface.

(A) 01 % (B) 03 % (C) 02 % (D) 04 %

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Why ATP is considered as a energy currency of a cell?

(ii) What is photosynthesis? Write its chemical equation.

(iii) What products are produced during photosynthesis?

(iv) Write the summary of dark reactions.

(v) Which is the main pigment in photosynthesis.

(vi) Photosynthesis and respiration are opposite to each other. How?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Explain ATP as a molecule that is the chief energy currency of all cells.

Chapter 08: Bioenergetics	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. Through which process organisms get energy?
(A) Photosynthesis (B) Respiration (C) Transpiration (D) Evaporation

2. In first phase of aerobic respiration one molecule of glucose is broken down in how many molecules of pyruvic acids.
(A) Two (B) Three (C) Five (D) Six

3. Each $FADH_2$ produces ATP.
(A) 2 (B) 4 (C) 6 (D) 8

4. What was the primary energy-yielding process for early life forms on Earth?
(A) Aerobic respiration (B) Anaerobic respiration
(C) Photosynthesis (D) Chemosynthesis

5. Which of the following is not a product of fermentation?
(A) Lactic acid (B) Ethanol (C) Carbon dioxide (D) Pyruvic acid

6. First step of cellular respiration is:
(A) Glycolysis (B) Krebs cycle
(C) Electron transport chain (D) Fermentation

7. Which of the following is not a product of glycolysis?
(A) ATP (B) NADH (C) Pyruvate (D) Acetyl-CoA

8. ATP is used in:
(A) Muscle Contraction (B) Active transport (C) Replication of DNA (D) All of the above

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Compare aerobic and anaerobic respiration.
(ii) Name the main steps of aerobic respiration.
(iii) Write the uses of ATP.
(iv) Write the importance of oxidation-reduction reactions.
(v) Which organisms carry out photosynthesis? Which cell organelle is responsible for the absorption of light for photosynthesis?
(vi) State the main purpose of cellular respiration?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Compare the processes of respiration and photosynthesis.

Chapter 09

Plant Physiology

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

9.1 Nutrition in Plants

1. Organisms that can prepare their own food are called:
(A) Autotrophs (B) Heterotrops (C) Consumers (D) Decomposers

2. What is the primary source of energy for autotrophs?
(A) Sunlight (B) Inorganic molecules (C) Organic molecules (D) Heat

3. The process by which plants get their food is called:
(A) Respiration (B) Photosynthesis (C) Transpiration (D) Fermentation

4. Which of the following is a macronutrient required by plants?
(A) Iron (B) Boron (C) Nitrogen (D) Molybdenum

5. Which mineral nutrient is essential for the synthesis of chlorophyll?
(A) Nitrogen (B) Phosphorus (C) Magnesium (D) Potassium

6. What is the role of potassium in plants?
(A) Component of proteins
(B) Regulates the opening and closing of stomata
(C) Activates enzymes (D) Component of chlorophyll

7. Which nutrient deficiency leads to yellowing of older leaves first?
(A) Nitrogen (B) Magnesium (C) Both A and B (D) Phosphorus

8. How do plants obtain nitrogen?
(A) Directly from atmosphere (B) Through photosynthesis
(C) By absorbing nitrates from soil (D) By trapping and digesting insects

9. Magnesium is the part of:
(A) Carotenoids (B) Xanthophylls (C) Chlorophyll (D) None of these

Answers **1.** Autotrophs **2.** Sunlight **3.** Photosynthesis **4.** Nitrogen
5. Magnesium **6.** Regulates the opening and closing of stomata **7.** Both A and B
8. By absorbing nitrates from soil **9.** Chlorophyll

9.2 Trasnport in Plants

1. Which tissues is responsible for the transport of food?
(A) Xylem (B) Phloem (C) Parenchyma (D) Collenchyma

2. Name the organs of a plant responsible for absorption of water and salt from soil:
(A) Leaves (B) Stem (C) Roots (D) Flower

3. Which is the narrow layer of cells present on the inner side of endodermis?
(A) Cortex (B) Epidermis (C) Pericycle (D) Xylem

4. Xylem and phloem collectively called:
(A) Pericycle (B) Vascular bundle (C) Stomata (D) Endodermis

Answers **1.** Phloem **2.** Roots **3.** Pericycle **4.** Vascular bundle

9.3 Transpiration

1. The loss of water vapours from the plant surface is called:
(A) Transpiration (B) Respiration (C) Guttation (D) Photosynthesis

2. Which plant organ is primarily responsible for transpiration?
(A) Root (B) Stem (C) Leave (D) Flower

3. Special openings present in the stems of some plants are called:
(A) Stomata (B) Cuticle (C) Lenticles (D) Epidermis

4. When do guard cells become turgid?
(A) When they lose water (B) When they gain water
(C) In the absence of light (D) During the night

5. Through which process water moves from epidermal cells to guard cells?
(A) Diffusion (B) Osmosis (C) Active transport (D) Transpiration

6. The uptake of potassium ions in the guard cells occurs through:
(A) Osmosis (B) Guttation (C) Passive transport (D) Active transport

7. Why do guard cells lose water at night?
(A) Due to less light (B) Due to less CO_2
(C) Due to less glucose level (D) Due to humidity

8. How does temperature affects transpiration?
(A) Decrease (B) Increase
(C) No effect (D) Increase only at night

9. The percentage of water vapours in the atmosphere is called:
(A) Wind (B) Temperature (C) Humidity (D) Stomata

10. Where are the stomata typically more abundant on a leaf?
(A) Upper surface (B) Lower surface
(C) Both surfaces equally (D) Edges of leaf

11. Why is the distribution of stomata important?
(A) For water loss (B) For photosynthesis
(C) For support (D) For gasses exchange

Answers
1. Transpiration **2.** Leave **3.** Lenticles
4. When they gain water **5.** Osmosis **6.** Active transport
7. Due to less glucose level **8.** Increase **9.** Humidity **10.** Lower surface
11. For water loss

9.4 Transport of Water and Salts in Plants
9.5 Translocation of Food in Plants

1. What is the primary driving force for water movement in plants?
(A) Root pressure (B) Transpirational pull (C) Capillary action (D) Osmosis

2. What is the role of transpiration in water transport?
(A) Pulls water (B) Pushes water (C) Reduces loss (D) Increase absorption

3. What is the process of food transport in plants called?
(A) Transpiration (B) Translocation (C) Diffusion (D) Osmosis

4. For transport in plants, glucose is converted into:
(A) Sucrose (B) Starch (C) Fructose (D) Glucose

5. What are the sources of food in plants?
(A) Roots and stems (B) Leaves and storage organs
(C) Flowers and fruits (D) All of these

6. What drives the movement of the food solution in the phloem?
(A) Root pressure (B) Traspirational pull (C) Pressure gradient (D) Capillary action

7. What happens to the fluid pressure in the phloem at the sink?
(A) Increases (B) Decreases (C) Remain constant (D) Fluctuates

Answers
1. Transpirational pull **2.** Pulls water **3.** Translocation
4. Sucrose **5.** Leaves and storage organs **6.** Pressure gradient **7.** Decreases

9.6 Gaseous Exchange in Plants

1. In photosynthesis plants release:
(A) Oxygen (B) Carbon dioxide (C) Water (D) Glucose

2. During night which chemical reaction takes place?
(A) Fermentation (B) Glycolysis (C) Photosynthesis (D) Respiration

3. Which structure on leaves facilitate gaseous exchange?
(A) Stomata (B) Cuticle (C) Lenticels (D) All of the above

4. Pores present on the bark of some woody plants called:
(A) Cuticle (B) lenticles (C) Stomata (D) Epidermis

Answers **1.** Oxygen **2.** Respiration **3.** All of the above **4.** lenticles

9.7 Mechanisms for Excretion

1. Primary waste product of plant respiration is:
(A) Water varpour (B) Oxygen (C) Carbon dioxide (D) Nitrogenous waste

2. How do plants primarily remove excess carbon dioxide?
(A) Through roots (B) Through stem (C) Through stomata (D) Through lenticels

3. What is the main method by which plants lose excess water?
(A) Gutation (B) Transpiration (C) Excretion (D) Photosynthesis

4. Which of the following is NOT a type of transpiration?
(A) Stomatal transpiration (B) Cuticular transpiration
(C) Lenticular transpiration (D) Root transpiration

5. When does guttation typically occurs?
(A) During the day (B) At night (C) In dry condition (D) In high humidity

6. What is the example of a plant that excretes latex?
(A) Grass (B) Rubber plant (C) Coniferous tree (D) Lady finger

7. How does guttation help plants?
(A) Helps in photosynthesis (B) Helps in mineral absorption
(C) Helps in regulating water content (D) Helps in pollination

8. How do Plants remove metabolic wastes?
(A) By storing them in leaves (B) By excreting them through special pores
(C) Both A and B (D) None of the above

Answers **1.** Carbon dioxide **2.** Through stomata **3.** Transpiration **4.** Root transpiration **5.** At night **6.** Rubber plant **7.** Helps in regulating water content **8.** Both A and B

9.8 Osmotic Adjustment in Plants

1. On the basis of habitats, how many types of plants are classified?
(A) Two (B) Three (C) Five (D) Four

2. Mesophytes are the plants that live in:
(A) Water-logged soils (B) Dry areas
(C) Moderately moist areas (D) Saline areas

3. How mesophytes prevents water loss?
(A) Have sunken stomata (B) Have a thick cuticle
(C) Reduce leaf surface area (D) All of the above

4. Maize is the example of which types of plants?
(A) Mesophytes (B) Halophytes (C) Hydrophytes (D) Xerophytes

5. Hydrophytes are the plants that live in:
(A) Dry areas (B) Aquatic environments
(C)Saline environments (D) Desert environments

6. How do xerophytes adapt to dry condition?
(A) By having a thick cuticle (B) By having reduced leaf surface area
(C) By storing water in their tissues (D) All of the above

7. Sea grasses are the examples of:
(A) Meosphytes (B) Halophytes (C) Xerophyates (D) Hydrophytes

8. Which of the following is the common example of succulent organs?
(A) Rose (B) Cactus (C) Oak tree (D) Water Lilly

Answers **1.** Four **2.** Dry areas **3.** Have a thick cuticle **4.** Mesophytes
5. Aquatic environments **6.** All of the above **7.** Halophytes **8.** Cactus

Exercise (Multiple Choice Questions)

Select the correct answers for the following questions.

1. Which of the following plant nutrients is required in large amount?
a) Iron b) Zinc c) Potassium d) Boron

2. Which element is required by plants for the formation of chlorophyll?
a) Phosphorus b) Calcium c) Magnesium d) Sulphur

3. The primary function of root hairs is:
a) Transport of nutrients b) Storage of food
c) Increase surface area for absorption d) Synthesis of proteins

4. Root hairs absorb salts from soil by;
a) Diffusion b) Osmosis c) Active transport d) Filtration

5. Water moves from the soil into root cells by:
a) Osmosis b) Active transport c) Diffusion d) Bulk flow

6. The transpiration is regulated by;
a) Mesophyll b) Guard cells c) Xylem d) Phloem

7. Under which condition, there will be high rate of transpiration?
a) High humidity b) Low light intensity
c) Wind d) Waterlogged soil

8. Which ion plays a role in the opening of stomata?
a) Sodium (Na^+) b) Potassium (K^+)
c) Calcium (Ca^{2+}) d) Magnesium (Mg^{2+})

9. In most plants the food is transported in the form of:
a) Glucose b) Sucrose c) Starch d) Maltose

10. What is TRUE according to the pressure flow mechanism of food transport?
a) Water enters the source, creating pressure b) Water is pulled from the sink
c) Movement of food in phloem is due to gravity
d) Solutes move from low to high concentration

11. Succulent organs are present in:
a) Xerophytes b) Hydrophytes c) Mesophytes d) Halophytes

Answers **1.** (c) **2.** (c) **3.** (c) **4.** (c) **5.** (a) **6.** (b)
7. (c) **8.** (b) **9.** (b) **10.** (a) **11.** (a)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

9.1 Nutrition in Plants

1. How would you distinguish between nutrition and nutrients.

Ans. Nutrition: Nutrition means the processes in which food is prepared or obtained and converted into body substances for growth and energy.

Nutrients: Nutrients are the substances required by organisms for energy, growth, repair and maintenance.

2. State the roles of nitrogen and magnesium in plants.

Ans. Nitrogen is a component of proteins, chlorophyll and enzymes. It catalyzes biochemical reactions within plant cells. Magnesium is a component of chlorophyll, it activates many enzyme.

9.2 Transport In Plants

1. Write about the two types of diffusion.

Ans. The types of diffusion are passive transport and active transport.

Passive transport: It is the movement of molecules across a cell membrane from a high to low concentration, without using energy.

Active transport: It is a movement of molecules across a cell membrane from a low concentration to a high concentration using energy.

2. Differentiate between epidermis and root hairs.

Ans. **Epidermis:** The outermost covering of the root is called epidermis. It is a single layer of cells.

Root hairs: Many cells of epidermis have tiny hair-like extensions into the space among soil particles. These extensions called root hairs.

9.3 Transpiration

1. Define the term "Transpiration".

Ans. The loss of water in the form of vapours from plant surface is called transpiration.

2. Which factors affects the rate of transpiration?

Ans. Transpiration is affected by several factros these are:

i. Temperature **ii.** Wind
iii. Humidity
iv. Surface area and distribution of stomata.

9.4 Transport of Water and Salts in Plants
9.5 Translocation of Food

1. What is transpirational pull?

Ans. Leaves apply a pulling force on water present in roots. The pulling force in leaves is created by the transpiration of water from their surface. Therefore, it is called transpirational pull.

2. Which tissue is responsible for the translocation of food?

Ans. Phloem tissues is responsible for the translocation of food.

3. What is pressure flow mechanism?

Ans. The mechanism of the transport of food is called pressure flow mechanism. According to pressure flow mechanism, dissolved food flows form a source of a sink.

9.6 Gaseous Exchange in Plants

1. What is the role of stomata in plant gas exchange?

Ans. Stomata are tiny pores on the leaf surface that regulates that exchange of gases between the plant and the atmosphere. They open to allow carbon dioxide to enter for photosynthesis and oxygen to exit.

2. How does the balance between photosynthesis and respiration affect gas exchange during the day and night?

Ans. During the day, leaves are releasing oxygen and taking carbon dioxide from the environment. During night, all cells are carring out respiration while taking in oxygen and releasing carbon dioxide.

9.8 Osmotic Adjustments in Plants

1. What are the types of plants on the basis of habitats?

Ans. On the basis of habitats, these are four types of plants.

i. Mesophytes **ii.** Hydrophytes
iii. Xerophytes **iv.** Halophytes

2. How hydrophytes remove excess water?

Ans. Hydrophytes have different ways to remove extra water. Many hydrophytes have broad leaves. These leaves have large number of stomata. Water moves out through stomata.

Exercise (Short Answer Questions)

B. Write short answers.

1. Define mineral nutrition in plants.

Ans. The materials that plants need for the synthesis of biomolecules are called mineral nutrients. The process of absorption of mineral nutrients from soil is called mineral nutrition.

2. Define macronutrients and micronutrients and give examples.

Ans. **Macronutrients:** The minerals which are required in larger quantities are called macronutrients.

Examples: Carbon, hydrogen, oxygen, phosphorous, potassium, nitrogen, sulphur, calcium and magnesium

Micronutrients: The minerals which are required in lower quantities are called micronutrients.

Example: Iron, molybdenum, boron, copper, zinc, manganese, chlorine and nickel.

3. State the roles of nitrogen and magnesium in plants.

Ans. Roles of Nitrogen in Plants: Nitrogen helps plants for rapid growth, increasing seed and fruit production and improving the quality of leaf.

Roles of Magnesium in Plants: Magnesium activates many plant enzymes needed for growth. It also helps in fruit formation and germination of seeds.

4. Define transpiration and its types.

Ans. Transpiration: The loss of water in the form of vapours from plant surface is called transpiration.

Types of transpiration: There are three types of transpiration:

(i) Stomatal trnanspiration
(ii) Cuticular transpiration
(iii) Lenticular transpiration

5. How is the transpirational pull important in plants?

Ans. Transpiration pull is the pulling force in leaves that is created by the transpiration of water from their surfaces. It helps in the upward movement of water into the xylem vessels.

6. Transpiration is the loss of water from plants. Is it a harmful phenomenon? If no, what is its importance?

Ans. Importance of transpiration: Transpiration conducts water and minerals salts to different parts of the plant body. It maintains the osmosis and turgidity of the cells. It helps in the upward movement of water.

7. Differentiate between:

i. Xylem and phloem

Ans. Xylem: It is the vascular tissue responsible for the transporting water and minerals absorbed by the roots from the soil to the rest of the plants.

Phloem: It is the vascular tissue in higher plants that transports food from where it is produced or stored to other parts of the plant.

ii. Transpiration and guttation

Ans. Transpiration: The loss of water in the form of vapours from plant surface is called transpiration.

Guttation: The process that involves the release of water droplets through small pores located at the tips or edges of leaves.

iii. Hydrophytes and halophytes

Ans. Hydrophytes: Hydrophytes are the plants that live in freshwater (ponds and lakes etc.) or in wet soil. They have broad leaves and large number of stomata.

Halophytes: Halophytes are th eplants that live in habitats with salty waters (e.g. sea or salty marshes).

iv. Hydrophytes and xerophytes

Ans. Hydrophytes: Hydrophytes are the plants that live in freshwater (ponds and lakes etc.) or in wet soil. They have broad leaves and large number of stomata.

Xerophytes: Xerophytes are the plants that live in extremely dry environments (deserts).

v. Lenticular transpiration and stomatal transpiration

Ans. Lenticular transpiration: The process by which water evaporates from a plant through lenticles (small pores on the stems and roots of woody plants) is called lenticular transpiration.

Stomatal transpiration: The process by which water evaporated from stomata is called stomatal transpiration.

8. How do the plants of rubber and keekar excrete their wastes?

Ans. Rubber: Rubber plant excretes its waste in the form of latexes.

Keekar: Keekar plant excretes its waste in the form of gums.

Exercise (Essay Type Questions)

1. **Describe the events involved in the opening and closing of stomata.**
2. **Explain the internal structure of root and describe the uptake of salt and water by root.**
3. **Describe temperature, wind and humidity as the factors affecting the rate of transpiration.**
4. **Describe the mechanism of transport of water and salt in plants.**
5. **Explain the mechanism of food translocation by Pressure Flow Mechanism.**
6. **How do the plants excrete extra water and salts from their bodies?**
7. **Describe the process of gaseous exchange in plants**
8. **Describe the mechanisms/adaptations in plants for excretion of wastes.**
9. **Explain osmotic adjustments in hydrophytes, xerophytes and halophytes**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 09 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter: 09 Marks: 12

Plant Physiology **OBJECTIVE TYPE** Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. Which of the following organisms is a heterotroph?
(A) Algae (B) Fungi (C) Bacteria (D) Cyanobacteria

2. The minerals which are required in lower quantities are called:
(A) Micronutrients (B) Macronutrients (C) Nanoparticles (D) None of these

3. The yellowing of leaves is seen first in:
(A) Younger leaves (B) Older leaves (C) Stem (D) Roots

4. Movement of molecules from an area of higher concentration to an area of lower concentration is called:
(A) Active transport (B) Passive transport (C) Osmosis (D) Diffusion

5. The outermost layer of root is:
(A) Cortex (B) Epidermis (C) Xylem (D) Phloem

6. Name the process responsible for the movement of water from soil into root hairs:
(A) Active transport (B) Diffusion (C) Osmosis (D) Transpiration

7. What is the adaptive significance of transpiration?
(A) Cooling the plant (B) Mineral transport (C) Photosynthesis (D) All of the above

8. What is the primary function of guard cells?
(A) To transport water (B) To regular gas exchange
(C) To store nutrients (D) To protect the leaf

9. How does wind affects transpiration?
(A) Decreases (B) Increases
(C) No effect (D) Increase only at night

10. How does water moves from the roots to the leaves?
(A) Through the phloem (B) Through the xylem
(C) Through the cortex (D) Through the epidermis

11. What is the mechanisms of food transport in plants?
(A) Root pressure (B) Transpirational pull
(C) Pressure flow mechanism (D) Capillary action

12. What is the primary organ for gaseous exchange in plants?
(A) Root (B) Stem (C) Leaf (D) Flower

Roll No.(in figures): ..... (in words): .....

Chapter-09: Plant Physiology

SUBJECTIVE TYPE

Marks: 48
Time: 1.45 Hours

(PART - I)

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Differentiate between autotrophic and heterotrophic organisms.

(ii) Define mineral nutrients.

(iii) Differentiate between micronutrients and macronutrients.

(iv) How carnivorous plants, fulfill their need of nitrogen?

(v) How the deficiency of Mg affects the plant?

(vi) What is meant by osmosis?

(vi) What is the role of xylem and phloem in transportation?

(viii) What is pericycle?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What are the main parts of leaf involved in transpiration?

(ii) How transpiration occurs through stomata?

(iii) What are guard cells?

(iv) What is the role of potassium ions in stomatal opening and closing?

(v) Write the names of types of transpiration.

(vi) Why the transcription at the lower surface of leaf is greater than on the upper surface?

(vii) How water column is created in xylem vessels? Give reasons.

(viii) How does sucrose enter the phloem at the source?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is the role of cuticle in gaseous exchange?

(i) Write the names of two ways through which plants excrete extra water.

(iii) Define guttation.

(iv) How plants excrete metabolic wastes?

(v) How do mesophytes adapt to their environment?

(vi) What adaptions do xerophytes have to survive in dry conditions?

(vii) Differentiate between hydrophytes and xerophytes.

(viii) What are halophytes?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Define nutrition and nutrients. Describe its types. 4

(b) Discuss the role of important macronutrients in Plants. 5

Q6. (a) Discuss role of nitrogen and magnesium. 4

(b) What is meant by transport in plants? Write about transport in plants. 5

Q7. (a) Explain the internal structure of root and describe the uptake of salt and water by root. 4

(b) Define transpiration. Write types of transpiration. 5

Chapter 09: Plant Physiology	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **(08)**

1. What is the primary source of energy for autotrophs?

(A) Sunlight (B) Inorganic molecules (C) Organic molecules (D) Heat

2. Which mineral nutrient is essential for the synthesis of chlorophyll?

(A) Nitrogen (B) Phosphorus (C) Magnesium (D) Potassium

3. Magnesium is the part of:

(A) Carotenoids (B) Xanthophylls (C) Chlorophyll (D) None of these

4. Which tissues is responsible for the transport of food?

(A) Xylem (B) Phloem (C) Parenchyma (D) Collenchyma

5. From epidermis water enters to which past of root?

(A) Endodermis (B) Cortex

(C) Pericycle (D) Vascular Tissue

6. Which plant organ is primarily responsible for transpiration?

(A) Root (B) Stem (C) Leave (D) Flower

7. Through which process water moves from epidermal cells to guard cells?

(A) Diffusion (B) Osmosis (C) Active transport (D) Transpiration

8. What happens to guard cells at night?

(A) Turgid (B) Flaccid (C) No change (D) Osmosis

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) State the roles of nitrogen and magnesium in plants.

(ii) Differentiate between epidermis and root hairs.

(iii) Define the term "Transpiration".

(iv) Which factors affects the rate of transpiration?

(v) What is transpirational pull?

(vi) Which tissue is responsible for the translocation of food?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe temperature, wind and humidity as the factors affecting the rate of transpiration.

Chapter 09: Plant Physiology	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. The percentage of water vapours in the atmosphere is celled:
(A) Wind (B) Temperature (C) Humidity (D) Stomata

2. What is the primary driving force for water movement in plants?
(A) Root pressure (B) Transpirational pull (C) Capillary action (D) Osmosis

3. For transport in plants, glucose is converted into:
(A) Sucrose (B) Starch (C) Fructose (D) Glucose

4. What drives the movement of the food solution in the phloem?
(A) Root pressure (B) Traspirational pull (C) Pressure gradient (D) Capillary action

5. Which structure on leaves facilitate gas exchange?
(A) Stomata (B) Cuticle (C) Lenticels (D) All of the above

6. When does guttation typically occurs?
(A) During the day (B) At night (C) In dry condition (D) In high humidity

7. Mesophytes are the plants that live in:
(A) Water-logged soils (B) Dry areas
(C) Moderately moist areas (D) Saline areas

8. How mesophytes prevents water loss?
(A) Have sunken stomata (B) Have a thick cuticle
(C) Reduce leaf surface area (D) All of the above

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) What is pressure flow mechanism?
(ii) What is the role of stomata in plant gas exchange?
(iii) How does the balance between photosynthesis and respiration affect gas exchange during the day and night?
(iv) What are the types of plants on the basis of habitats?
(v) How hydrophytes remove excess water?
(vi) Differentiate between two types of diffusion.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Explain osmotic adjustments in hydrophytes, xerophytes and halophytes.

Chapter 10

Reproduction in Plants

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

10.1 Types of asexual reproduction

1. Main kinds of reproduction are:
(A) Two (B) Three (C) Four (D) Five

2. Binary fission is a type of:
(A) Sexual reproduction (B) Asexual reproduction
(C) Both (A) and (B) (D) None of the above

3. Which of the following organisms reproduce by binary fission?
(A) Amoeba (B) Euglena (C) Planarians (D) All of the above

4. In budding, a new individual develops from:
(A) A spare (B) A seed (C) A bud (D) A gamete

5. Example of budding:
(A) Amoeba (B) Euglena (C) Hydra (D) Bacteria

6. The structure that produces spores in fungi are called:
(A) Conidia (B) Zoospores (C) Gametangia (D) Sporangia

7. Spores are typically:
(A) Thin-walled (B) Thick-walled
(C) Without a wall (D) Have soft outer layer

8. Which of the following organisms commonly reproduce by binary fission?
(A) Yeast (B) Bacteria (C) Rhizopus (D) Plants

9. Which are the vegetative parts of the plants?
(A) Roots (B) Stem (C) Leaves (D) All of these

10. Vegetative propagation may be:
(A) Natural (B) Artificial (C) Both A and B (D) None of these

11. A stolen is the type:
(A) Root (B) Stem (C) Leaf (D) Flower

12. Which plant reproduces through stolons?
(A) Potato (B) Ginger (C) Strawberry (D) Sugarcane

13. What is the fleshy stem that grows underground?
(A) Stolon (B) Rhizome (C) Tuber (D) Bulb

14. Which plants reproduce through rhizome?
(A) Ferns (B) Ginger (C) Sugarcane (D) All of the these

15. The horizontal stem that grows below the ground, which have leaves and roots at its nodes is:
(A) Stolen (B) Bulb (C) Rhizome (D) Corm

Answers

1. Two **2.** Asexual reproduction **3.** All of the above
4. A bud **5.** Hydra **6.** Sporangia **7.** Thick-walled **8.** Bacteria
9. All of these **10.** Both A and B **11.** Stem **12.** Strawberry **13.** Tuber
14. All of the these **15.** Rhizome

10.2 Artifical Propagation

1. In some plants, a piece of stem or a piece of root can form new plant. This process is called:
(A) Grafting (B) Cutting (C) Layering (D) Budding

2. Which plant grown from root cutting?
(A) Roses (B) Graperies (C) Ginger (D) Sweet potato

3. Grafting is commonly used in the propagation of:
(A) Herbaceous plants (B) Annaual plants
(C) Fruit trees and ornamental plants (D) Ferns and moses

Answers **1.** Cutting **2.** Sweet potato **3.** Fruit trees and ornamental plants

10.3 Sexual Reproduction in Plants

1. What are the two generations involved in the sexual reproduction of plants?
(A) Zygote and spore (B) Gamete and zygote
(C) Mitosis and meiosis (D) Sporophyte and gametophyte

2. Which process produces haloid (1n) spores?
(A) Mitosis (B) Meiosis (C) Fertilization (D) Germination

3. What is the term used to describe the alternation between Sporophyte and gametophyte generation?
(A) Alternation of generation (B) Alternation of dominance
(C) Alternation of phases (D) Alternation of cycles

4. What is the swollen tip of a flower stalk called?
(A) Petal (B) Sepal (C) Receptacle (D) Ovary

5. Corolla is made up of:
(A) Sepals (B) Petals (C) Stamens (D) Carpel

6. What are the male reproductive structures in a flower called?
(A) Carpels (B) Ovules (C) Stamens (D) Sepals

7. What is the stalk-like part of a stamen called?
(A) Anther (B) Filament (C) Stigma (D) Style

8. Where are ovules produced in a flower?
(A) Style (B) Stigma (C) Ovary (D) Filament

9. What is the tip of the style called?
(A) Anther (B) Stigma (C) Ovary (D) Filament

10. One or more carpels are fused to form a structure called:
(A) Anther (B) Stamen (C) Filament (D) Pistil

11. The female gametophyte in flowering plants is known as:
(A) Pollen grain (B) Embryo sac (C) Ovary (D) Carpel

12. How many megaspores are typically produced after meiosis of the megaspore mother cell?
(A) One (B) Two (C) Three (D) Four

13. How many megaspores typically survive and develop into embryo sac?
(A) One (B) Two (C) Three (D) Four

14. The pollen sac in anther acts as:
(A) Megasporangium (B) Microsporangia (C) Megaspore (D) Pollination

15. After meiosis, microspore mother cell produces how many microspores.
(A) Two (B) Three (C) Four (D) Five

16. What is the Polyploidy level of the microspore mother cell?
(A) Haploid (1n) (B) Diploid (2n) (C) Triploid (3n) (D) Tetradploid (4n)

17. Which cell within the pollen grain is responsible for forming the pollen tube?
(A) Generative cell (B) Tube cell
(C) Microspore mother cell (D) Microspore

18. The process of fusion of male gametes with the egg cell called?
(A) Pollination (B) Fertilization (C) Germination (D) Meiosis

19. What does the second cell fuse with to form the endosperm?
(A) The fusion nucleus (B) The egg cell (C) The central cell (D) The polar nuclei

20. Polyploidy level of the endosperm is:
(A) Haploid (1n) (B) Diploid (3n) (C) Triploid (3n) (D) Tetraploid (4n)

21. After fertilization, the zygote develops into:
(A) Ovary (B) Ovule (C) Embryo (D) Endosperm

22. What does the ovary develops into after fertilization?
(A) The embryo (B) The endosperm (C) The seed (D) The fruit

23. What happens to seeds when they mature?
(A) They nature dormant (B) They are dispersed
(C) They germinate (D) They die

24. What is the advantage of parthenocarpy?
(A) Larger fruits (B) Sweeter fruits (C) Seedless fruits (D) Increase yield

Answers

1. Sporophyte and gametophyte **2.** Meiosis
3. Alternation of generation **4.** Receptacle **5.** Petals **6.** Stamens
7. Filament **8.** Ovary **9.** Stigma **10.** Pistil **11.** Embryo sac
12. Four **13.** One **14.** Microsporangia **15.** Four **16.** Diploid (2n)
17. Tube cell **18.** Fertilization **19.** The central cell **20.** Triploid (3n) **21.** Embryo
22. The fruit **23.** They are dispersed **24.** Seedless fruits

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. Which of the following organisms commonly reproduce by binary fission?
a) Yeast b) Bacteria c) Rhizopus d) Plants

2. What is the primary method of reproduction in yeast?
a) Binary fission b) Spore formation c) Budding d) Fragmentation

3. Which of the following statements is true about spore formation in fungi?
a) They produce spores during sexual reproduction
b) They produce two kinds of spores
c) Spores can only grow into new fungi in dry environments
d) Spores are produced to withstand harsh conditions

4. What happens in some bacteria during harsh conditions?
a) Creation of a bud that detaches from the cell
b) Formation of thick walled endospores
c) Splitting the cell into two identical daughter cells
d) Fusion of two bacterial cells

5. Which of the following is an example of vegetative propagation through runners?
a) Potato b) Strawberry c) Onion d) Ginger

6. Which plant propagates through tubers?
a) Onion b) Potato c) Ginger d) Garlic

7. The horizontal stem above ground, which produces leaves and roots at its nodes;
a) Stolon b) Bulb c) Rhizome d) Corm

8. Which of these does NOT help a plant for vegetative propagation?
a) Rhizome b) Corm c) Runner d) Flower

9. Which part of the flower is responsible for producing pollen?
a) Stigma b) Anther c) Ovary d) Petal

10. Which of the following is NOT a part of carpel?
a) Filament b) Style c) Stigma d) Ovary

11. Which structure forms the female gametophyte in flowering plants?
a) Pollen grain b) Ovule c) Anther d) Sepal

12. The male gametophyte in flowering plants is known as:
a) Pollen grain b) Embryo sac c) Ovary d) Carpel

13. In the life cycle of flowering plants, which structure is triploid (3n)?
a) Egg b) Fusion nucleus c) Endosperm nucleus d) Sperm

14. Embryo sac is formed inside;
a) Filament b) Anther c) Style d) Ovule

15. Double fertilization involves;
a) Fertilization of the egg by two male gametes
b) Fertilization of two eggs in the same embryo sac by two sperms
c) Fertilization of the egg and the fusion nucleus by two sperms
d) Fertilization of the egg and the tube cell by two sperms

Answers

1. (b)	**2.** (c)	**3.** (d)	**4.** (b)	**5.** (b)
6. (b)	**7.** (a)	**8.** (d)	**9.** (b)	**10.** (a)
11. (b)	**12.** (a)	**13.** (c)	**14.** (d)	**15.** (c)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

10.1 Types of Asexual Reproduction

1. Define the term reproduction.

Ans. The process in which organism produce new organisms of their own kind is called reproduction.

2. How many kinds of reproduction are there? Name them.

Ans. There are two kinds of reproduction:
(i) Asexual reproduction **(ii)** Sexual reproduction

3. What is asexual reproduction?

Ans. The reproduction that does not involve the fusion of gametes is called asexual reproduction.

4. What are different types of asexual reproduction?

Ans. Different types of asexual reproduction include binary fission, budding, spore formation and vegetative propagation.

5. What does binary fission mean?

Ans. Binary fission means division into two.

6. Name the animals that reproduce by binary fission.

Ans. Bacteria, amoeba, euglena and planarians reproduce by binary fission.

7. Name the animals that reproduce by budding.

Ans. Fungus and hydra reproduce by budding.

8. What are spores?
Ans. Spores are thick walled asexual reproductive cells.
9. How spores are released?
Ans. When spores are mature, the sporangium bursts and spores are released.
10. What is stolon or runner?
Ans. Stolon or runner is a horizontal stem that grows above the ground.
11. What is tuber?
Ans. Tuber is a fleshy stem that grows underground.
12. Give examples of plants that reproduce by rhizome.
Ans. Ferns, ginger and sugar cane reproduce by rhizome.

10.2 Artificial Propagation

1. Which techniques are involved in the artificial propagation?
Ans. Cutting, grafting or tissue culture are the techniques involved in the artificial propagation.
2. For propagation of which plants cuttings are used?
Ans. Cuttings are widely used to propagate house plants, ornamental trees and shrubs, and some fruit crops.
3. What is Grafting?
Ans. Grafting is the joining of two or more plant parts of the same type to form a single plant.
4. Which plants reproduce by grafting?
Ans. All commercial fruit trees (e.g. almond, plum, cherries etc.) and many ornamental trees and shrubs reproduce by grafting.

10.3 Sexual Reproduction in Plants

1. Which types of generation do plants have during sexual reproduction?
Ans. The major groups of plants have two type of generations during sexual reproduction which come one after the other. There are sporophyte generation and gametophyte generation.
2. What is alternation of generation?
Ans. The sporophyte generation produces spores which grow and make the new gametophyte generation. The gametophyte generation produces gametes which unite and make the new sporophyte generation. This phenomenon is called alternation of generation.
3. What sporophyte produces?
Ans. The sporophyte generation is diploid (2n) and produces haploid (1n) spores by meiosis. The spores develop into haploid gametophyte generation.
4. What is receptacle?
Ans. Receptacle is the swollen tip of a flower stalk where all the floral parts are attached.
5. What is the function of receptacle?
Ans. Receptacle serves as the base that supports the flowers structure.
6. What calyx is made of?
Ans. Calyx is made of green leaf-like sepals.
7. What does stamen consist of?
Ans. Stamen consists of an anther and a filament.
8. What is pistil?
Ans. Pistil is a structure formed by the fusion of one or more carpels in some flowers.
9. What are main stages in the life cycle of an angiosperm?
Ans. The main stages in the life cycle of an angiosperm are as follows:

i. Development of Female Gametophyte (Embryo Sac)
ii. Development of Male Gametophyte (Pollen Grain)
iii. Pollination
iv. Fertilization
v. Seed and Fruit Formation
vi. Development of Sporophytes

10. How fusion nucleus is formed?

Ans. Inside megaspore, eight haploid nuclei are formed by mitosis. Two nuclei migrate to the center and fuse to form a fusion nucleus.

11. What does female gametophyte or embryo sac contain?

Ans. Female gametophyte or embryo sac contains seven cells (one egg cell, one fusion nucleus and five non-functional cells).

12. What is double fertilization?

Ans. The process of fusion of two sperms (one with the egg and the other with the fusion nucleus) is called double fertilization.

Exercise (Short Answer Questions)

Write short answers.

1. Write a short note on budding in yeast.

Ans. Budding in Yeast:

This method is very common in yeast (a unicellular fungus). During budding, a part of the parent organism grows out from its body. This part is called a bud. When the bud has grown big, it may separate from parent body or may remain attached.

2. Write a short note on spore formation in fungi.

Ans. Most fungi (e.g. Rhizopus; bread mold) produce spores in special sac like structures called sporangia. When spores are mature, the sporangium bursts and spores are released.

3. What are the advantages of spore formation in fungi and bacteria?

Ans. Fungi produce by spores. Spores can tolerate unfavourable conditions due to their walls. When conditions are favourable, spores germinate to produce new fungus.

Similarly, bacteria produces by forming endospores (spores produced inside the cell). Even, if the original cell dies, the endospore survives and it grows into a new bacterium under favourable conditions.

4. Describe how vegetative propagation occurs through runners.

Ans. Runner is a horizontal stem that grows above the ground. It produces through vegetative propagation.

During vegetative propagation in runner, new leaves and roots grow from nodes of the runner. The leaves grow upwards and roots grow down. In this way, a new plant is formed at the node.

5. State how potatoes reproduce through tubers.

Ans. Potatoes reproduce by tubers. It is fleshy stem that grows underground. It has eyes which are actually its buds. Eyes can grow into new plants.

6. Describe the advantages and disadvantages of vegetative propagation.

Ans. Advantages of Vegetative Propagation: Vegetative propagation allows to produce many new plants in a short time. The new plants are exactly like the parent plant, so they all have the same characteristics. This means useful qualities, like good fruit or strong growth, are passed on to the next generation.

Disadvantages of Vegetative Propagation: Plants produced through vegetative propagation do not have genetic variations. In other words, all the offspring are identical. Due to it, they are equally sensitive to environmental changes and prone to the same diseases or pests.

7. Name the four whorls present in a flower and also tell the components of each whorl.

Ans. Four whorls of a flower:

A flower has following four whorls:

- Calyx
- corolla
- androecium
- Gynoecium

- **Calyx:**
  It is the outermost whorl. It is made of green leaf like petals.
- **Corolla:**
  It is the second whorl. It is made of coloured petals.
- **Androecium:**
  It is the third whorl. It is made of male reproductive structure called stamens. Each stamen has an anther and a filament.
- **Gynoecium:**
  It is the fourth whorl. It is made of female reproductive structures called carpels. Each carpel has three parts ovary, style and stigma.

8. Briefly describe the formation of egg cell and polar nuclei within embryo sac of a flower.

Ans. Formation of Egg cell within Embryo sac of a flower:
Megaspore mother cell within megasporangium undergoes meiosis and produces four haploid megaspores. Only one megaspore remains alive. Inside megaspore, eight haploid nuclei are formed by mitosis. Two nuclei migrate to the center and fuse to form a fusion nucleus. One nucleus out of the remaining six forms the female gamete i.e., egg cell.

Formation of Polar Nuclei within Embryo sac of a flower:
Polar nuclei are formed by mitosis from the same meiotic product that produces the egg in plants. They are located in the central cell of the female gametophyte or embryo sac of angiosperms (flowering plants).

9. Differentiate between:

i. Asexual and sexual reproduction

Ans. Asexual Reproduction: The reproduction that does not involve the fusion of gametes is called asexual reproduction.

Sexual Reproduction: The reproduction that involves the fusion of male and female gametes is called sexual reproduction.

ii. Binary fission in bacteria and amoeba

Ans. In bacteria, during binary fission, the bacterial DNA replicates and the daughter DNA molecules moves to opposite sides. Then, the cell membrane pinches in. New cell wall in synthesized in the middle and so two identical daughter cells bacteria are produced.

In amoeba, the nucleus of parent organism divides into two. This is followed by the division of cytoplasm. So, two daughter amoeba are formed.

iii. Stolon and rhizome

Ans. Stolon:
It is a horizontal stem that grows above the ground.

Rhizome:
It is a horizontal stem that grows below the ground.

iv. Bulb and corm

Ans. Bulb:
It is a very short stem that grows underground. It has bud and fleshy leaves.

Corn:
It resembles the bulb but does not have fleshy leaves.

v. Cutting and grafting

Ans. Cutting:
A piece of stem or root that are cut from a plant and used to grow new plant is called cutting.

Grafting:
It is the joining of two or more plant parts of the same type to form a single plant.

vi. Vegetative propagation and artificial propagation

Ans. Vegetative propagation: It is a method of asexual reproduction in plants, in which new plant is produced from the vegetative part (root, stem or leaf) of the parent plant.

Artificial propagation:

It is a method of reproduction in which humans produce new plants by using the vegetative parts of plants. It includes techniques such as cutting, grafting or tissue culture.

vii. Male and female gametophytes

Ans. The male gametophyte (pollen grain) contains sperms while the female gametophyte (embryo sac) contains egg.

viii. Calyx and corolla

Ans. **Calyx:** It is the outermost whorl. It is made of green leaf like sepals.

Corolla: It is the second whorl. It is made of coloured petals.

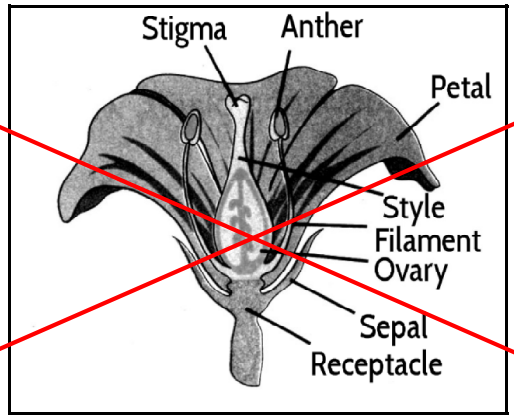
ix. Stamen and carpel

Ans. **Stamen:** It is the male reproductive structure of the flower. It consists of an anther and a filament.

Carpel: It is the female reproductive structure of the flower. It consists of three parts i.e. style and ovary.

10. Label the given diagram of flower.

Ans.



Parts of a flower

Exercise (Essay Type Questions)

1. **Explain the process of binary fission in bacteria and describe how it leads to the formation of two daughter bacteria.**
2. **What do you mean by vegetative propagation? Differentiate among different plant structures modified for vegetative propagation.**
3. **Describe the ways by which humans can grow new plants by using the vegetative parts of the parent plants?**
4. **Define sporophyte and gametophyte. State their roles in the life cycle of plants.**
5. **Explain the lifecycle of flowering plants, focusing on the alternation between the gametophyte and sporophyte generations.**
6. **Describe how the female gametophyte (embryo sac) develops within the ovule of a flower?**

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 10 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... **(in words):** .....

Chapter: 10 **Marks: 12**

Reproduction in Plants

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. In asexual reproduction, offspring are:
(A) Genetically identical (B) Genetically different
(C) A mix of both parent (D) Genetically unrelated

2. During binary fission, the first step is:
(A) Division of nucleus (B) DNA replication
(C) Formation of a cell plate (D) Separation of Chromosomes

3. Endospores are the spores produces:
(A) Inside the cell (B) Outside the cell (C) Both of these (D) None of these

4. Which are the new shoots that emerge from the base of the parent plant.
(A) Bulb (B) Corm (C) Stem (D) Suckers

5. Which generation of sexual reproduction is diploid (2n)?
(A) Sporophyte (B) Gametophyte (C) Both (A) and (B) (D) Neither (A) and (B)

6. Which are the organs responsible for sexual reproduction in angiosperms?
(A) Roots (B) Leaves (C) Stem (D) Flowers

7. What is the possible structure that contains the megaspore mother cell?
(A) Stigma (B) Ovule (C) Style (D) Embryo sac

8. The transfer of pollen grains from an anther to a stigma is called:
(A) Fertilization (B) Pollination (C) Germination (D) Double fertilization

9. What type of pollination occurs when pollen is transferred from the anther of one flower to the stigma of another flower on the same plants?
(A) Self-pollination (B) Cross-pollination (C) Wind pollination (D) Insect pollination

10. How many sperm cell are involved in the fertilization of a flowering plant?
(A) One (B) Two (C) Three (D) Four

11. The unique characteristics of angiosperms as compared to other plants:
(A) Formation of pollen tube (B) Presence an ovary
(C) Double fertilization (D) Involvement of sperm cell

12. Fruit produced through parthenocarpy
(A) Banana (B) Apple (C) Tomato (D) Mangoes

Roll No.(in figures): ..... (in words): .....

Chapter: 10
Reproduction in Plants

SUBJECTIVE TYPE
(PART - I)

Marks: 48
Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is the most common method of reproduction in bacteria?
(ii) How does binary fission take place in protists?
(iii) Describe the process of spore formation in rhizopus.
(iv) What are endospores?
(v) What is meant by vegetative propagation?
(vi) Differentiate between natural vegetative propagation and artificial vegetative propagation.
(vii) Write about vegetative propagation through rhizome.
(viii) Which plant reproduce by tubers?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) How vegetative propagation occurs by corms?
(ii) Define suckers in vegetative propagation.
(iii) Write a note on vegetative propagation occurs through modified leaves.
(iv) Why artificial propagation is used?
(v) Differentiate between cutting and grafting.
(vi) What is sporophyte generation?
(vii) Discuss the phenomenon of alternation of generation.
(viii) What is calyx? Tell its unit.

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write the function of anther and filament.
(ii) What are the parts of a carpel?
(iii) What is the final structure formed after the development of female gametophyte?
(iv) How microspores produced?
(v) Define pollination.
(vi) What is double fertilization?
(vii) What is meant by parthenocarpy?
(viii) Define cloning.

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Define reproduction. Explain its types. 4
(b) Explain the process of binary fission in bacteria and describe how it leads to the formation of two daughter bacteria. 5

Q6. (a) Describe budding in yeast. 4
(b) Discuss asexual reproduction by spores in rhizopus. 5

Q7. (a) How do bacteria reproduce by forming endospores? 4
(b) What is artificial propagation? Write down its importance. 5

Chapter 10: Reproduction in plants	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ					

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. Which of the following organisms reproduce by binary fission?

(A) Amoeba (B) Euglena (C) Planarians (D) All of the above

2. The structure that produces spores in fungi are called:

(A) Conidia (B) Zoospores (C) Gametangia (D) Sporangia

3. Which are the vegetative parts of the plants?

(A) Roots (B) Stem (C) Leaves (D) All of these

4. A stolen is the type:

(A) Root (B) Stem (C) Leaf (D) Flower

5. What is the fleshy stem that grows underground?

(A) Stolon (B) Rhizome (C) Tuber (D) Bulb

6. Which of these does not help a plant for vegetative propagation?

(A) Rhizome (B) Corm (C) Runner (D) Flower

7. In some plants, a piece of stem or a piece of root can form new plant. This process is called:

(A) Grafting (B) Cutting (C) Layering (D) Budding

8. Which plant grown from root cutting?

(A) Roses (B) Graperies (C) Ginger (D) Sweet potato

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Write a short note on budding in yeast.

(ii) What are the advantages of spore formation in fungi and bacteria?

(iii) State how potatoes reproduce through tubers.

(iv) Describe the advantages and disadvantages of vegetative propagation.

(v) Name the four whorls present in a flower and also tell the components of each whorl.

(vi) Briefly describe the formation of egg cell and polar nuclei within embryo sac of a flower.

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Explain the process of binary fission in bacteria and describe how it leads to the formation of two daughter bacteria.

Chapter 10: Reproduction in plants	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. Which process produces haloid (1n) spores?
(A) Mitosis (B) Meiosis (C) Fertilization (D) Germination

2. Corolla is made up of:
(A) Sepals (B) Petals (C) Stamens (D) Carpel

3. Where are ovules produced in a flower?
(A) Style (B) Stigma (C) Ovary (D) Filament

4. One or more carpels are fused to form a structure called:
(A) Anther (B) Stamen (C) Filament (D) Pistil

5. The pollen sac in anther acts as:
(A) Megasporangium (B) Microsporangia (C) Megaspore (D) Pollination

6. What is the Polyploidy level of the microspore mother cell?
(A) Haploid (1n) (B) Diploid (2n) (C) Triploid (3n) (D) Tetradploid (4n)

7. Polyploidy level of the endosperm is:
(A) Haploid (1n) (B) Diploid (3n) (C) Triploid (3n) (D) Tetraploid (4n)

8. What does the ovary develops into after fertilization?
(A) The embryo (B) The endosperm (C) The seed (D) The fruit

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Define Tuber.

(ii) What are Spores?

(iii) Define Receptecal.

(iv) Write function of ovary?

(v) What is pistil?

(vi) What is the importance of tissue culture?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Explain the lifecycle of flowering plants, focusing on the alternation between the gametophyte and sporophyte generations.

Chapter 11

Biostatistics

Multiple Choice Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

11.1 Introduciton of Biostatistics

1. **What is the primary purpose of biostatistics?**
   (A) To analyze financial data (B) To apply statistical methods to biological science
   (C) To design engineering models (D) To study hostorial events
2. **In biostatistics, which method is used to predict future outcomes based on current data?**
   (A) Designing experiments (B) Interpreting results
   (C) Predicting outcomes (D) Analyzing data
3. **Which of the following is a use of biostatistics in agriculture?**
   (A) Crop yield prediction (B) Analysis of soil quality
   (C) Development of new fertilizers (D) All of the above
4. **Comparing the yield of different wheat verities is the example of:**
   (A) Clinical trails (B) Agriculture (C) Genetics (D) Epidemology

Answers

1. To apply statistical methods to biological science
2. Predicting outcomes 3. All of the above 4. Agriculture

11.2 Mean, Median and Mode

1. **Which of the following is another name for the mean?**
   (A) Range (B) Average (C) Mode (D) Median
2. **What is the formula for calculating the mean of a dataset?**
   (A) Sum of all data points ÷ Number of data points. (B) Sum of all data points × Number of data points.
   (C) Sum of all data points – Number of data points. (D) Sum of all data points + Number of data points.
3. **The median represents the:**
   (A) Greater value (B) Smaller value (C) Middle value (D) None of these
4. **What is the mode in the following data set: 150, 160, 160, 155, 155**
   (A) 160 (B) 155 (C) 160, 155 (D) 160, 150
5. **What is the first step to calculate mode?**
   (A) Arrange the data (B) Count the number of values
   (C) Count the frequency (D) Sum the values

Answers

1. Average 2. Sum of all data points ÷ Number of data points.
3. Middle value 4. 160, 155 5. Count the frequency

11.3 Bar Chart

1. **What is a bar chart used for?**
   (A) To show trends over time (B) To compare different categories of data
   (C) To represent numerical data (D) To display the distribution
2. **Horizontal axis is the:**
   (A) x-axis (B) y-axis (C) z-axis (D) x and z axis
3. **When creating a box chart, it is important to:**
   (A) Use different colours (B) Make the bars as wide as possible
   (C) Ensure the bars are evenly spaced. (D) Stat the y-axis at zero

Answers

1. To compare different categories of data
2. x-axis 3. Ensure the bars are evenly spaced.

Exercise (Multiple Choice Questions)

A. Select the correct answers for the following questions.

1. What is the primary purpose of biostatistics?
a) To analyse financial data
b) To apply statistical methods to biological sciences
c) To design engineering models
d) To study historical events

2. In biostatistics, which method is used to predict future outcomes based on current data?
a) Designing experiments
b) Drawing charts
c) Taking average
d) Analysing data

3. Which of the following best describes the mean of a data set?
a) The most frequently occurring value
b) The middle value when data is ordered
c) The sum of all values divided by the number of values
d) The difference between the highest and lowest values

4. If the data set is 5, 8; 12,15, 20, what is the median?
a) 8 b) 12 c) 15 d) 20

5. What is the mean of the data set: 7, 8, 9, 10, 11?
a) 7 b) 8 c) 9 d) 10

6. When the number of values in a data set is even, how is the median calculated?
a) By choosing the middle value
b) By taking the average of the two middle values
c) By selecting the most frequent value
d) By adding all values and dividing by the total number of values

7. In a data set with values 3, 3, 6, 7, 8, 9, 9, what is the mode?
a) 3 b) 6 c) 7 d) Both 3 and 9

8. If a data set has no repeated values, what is the mode?
a) The highest value
b) The average of the data set
c) There is no mode
d) The median value

9. In a bar chart, what does the height or length of each bar represent?
a) The total number of categories
b) The value of the corresponding category
c) The average of all values
d) The difference between the highest and lowest values

10. When constructing a bar chart, which axis usually represents the categories?
a) Vertical axis (y-axis)
b) Horizontal axis (x-axis)
c) Both axis equally represent the categories
d) Neither axis represents the categories

Answers

1. (b)	**2.** (c)	**3.** (c)	**4.** (b)	**5.** (c)
6. (b)	**7.** (d)	**8.** (c)	**9.** (b)	**10.** (b)

Short Questions developed according to the New Examination Techniques (Knowledge, Understanding, Application, Analytical and Conceptual) of the Education Department.

1. What is biostatistics?

Ans. Biostatistics is a branch of statistics that applies statistical methods to biological sciences.

2. What is importance of biostatistics?

Ans. Biostatistics is essential for designing biological experiments, clinical trials, and epidemiological studies.

3. What is importance of biostatistics in designing experiments and studies?

Ans. Biostatistics helps in planning and structuring experiments to ensure that the data collected will be relevant and sufficient to answer the research questions. For instance, in a clinical trial testing a new drug, biostatisticians determine the sample size needed to detect a significant effect.

4. How biostatistics does help in interpreting results?

Ans. After analysing data, biostatistics helps to interpret the results in a meaningful way. For example, interpreting the results of a survey on the prevalence of a disease in a population can guide health interventions.

5. How biostatistics is helpful in public health and policy making?

Ans. In public health, biostatistics provides evidence based insights that guide policy decisions and helath guidelines. For example, statistical analysis of data on COVID-19 rates can lead to the implementation of COVID-19 vaccination campaign.

6. Why do epidemiologists use biostatistics?

Ans. Epidemiologists use biostatistics to study the distribution and determinants of health and diseases in populations.

For example:

Analysing data on COVID-19 infection rates, recovery rates, and the effectiveness of vaccines involves biostatistical methods.

7. What is benefit of biostatistics in genetics?

Ans. Biostatistics is used in genetic research to analyse the inheritance of traits and the association of genetics variations with diseases.

For example:

Genetic studies use biostatistics to identify genetic markers linked to diseases like diabetes and cancer.

8. How does biostatistics help in agriculture?

Ans. In agricultural research, biostatistics helps in analysing crop yields, the effectiveness of fertilizers and the resistance of plants to perts and diseases.

For example: Comparing the yields of different wheat varieties under various famous practices involves statistical analysis.

9. What are the measures that help summarize and understand data sets?

Ans. The mean median and mode are the measures that help summarize and understand data sets.

10. What is mean in biostatistics?

Ans. The mean is also known as the average. In biostatistics, the sum of all the values in a data set divided by the number of values. It represents the central value of the data set.

11. What is the formula of mean in data set?

Ans.

$$\text{Mean} = \frac{\text{Sum of All data Points}}{\text{Numbers of Data Points}}$$

12. What is median in data set?

Ans. The median is the middle value of a data set when the values are arranged in ascending or descending order.

13. What is the value of median of the data set if the number of value is even?

Ans. If the number of values is even, the median is the average of the two middle values.

Exercise (Short Answer Questions)

B. Write short answers.

1. Define biostatistics.

Ans. Biostatistics: Biostatistics is a branch of statistics that applies statistical methods to biological sciences.

2. What is the median of a data set?

Ans. The middle value of data set is called median.

3. How is the mean calculated?

Ans. Mean is calculated by the following formula:

$$\text{Mean} = \frac{\text{Sum of all Data Points}}{\text{Number of Data Points}}$$

4. What does the height of a bar in a bar chart represent?

Ans. The height of a bar in a bar chart represents the number of units or observations in that category or simply the value of the variable.

5. What is the mode of a data set?

Ans. Mode of a data set: The mode is the value that appear most frequently in a data set. A data set may have one mode, more than one mode, or no mode at all.

Exercise (Essay Type Questions)

1. **Explain the importance of biostatistics in the field of public health. Provide examples of how it is used to inform public health decisions.**
2. **Discuss the differences between mean, median, and mode. Include examples where each measure is most appropriate to use.**
3. **Describe the steps involved in creating a bar chart using Excel, include a discussion on how to customize the chart for better visualization and interpretation of data.**
4. **Provide a detailed example of how to calculate the mean, median, and mode of a data set. Use the following data set for your calculations: 12, 15, 22, 8, 19, 25, 15.**
5. **You are given the following data set. Create a bar chart to represent the number of different types of fruits sold at a market in one week:**
   - **Apples: 30**
   - **Bananas: 45**
   - **Oranges: 20**
   - **Grapes: 25**
   - **Mangoes: 15**

   Ensure to label the axes and provide a title for the chart.

For Answers See "Hamdard Imtihani Biology 9th"

PAPER NO. 11 BIOLOGY CHAPTER WISE

Roll No.(in figures): ..... (in words): .....

Chapter: 11 Marks: 12

Biostatistics

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

	A	B	C	D
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. In biostatistics, which method is used to predict future outcomes based on current data?
(A) Designing experiments (B) Drawing charts
(C) Taking average (D) Analysing data

2. What is the primary role of biostatistics in biological research?
(A) Collecting data (B) Analyzing biological data
(C) Interpreting results (D) All of the above

3. Biostatistics is used in which of the following fields to study the spread of diseases?
(A) Epidemology (B) Genetics (C) Ecology (D) Biochemistry

4. If the data set is 5, 8; 12,15, 20, what is the median?
(A) 8 (B) 12 (C) 15 (D) 20

5. What is the mean of the following data set: 2, 4, 6, 8, 10:
(A) 4 (B) 6 (C) 8 (D) 10

6. If number of values is even then median is:
(A) Average of middle value (B) Sum of middle values
(C) Greater middle value (D) Smaller middle value

7. Median values are arranged in:
(A) Descending to ascending (B) Ascending or descending
(C) First even than add (D) First odd then even

8. What is the mean of the data set: 7, 8, 9, 10, 11?
(A) 7 (B) 8 (C) 9 (D) 10

9. A data set may have:
(A) one mode (B) more than one mode (C) No mode (D) All of these

10. A bar chart is a:
(A) Numerical representation (B) Tabular representation
(C) Alphabetic representation (D) Graphic representation

11. Which axis of a bar chart typically represents the categories?
(A) x-axis (B) y-axis
(C) Both x-axis and y-axis (D) x, y and z-axis

12. What is the first step in creating a bar chart?
(A) Determine the scale (B) Gather the data (C) Draw the axis (D) Label the bars

Roll No.(in figures): ..... (in words): .....

Chapter: 11
Biostatistics

SUBJECTIVE TYPE

Marks: 48
Time: 1.45 Hours

(PART - I)

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by biostatistics?
(ii) What is the mode of a data set?
(iii) What does the height of a bar in a bar chart represent?
(iv) How biological data can be analyzed?
(v) What is the role of biostatistics in public health?
(vi) Why epidemologists use biostatistics?
(vii) How biostatistics used in the field of genetics?
(viii) What is mean in biostatistics?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write the formula of mean.
(ii) Consider the following data set representing the weight (kg) of six students:
55, 60, 65, 70, 75, 80. What is the mean weight?
(iii) If the mean of a dataset is 12 and the number of values is 8. What is the sum of values?
(iv) What is the median of a data set?
(v) Write the steps to calculate median.
(vi) Define mode with example.
(vii) How mode is calculated?
(viii) Define bar chart.

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) For what purposes bar charts are used?
(ii) What are the steps to create a Bar Chart?
(iii) What does the height of a bar in a bar chart represent?
(iv) How biostatistics is helpful in analysing biological data?
(v) What is benefit of biostatistics in agriculture?
(vi) What is average?
(vii) How is the mean different from median.
(viii) What is the important part of a bar graph.

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) What is biostatistics? Write its importance. 4
(b) Discuss major uses of biostatistics in different fields. 5

Q6. (a) Describe the uses of Biostatistics in epidemiology, genetics, agriculture and clinical trials. 4
(b) Discuss the differences between mean, median and mode. Include examples where each measure is more appropriate to use. 5

Q7. (a) What is role of mean, median and mode in health sector? 4
(b) Find the mode of the data: 2, 6, 5, 3, 0, 3, 4, 3, 2, 4, 5, 2, 4. 5

Chapter 11: Biostatistics	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 1	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. In biostatistics, which method is used to predict future outcomes based on current data?
(A) Designing experiments (B) Interpreting results
(C) Predicting outcomes (D) Analyzing data

2. Which of the following is a use of biostatistics in agriculture?
(A) Crop yield prediction (B) Analysis of soil quality
(C) Development of new fertilizers (D) All of the above

3. Comparing the yield of different wheat verities is the example of:
(A) Clinical trails (B) Agriculture (C) Genetics (D) Epidemology

4. Which of the following is another name for the mean?
(A) Range (B) Average (C) Mode (D) Median

5. The median represents the:
(A) Greater value (B) Smaller value (C) Middle value (D) None of these

6. What is the mode in the following data set: 150, 160, 160, 155, 155
(A) 160 (B) 155 (C) 160, 155 (D) 160, 150

7. Horizontal axis is the:
(A) x-axis (B) y-axis (C) z-axis (D) x and z axis

8. When creating a box chart, it is important to:
(A) Use different colours (B) Make the bars as wide as possible
(C) Ensure the bars are evenly spaced. (D) Stat the y-axis at zero

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) Define biostatistics.
(ii) What is the median of a data set?
(iii) How is the mean calculated?
(iv) What is the most important part of bar chart?
(v) What is the mode of a data set?
(vi) What is bar chart?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Discuss the differences between mean, median, and mode. Include examples where each measure is most appropriate to use.

Chapter 11: Biostatistics	CHAPTER WISE CLASS TEST	Biology
Total Time: 35 Minutes	Test No. 2	Total Marks: 25

	A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

TIME: 10 Min **(OBJECTIVE)** **MARKS: 8**

Q.1: **08**

1. **It is a branch of statistics that applies statistical methods to biological sciences.**
   (A) Biochemistry (B) Economics (C) Biostatistics (D) Genetics
2. **Biostatistics involves applying statistical techiques to:**
   (A) Analyse data (B) Plan experiment (C) Predict future (D) Interpret results
3. **After analysing data, biostatistics helps interpret the:**
   (A) Hypothesis (B) Results (C) Theory (D) Observation
4. **Who use biostatistics to study the distribution and determinants of health and diseases in populations?**
   (A) Farmers (B) Doctors (C) Epidemiologist (D) Engineers
5. **It is the measure that helps summarize and understand data sets.**
   (A) Mean (B) Median (C) Mode (D) All of these
6. **In biostatistics, which method is used to predict future outcomes based on current data?**
   (A) Designing experiments (B) Drawing charts
   (C) Taking average (D) Analysing data
7. **If the data set is 5, 8, 12,15, 20, what is the median?**
   (A) 8 (B) 12 (C) 15 (D) 20
8. **If a data set has no repeated values, what is the mode?**
   (A) The highest value (B) The average of the data set
   (C) There is no mode (D) The median value

TIME: 25 Min **(SUBJECTIVE)** **MARKS: 17**

(PART - I)

Q.2 Write short answers the questions. **(6×2=12)**

(i) How biostatistics does help in interpreting results?

(ii) Why do epidemiologists use biostatistics?

(iii) What is benefit of biostatistics in genetics?

(iv) What is mean in biostatistics?

(v) When the median of the data set is the middle value?

(vi) What is mode in data set?

(PART - II)

☆ **Attempt the following question.** **(5)**

Q.3: Describe the steps involved in creating a bar chart using Excel, include a discussion on how to customize the chart for better visualization and interpretation of data.

PAPER NO. 12 BIOLOGY FIRST QUARTER

Roll No.(in figures): ..... **(in words):** .....

First Quarter **Marks: 12**

Chapter: 01 to 03 **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: 12

1. Which branch of biology deals with the study of animals?
(A) Botany (B) Zoology (C) Microbiology (D) Biochemistry

2. In which branch of biology we study the components of immune system and their role against diseases?
(A) Pathology (B) Marine biology (C) Ecology (D) Immunology

3. Which field of biology is related to healthcare, agriculture and environmental management?
(A) Biochemistry (B) Biophysics
(C) Computational Bilogy (D) Biotechnology

4. Oncologists, biologists, biochemists geneticists, pharmacologists and statisticions are included in:
(A) Human genome project (B) Climate change research
(C) Medical research (D) Space exploration

5. Who divided the organisms into two groups first?
(A) Ernst Hackel (B) Aristotle (C) Robert Hook (D) Golgi

6. Animal like protists are called:
(A) Protozoans (B) Amoeba (C) Fungi (D) Bacteria

7. Which are at the borderline of living and non-living organisms?
(A) Fungi (B) Viruses (C) Bacteria (D) Mosses

8. Allium cepa is the scientific name of:
(A) Onion (B) Tomato (C) Pea (D) Human beings

9. The fluidity of cell membrane is due to:
(A) Proteins (B) Lipids (C) Vitamins (D) Carbohydrates

10. During floating, ribosomes attached with:
(A) Rough endoplasmic reticulum (B) Cytoplasm
(C) Smooth endoplasmic reticulum (D) Nucleus

11. Which organ of plant is responsible for absorption of water and minerals from soil?
(A) Stem (B) Root (C) Leaves (D) Root hairs

12. What is the name of liver cells?
(A) Nephrons (B) Erythrocytes (C) Pancreatic cells (D) Hepatocytes

Roll No.(in figures): ..... (in words): .....

First Quarter

SUBJECTIVE TYPE

Marks: 48

Chapter: 01 to 03

(PART - I)

Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Define microbiology.

(ii) What do you know about cytology?

(iii) Define fossils. What is the oldest known fossil?

(iv) What is the difference between pathology and immunology?

(v) What is the different between surgery and medicine?

(vi) When human genome project completed and what was the important aim of it?

(vii) What is meant by scientific law? Give example.

(viii) What deduction was made for malaria?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by classification?

(ii) What was the contribution of E Chatton in classification?

(iii) Write down the taxonomic hierarchy of Carl Linnaeus?

(iv) Define viruses.

(v) What is the classification of Pea?

(vi) Why cell membrane is called selectively permeable membrane?

(vii) What is the difference between microtubules and microfilaments.

(viii) Write the function of chloroplasts.

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Differentiate between cilia and flagella.

(ii) Write any two advantages of plant cell structures.

(iii) Write down the advantages of animal cell structures.

(iv) What is the role of muscle cell in body?

(v) What is the role of liver cells in detoxification?

(vi) What is division of labour within cells?

(vii) What is the role of muscle cells and nerve cells?

(viii) How stem cells differentiate into specialized cells?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Science is a collaborative field in which scientists work together to share knowledge. Prove this statement by giving examples. 4

(b) What are the basic steps a scientist adopts in order to solve scientific problem? 5

Q6. (a) Explain Two-Kingdom Classification system. 4

(b) Describe Five-Kingdom Classification system. 5

Q7. (a) Write types and functions of endoplasmic reticulum? 4

(b) Describe the formation and function of the Golgi complex apparatus. 5

PAPER NO. 13 BIOLOGY SECOND QUARTER

Roll No.(in figures): ..... **(in words):** .....

Second Quarter **Marks: 12**

Chapter: 04 to 07 **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. ~~In which phase of cell cycle, the chromosomes duplicated?~~
   ~~(A) Mitosis (B) G 2 Phase (C) G 1 Phase (D) S Phase~~
2. **In which phase of mitosis, spindle fibers bind with the chromosome?**
   (A) Prophase (B) Metaphase (C) Anaphase (D) Telophase
3. **Pairing of homologus chromosomes is called:**
   (A) Crossing over (B) Chiasmata (C) Synapsis (D) Metaphase
4. **Circulatory system in animals is the example of:**
   (A) Organ system (B) Tissue (C) Molecules (D) Organism
5. **Which tissue lies between the upper and lower epidermis?**
   (A) Epidermal tissue (B) Mesophyll tissue (C) Vascular tissue (D) Epithelial tissue
6. **Examples of homeostasis are:**
   (A) Temperature (B) pH levels (C) Blood pressure (D) All of the above
7. **What is the primary function of carbohydrates?**
   (A) Provide energy (B) Act as enzymes (C) Regulate processes (D) Make membranes
8. **Which of the following are the good sources of proteins?**
   (A) Mutton (B) Eggs (C) Fish (D) All of the above
9. **Steroid hormones are derived from:**
   (A) Carbohydrate (B) Protein (C) Lipid (D) Nucleic Acids
10. **Structurally enzymes are made of:**
    (A) Minerals (B) Vitamins (C) Fats (D) Amino acids
11. **Chemical nature of enzymes is:**
    (A) Cellulose (B) Glucose (C) Lipids (D) Proteins
12. **Which is the alternative model to the lock and key model?**
    (A) Binding model (B) Catalytic model (C) Allosteric model (D) Induced fit model

Roll No.(in figures): ..... (in words): .....

Second Quarter **SUBJECTIVE TYPE** Marks: 48

Chapter: 04 to 07 **(PART - I)** Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What happens in G2 phase of cell cycle?

(ii) How is metaphase plate formed?

(iii) Write down the process of budding in Hydra.

(iv) How does crossing over contribute to genetic variations in meiosis?

(v) Write down the similarities between mitosis and meiosis.

(vi) Explain the example of organ and organ system from emergent properties.

(vii) Differentiate between root system and shoot system.

(viii) Tissue has more properties than cell. Explain with an example.

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is the important function of stem? Which tissue do stem contain?

(ii) Differentiate between skeletal system and muscular system.

(iii) What is the mechanism for cooling the body?

(iv) How nervous system and endocrine system maintain homeostasis?

(v) How can you define the term "macromolecules"? Give examples.

(vi) Explain about the percentage of biomolecule in the dry mass of protoplasm.

(vii) What are the main functions of carbohydrates in the body?

(viii) How lipids are the energy rich molecules? Explain.

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) How many components combine to form a nucleotide? Write their names.

(ii) Why and when Watson and Crick awarded noble prize?

(iii) What is the primary function of DNA?

(iv) Where are the ribozymes found?

(v) Define co-factors.

(vi) Justify "Lock and Key Model" of enzymes action.

(vii) What is optimum temperature? Write the optimum temperature for human enzyme.

(viii) How does pH affect enzyme activity?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Compare meosis and mitosis. 4

(b) Discuss how different organ systems work together to maintain homeostasis. 5

Q6. (a) What would happen if any one system in the human body does not work properly? 4

(b) What are main groups of lipids? 5

Q7. (a) What are Nucleic acids? Discuss different types of Nucleic acids. 4

(b) Why enzymes are vital to life? 5

PAPER NO. 14 BIOLOGY THIRD QUARTER

Roll No.(in figures): ..... **(in words):** .....

Third Quarter **Marks: 12**

Chapter: 08 to 11 **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: 12

1. Who proposed ATP as the main energy source?
(A) Louis Pasteur (B) Kelvin (C) Fritz Lipmann (D) Karl Loman

2. In which part of the plant cell Photosynthesis occurs:
(A) Mitochondria (B) Nucleus (C) Chloroplasts (D) Cell wall

3. What is the byproduct of anaerobic respiration in muscles?
(A) CO_2 and H_2O (B) Lactic acid (C) Ethanol (D) ATP only

4. Which plants fulfill their needs of nitrogen from the prey animals?
(A) Autotrophic (B) Heterotropic (C) Carnivorous (D) Omnivorous

5. Which part of roots is responsible for absorbing water from soil?
(A) Root hairs (B) Root cap (C) Cortex (D) Endodermis

6. Which of the following structures is primarily responsible for transpiration?
(A) Root hairs (B) Xylem (C) Phloem (D) Stomata

7. Cutting, grafting or layering are the examples of:
(A) Natural vegetative propagation (B) Artificial vegetative propagation
(C) Sexual reproduction (D) Fertilization

8. Which whorl is responsible of a developing flower?
(A) Calyx (B) Corolla (C) Androecium (D) Gyroecium

9. Female gametophyte at the end contains:
(A) One egg cell (B) One fusion nucleus
(C) Five non-functional cells (D) All of these

10. The development of fruits without fertilization is called:
(A) Pollination (B) Parthenocarpy (C) Fertilization (D) Germination

11. Biostatistics is used in genetic research to analyze the:
(A) Inheritance of traits (B) Genetic variations (C) Disease in population (D) Both a and b

12. If the mean of a dataset is 12 and the number of values is 8, what is the sum of values?
(A) 96 (B) 80 (C) 64 (D) 48

Roll No.(in figures): ..... (in words): .....

Third Quarter **SUBJECTIVE TYPE** Marks: 48

Chapter: 08 to 11 **(PART - I)** Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is the role of ATP in metabolic processes?

(ii) Write down any two events of light reactions.

(iii) What is meant by pigments?

(iv) In which type of anaerobic respiration pyruvic acid is converted in ethyl alcohol. State it.

(v) Why glycolysis also occurs in anaerobic respiration?

(vi) Why does older leaves are more susecptible to nitrogen deficiency?

(vii) How transpiration is a necessary evil?

(viii) How temperature affects the rate of transpiration?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What happens to the osmotic pressure in the phloem at the sink?

(ii) What are succulent organs?

(iii) Why can spores tolerate unfavorable conditions?

(iv) How vegetative propagation is better than sexual method?

(v) Write the names of types of stems take part in vegetative propagation.

(vi) How reproduction of plants take place through bulb? Give two examples.

(vii) What is artificial propagation?

(viii) How new plants are grown from cutting?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What are the disadvantages of vegetative propagation?

(ii) Define receptacle. Write its function.

(iii) Write the names of the floral parts of a flower.

(iv) Name the main stages in the life cycle of angiosperm.

(v) What do you known about pollen grain?

(vi) How would you differentiate self-pollination and cross pollination?

(vii) How development of sporophyte takes place?

(viii) How pistil is formed?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Outline the mechanism of aerobic respiration. **4**

(b) Give difference between photosynthesis and respiration. **5**

Q6. (a) Describe the events involved in the opening and closing of stomata. **4**

(b) What will happen if transpiration does not take place in plants? **5**

Q7. (a) Write disadvantages of seedless plants. **4**

(b) What is the significance of mean in biostatistics? **5**

PAPER NO. 15 BIOLOGY FIRST HALF

Roll No.(in figures): ..... (in words): .....

First Half Marks: 12

Chapter: 01 to 05

OBJECTIVE TYPE

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions. 12

1. The structure, functions, habitats and reproduction of microorganisms is studied in:
(A) Molecular biology (B) Anatomy (C) Botany (D) Microbiology

2. We study the rules of lever and motion for understanding the function of muscles, bones and joints in:
(A) Biotechnology (B) Biogeography (C) Biophysics (D) Biochemistry

3. Hardy-Weinberg law and Mendle's laws of inheritance are the examples of:
(A) Biological laws (B) Theosies (C) Hypothesis (D) Principles

4. The most specific level of classification:
(A) Kingdom (B) Phylum (C) Genus (D) Species

5. Plants cell wall is made up of:
(A) Chitin (B) Chlorophyll (C) Peptidoglycan (D) Cellulose

6. Fluid mosaic model belongs to:
(A) Cell wall (B) Cell membrane (C) Dermis (D) Pericycle

7. What is the main function of ribosome.
(A) Protein synthesis (B) Cell division (C) DNA replication (D) Storage of wastage

8. Mitosis was discovered by:
(A) Pasteur (B) Darwin (C) Walther Flemming (D) Lamark

9. In which stage of cell cycle does cytokinesis occur?
(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

10. How many cells are formed, after telophase-II of meiosis?
(A) Four haploid cells (B) One diploid cell (C) Two diploid cells (D) Eight haploid cells

11. Which one of the following system consists of Mouth, stomach, intestine and liver like organs?
(A) Nervous System (B) Digestive System (C) Circulatory System (D) Muscular System

12. What is the function of the epidermis?
(A) Photosynthesis (B) Protection of plant (C) Absorption of water (D) Storage of food

Roll No.(in figures): ..... (in words): .....

First Half

SUBJECTIVE TYPE

Marks: 48

Chapter-01 to 05

(PART - I)

Time: 1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) How is anatomy different from morphology?

(ii) Which branch of Biology involves the study of the development and growth of organisms from fertilization to birth or hatching?

(iii) Discuss the work of an agriculturists and a horticulturists.

(iv) What thing do public health experts try to improve?

(v) What was the only remedy for malaria from 17th to 20th century?

(vi) Differentiate between prokaryotes and Eukaryotes.

(vii) What is Computational Biology?

(viii) How is the biodiversity crucial for humans and for the planet Earth?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What are the main functions of cell membrane?

(ii) Why mitochondria is called the "Powerhouse" of the cell?

(iii) Which type of cell is responsible for sending nerve signals?

(iv) What do you know about the principle division of labour?

(v) Define cytosol.

(vi) Differentiate between karyokinesis any cytokinesis.

(vii) What is diploid and haploid?

(viii) What is the function of the centrosome during cell division?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What is meant by emergent properties?

(ii) How molecule is formed?

(iii) What is the function of epithelial tissue and vascular tissue?

(iv) Enlist the levels of organization from cells to organ systems.

(v) What are the major roles of the epithelial tissue present in the stomach?

(vi) Define homeostasis. Give an example.

(vii) Write the names of the organ systems which maintain homeostasis:

(viii) What is the role of urinary system in homeostasis?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) How can biological method be used to understand the spread of malaria? 4

(b) Why Ronald Ross did not allow the infected mosquitoes to bite a healthy person? 5

Q6. (a) What is three-Domain Classification System? 4

(b) Write a note on lysosomes, also draw labelled diagram. 5

Q7. (a) What is the hardest phase to identify in mitosis? 4

(b) What would happen if stomata do not work properly? 5

PAPER NO. 16 BIOLOGY SECOND HALF

Roll No.(in figures): ..... **(in words):** .....

Second Half **Marks: 12**

Chapter: 06 to 11 **OBJECTIVE TYPE** **Time: 15 Minutes**

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. What is the primary function of carbohydrates?

(A) Provide energy (B) Act as enzymes (C) Regulate processes (D) Make membranes

2. What is true about cellulose?

(A) It is sweet in taste. (B) It is soluble in water.(C) It provides support. (D) It is digestable.

3. Which nitrogenous base is found in RNA but not in DNA?

(A) Adenine (B) Thymine (C) Uracil (D) Guanin

4. Primarily all enzymes are;

(A) Nucleic acids (B) Proteins (C) Carbohydrates (D) Lipids

5. The substrate is transformed into the:

(A) Enzyme substrate complex (B) Products

(C) Active site (D) Coenzymes

6. When all the active sites of the enzymes are occupied. This state is called :

(A) Denaturation (B) Saturation (C) Inactivation (D) Unsaturation

7. Which pigment is responsible for absorbing light energy in photosynthesis?

(A) Chlorophyll (B) Carrtenoids (C) Anthocyanins (D) Betacyanins

8. The chemical formula of lactic acid is:

(A) C_2H_2OH (B) $C_3H_6O_3$ (C) $C_6H_{12}O_6$ (D) $C_2H_{12}O_6$

9. Plants roots absorbs in ionic form.

(A) Magnesium (B) Calcium (C) Nitrogen (D) Hydrogen

10. The transpiration is regulated by;

(A) Mesophyll (B) Guard cells (C) Xylem (D) Phloem

11. In binary fission, the parent cell divides into:

(A) One daughter cell (B) Two daughter cells (C) Three daughter cells (D) Four daughter cells

12. Find the median of the following data set: 12, 15, 18, 20, 25, 30, 22

(A) 25 (B) 20 (C) 22 (D) 15

Roll No.(in figures): ..... (in words): .....

Second Half **SUBJECTIVE TYPE** **Marks: 48**

Chapter: 06 to 11 **(PART - I)** **Time: 1.45 Hours**

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What are the types of RNA? Write their functions.

(ii) Name two monosaccharides and two disaccharides.

(iii) What is amino acid and draw its structure?

(iv) How do the three group of carbohydrates differ in taste?

(v) What are the basic components of lipids?

(vi) What is meant by phospholipids?

(vii) What do you know about metabolism?

(viii) Define lipolysis.

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is the specificity of enzymes?

(ii) What are the uses of enzymes in food industry?

(iii) Differentiate between catabolism and anabolism.

(iv) What is meant by fermentation?

(v) Write down the word equation for photosynthesis.

(vi) Define light reactions.

(vii) What happens to the electrons released when chlorophyll absorbs light?

(viii) Name the final products of Aerobic and Anaerobic respiration.

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What causes stomata to open and close?

(ii) How does water moves from epidermal cells to guard cells in transpiration?

(iii) How do lenticels facilitate gas exchange in woody stems?

(iv) How extra oxygen and carbon dioxide excreated from the plant?

(v) Differentiate between guttation and dew.

(vi) Differentiate between sexual and asexual re0production.

(vii) Write a short on budding in yeast.

(viii) State how potatoes reproduce through tubers.

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Explain how the information in DNA is converted to information on RNA and then to proteins? **4**

(b) What are digestive enzymes? What do they do? **5**

Q6. (a) Discuss the budghet of energy in aerobic and anaerobic respiration. **4**

(b) Why is translocation essential for plants? **5**

Q7. (a) What are the benefits of asexual reproduction in plants? **4**

(b) Find the mean of the first 10 odd integers. **5**

PAPER NO. 17 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (01) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. It is the branch of Biology that deals with the functioning of body parts:

(A) Palaeontology (B) Immunology (C) Physiology (D) Pharmacology

2. The United Nations has designed _____ as International Biodiversity Day.

(A) July 3rd (B) April 1st (C) May 22nd (D) September 6th

3. Biologist have identified and described about _____ kinds of organisms.

(A) 0.1 million (B) 0.2 million (C) 0.3 million (D) 0.4 million

4. The basic structure of a cell was discovered by:

(A) Louis Pasteur (B) Robert Brown (C) Robert Hooke (D) Zacharias Janssen

5. The longest phase of cell cycle is:

(A) Prophase (B) Telophase (C) Interphase (D) Metaphase

6. Atoms combine to form:

(A) tissue (B) cell (C) organ (D) molecule

7. It is the study of the structure and function of the biomolecules:

(A) Biostatistics (B) Marine biology (C) Biochemistry (D) Molecular Biology

8. There are _____ sub sets of metabolism.

(A) 2 (B) 3 (C) 4 (D) 5

9. The energy currency of all cells is:

(A) ATP (B) ADP (C) NADP (D) NADPH

10. Plants use sunlight to turn carbon dioxide and water into:

(A) Potassium (B) Nitrogen (C) Sugar (D) Calcium

11. Which is the usual method of reproduction in bacteria?

(A) Budding (B) Grafting (C) Binary fission (D) None of these

12. It is a branch of statistics that applies statistical methods to biological sciences.

(A) Biochemistry (B) Economics (C) Biostatistics (D) Genetics

Roll No.(in Figures): ..... (in Words): .....

Annual (01)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Define physiology.
(ii) What is histology?
(iii) How many kinds of organisms have been named and classified by biologists?
(iv) Which region has more biodiversity, tropical or polar?
(v) Give examples of some cells that can be seen with naked eye.
(vi) What is cell wall?
(vii) During which phase of mitosis sister chromatids separate?
(viii) Which phase of interphase is called growth phase?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What are atoms?
(ii) How molecules are formed?
(iii) What key role does the Golgi apparatus play in eukaryotic cells?
(iv) What are biomolecules?
(v) What is location of carbohydrates in the cell?
~~**(vi)** Explain main functions of carbohydrates.~~
(vii) What are enzymes?
(viii) What is Lipolysis?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Who proposed that ATP is the main energy transfer molecule in the cell?
(ii) What does ATP stand for?
(iii) Define the term nutrition.
~~**(iv)** Define mineral nutrition in plants.~~
(v) What is a sexual reproduction?
(vi) Write a short note on spore formation in fungi.
~~**(vii)** What is biostatistics?~~
~~**(viii)** What is the mode of a data set?~~

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Write a note on different branches of Biology. (5)

~~**(b) Discuss the concept of biodiversity and its significance in maintaining the health of ecosystems.**~~ (4)

Q6. (a) Write functions of carbohydrates. (4)

(b) What is meant by metabolisms? Describe its types. (5)

Q7. (a) Define nutrition and nutrients. Describe its types. (5)

(b) Explain the process of binary fission in bacteria and describe how it leads to the formation of two daughter bacteria. (4)

PAPER NO. 18 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (02) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: 12

1. It deals with the use of living organisms or their components to develop beneficial products or processes for various fields such as healthcare, agriculture and environmental management.

(A) Biophysics (B) Biostatistics (C) Biotechnology (D) Biochemistry

2. Each phylum/division is divided into related:

(A) Species (B) Class (C) Genus (D) Phylum

3. It is the most specific level of classification.

(A) Genus (B) Family (C) Class (D) Species

4. The cell wall of algae is composed of:

(A) cellulose (B) Lignin (C) Pectin (D) Hemicellulose

5. Cell makes proteins and organelles and so grow in size during.

(A) Cytokinesis (B) G1 phase (C) S phase (D) G2 phase

6. There are responsible for cellular respiration.

(A) Mitochondria (B) Ribosomes (C) Lysosomes (D) Centrioles

7. Simpler substances combine to form complex substances in:

(A) Anabolism (B) Biomolecules (C) Metabolism (D) Catabolism

8. When we get energy from ATP, which bonds are broken?

(A) P-P bonds (B) C-H bonds (C) C-N bonds (D) C-O bonds

9. Light reactions of photosynthesis occur in;

(A) Plasma membrane of cell (B) Cytoplasm of cell

(C) Stroma of chloroplasts (D) Thylakoids of chloroplasts

10. Which major component regulates the opening and closing of the stoma?

(A) Sulphur (B) Calcium (C) Potassium (D) Hydrogen

11. Which of the following animals reproduce by budding?

(A) Hydra (B) Amoeba (C) Planaria (D) Bacteria

12. Biostatistics helps in planning and formation of:

(A) Data (B) Models (C) Results (D) Graph

Roll No.(in Figures): ..... (in Words): .....

Annual (02)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Define pathology.

(ii) What is biochemistry?

(iii) What is classification?

(iv) What are taxonomic ranks?

(v) What is fluid mosaic model?

(vi) What is cytosol?

(vii) In which phase of interphase DNA of each chromosome is replicated (copied)?

(viii) What is G0 phase?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is the function of epithelial tissue?

(ii) How do the smooth muscles contribute to the stomach's function?

(iii) What does an organ system consist of?

(iv) Define metabolism.

(v) Differentiate between anabolism and catabolism.

(vi) Which monosaccharides make a sucrose molecule?

(vii) What are ribozymes?

(viii) What is the advantage of globular structure of the enzymes?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What amount of energy is released. When the bonds between phosphates is broken?

(ii) Why is chlorophyll important for photosynthesis?

(iii) Define macronutrients and micronutrients and give examples.

(iv) Which macronutrients is necessary for cellular respiration?

(v) Name the animals that reproduce by binary fission.

(vi) Name the animals that reproduce by budding.

(vii) How biostatistics does help in interpreting results?

(viii) How biostatistics is helpful in public health and policy making?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Discuss relation of Biology with other Sciences. **(5)**

(b) Write aims and principles of classification. **(4)**

Q6. (a) Write percentage of biomolecules in dry mass of protoplasm. **(5)**

(b) Describe the characteristics of enzymes. **(4)**

Q7. (a) Discuss the role of important micronutrients in Plants. **(5)**

(b) Discuss the Process of Binary Fission in Protists. **(4)**

PAPER NO. 19 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (03) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. The defective parts of the body are repaired, replaced or removed in:

(A) Biotechnology (B) Horticulture (C) Agriculture (D) Surgery

2. Human is a class of:

(A) Magnoliophyta (B) Cordata (C) Fabales (D) Pisum

3. Hominidae is the family of:

(A) Pea (B) Human (C) Onion (D) Fruitfly

4. It is the jelly like substance that fills the inside of nucleus.

(A) Nucleoplasm (B) Nucleus (C) Cytoplasm (D) Chloroplast

5. Cell grows and produces proteins necessary for cell division during:

(A) S phase (B) G1 phase (C) G2 phase (D) Metaphase

6. In the wall of stomach; which tissue also contains blood vessels and nerves?

(A) Epithelial (B) Muscle (C) Inner connective (D) Outer connective

7. These are simple sugars made of single sugar molecule:

(A) Monosaccharides (B) Diasaccharides (C) Polysaccharides (D) Fatty acids

8. How does increasing temperature affect enzyme activity?

(A) Increases activity to a point (B) Always decreases activity

(C) Makes enzymes non-functional (D) No effect on enzyme

9. In Ribose sugar, number of carbon atom is:

(A) 4 (B) 5 (C) 6 (D) 7

10. Deficiency of which macronutrient slows down the growth of plant?

(A) Chlorophyll (B) Oxygen (C) Nitrogen (D) Sulphur

11. It is a horizontal stem that grows above the ground:

(A) Stolon (B) Tuber (C) Bulb (D) Corm

12. What is the mean of the data set: 7, 8, 9, 10, 11?

(A) 7 (B) 8 (C) 9 (D) 10

Roll No.(in Figures): ..... (in Words): .....

Annual (03)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Which degree is required for the career of pharmacology?

(ii) According to Sura Ambia, Verse 30 what all living things were created from?

(iii) What are the four kingdoms of domain Eukarya?

(iv) In which rank each kingdom is subdivided?

(v) What is chromatin?

(vi) Why DNA is called the hereditary material?

(vii) Differentiate between diploid and haploid cells.

(viii) Who discovered mitosis?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What does happen when organelles interact within a cell?

(ii) What emergent properties arise from the interactions of various organ systems in an individual?

(iii) Tissue has more properties than cell. Explain with an example.

(iv) What is general formula of carbohydrates?

(v) What are characteristics of monosaccharides?

(vi) How do the three group of carbohydrates differ in taste?

(vii) Differentiate between intracellular enzymes and extracellular enzymes.

(viii) What are cofactors?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) How is oxygen produced during photosynthesis?

(ii) Which are the most energy rich biomolecules?

(iii) What is the function of Molybdeum?

(iv) Name the micronutrient that is involved in osmosis of water in plants.

(v) How spores are released?

(vi) Describe how vegetative propagation occurs through runners.

(vii) Why do epidemiologists use biostatistics?

(viii) What is benefit of biostatistics in genetics?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Explain how the study of Biology can lead to different professional studies. 5

(b) Describe the Linnaean system of taxonomic hierarchy in detail, outlining the seven major taxonomic ranks and their relationships. 4

Q6. (a) Write a comprehensive note on the structures and roles of the three classes of carbohydrates. 4

(b) Write uses of enzymes in different industries. 5

Q7. (a) Discuss the role of important macronutrients in plants. 4

(b) Discuss asexual reproduction by spores in rhizopus. 5

PAPER NO. 20 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (04) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: 12

1. The Human Genome project was completed in:
(A) 2001 (B) 2002 (C) 2003 (D) 2004

2. Abu Usman Umer Al Jahiz described the characteristics of _____ species of aniamals.
(A) 150 (B) 250 (C) 350 (D) 450

3. Who divided plants into fifteen groups and called them genera:
(A) Andrea Caesalpinia (B) Jon ray
(C) Tourne fort (D) Carl Linnaeus

4. These rods make cell-to-cell junctions:
(A) Microtubules (B) Intermediate filaments
(C) Microfilaments (D) Ribosomes

5. In division phase, the cell divides into:
(A) 2 daughter cells (B) 3 daughter cells (C) 4 daughter cells (D) 5 daughter cells

6. In plants the root system:
(A) Anchors the plant (B) Absorbs water (C) Absorbs nutrients (D) All of these

7. Maltose is made of two molecules of:
(A) Fructose (B) Galactose
(C) Two Glucose molecules (D) Chitin

8. Enzymes contain amino acids:
(A) 50 to 100 (B) 100 to 500 (C) 100 to 1000 (D) 1000 to 1500

9. Which of the following organisms use inorganic raw materials to prepare their organic food?
(A) Plants (B) Algae (C) Some bacteria (D) All of these

10. The primary function of root hairs is:
(A) Transport of nutrients (B) Storage of food
(C) Increase surface area for absorption (D) Synthesis of proteins

11. Root hairs absorb salts from soil by;
(A) Diffusion (B) Osmosis (C) Active transport (D) Filtration

12. In a bar chart, what does the height or length of each bar represent?
(A) The total number of categories (B) The value of the corresponding category
(C) The average of all values
(D) The difference between the highest and lowest values

Roll No.(in Figures): ..... (in Words): .....

Annual (04)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Researchers from which disciplines were involved in the Human Genome Project?

(ii) What does cancer research involve?

(iii) What are the main functions of cell membrane?

(iv) What could happen if lysosomal enzymes stop working properly?

(v) What are ribosomes?

(vi) What is endoplasmic reticulum. Where it is located in eukaryotic cells?

(vii) Differentiate between chromatin and chromosomes.

(viii) What are the key events of anaphase in mitosis?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is the function of the centrosome during cell division?

(ii) What is the reproductive part of the plant?

(iii) Name the tissues that form a leaf.

(iv) What is maltose?

(v) Which is the most abundant carbohydrates in nature?

(vi) Give some examples of polysaccharides.

(vii) What are uses of enzymes in food industry?

(viii) Which enzymes are used for the removal of protein stains from clothes?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) In how many phases does photosynthesis occur?

(ii) On which organelles do light reactions take place?

(iii) State the role of nitrogen in plants.

(iv) How do carnivorous plants fulfil their needs of nitrogen?

(v) What is stolon or runner?

(vi) What is tuber?

(vii) How does biostatistics help in agriculture?

(viii) What are the measures that help summarize and understand data sets?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Write about some more careers and their major jobs in biology. **4**

(b) Write down classification of human, fruit fly and pea. **5**

Q6. (a) What are different sources and functions of carbohydrates? **4**

(b) Explain the mechanism of lock and key and induce fit model. **5**

Q7. (a) Discuss role of nitrogen and magnesium. **4**

(b) Explain different methods of vegetative propagation. **5**

PAPER NO. 21 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (05) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. Cancer research involves biologists, biochemists, geneticist, pharmacologists, statisticians and:

(A) Oncologists (B) Engineers (C) Dentists (D) Biotechnologists

2. In 1866, third kingdom classification system was introduced by:

(A) E-Chatton (B) Robert Whittaker (C) Ernst Hackel (D) Carl Woese

3. E-Chatton suggested the term "Procariotique" to describe:

(A) Fungi (B) Animals (C) Plants (D) Bacteria

4. The process of cellular respiration occurs in:

(A) Nucleus (B) Mitochondria (C) Ribosomes (D) Golgi apparatus

5. In eukaryotes mitosis occurs in the:

(A) Germs cells (B) Somatic cells (C) Daughter Cells (D) Parent cells

6. Centrosomes make mitotic spindle in;

(A) Animal cells (B) Plant cells (C) Prokaryotic cells (D) All of these

7. Dietary fibre contains:

(A) Chitin (B) Starch (C) Cellulose (D) Glycogen

8. On which molecules enzyme affect?

(A) Substrate (B) Products (C) Inhibitor (D) Activator

9. What is the primary function of carbohydrates?

(A) Provide energy (B) Act as enzymes (C) Regulate processes (D) Make membranes

10. Most of the transpiration occurs through:

(A) Lenticels (B) Cuticle (C) Stomata (D) Guard cells

11. Which of the given plants grow from stem cutting?

(A) Grapevines (B) Roses (C) Sweet potato (D) Both (A) and (B)

12. Who use biostatistics to study the distribution and determinants of health and diseases in populations?

(A) Farmers (B) Doctors (C) Epidemiologist (D) Engineers

Roll No.(in Figures): ..... (in Words): .....

Annual (05)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is meant by scientific method?

(ii) How is the profession of medicine and surgery different from animal husbandry?

(iii) Who created a taxonomic hierarchy of organisms with six taxa?

(iv) How is the biodiversity crucial for humans and for the planet Earth?

(v) Define stem cell.

(vi) What is the function of golgi apparatus?

(vii) What is regeneration?

(viii) How does hydra reproduce?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Enlist the events that occur during the G1 phase of interphase?

(ii) What is the function of cuticle?

(iii) What is the function of stomata?

(iv) What are the main functions of carbohydrates in the body?

(v) Which is the most abundant biomolecules in the cell?

(vi) What are the basic components of lipids? Draw their structures.

(vii) What two models have been proposed to explain the mechanism of enzyme action?

(viii) What is the active site of enzyme? State its importance in enzyme specificity.

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Which organisms carry out photosynthesis? Which cell organelle is responsible for the absorption of light for photosynthesis?

(ii) What is used to reduce NADP into NADPH?

(iii) In which form do plant roots absorb Nitrogen?

(iv) Define osmosis.

(v) Write a short note on spore formation in fungi.

(vi) Write a short note on budding in yeast.

(vii) What is mean in biostatistics?

(viii) What does the height of a bar in a bar chart represent?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) What do you know about the instructions of Quran to reveal the study of life? **4**

(b) Write a note on the history of the classification system. **5**

Q6. (a) What are proteins? Discuss structure of the proteins. **4**

(b) Describe the factors that affect the activity of enzymes. **5**

Q7. (a) What is meant by transport in plants? Write about transport in plants. **4**

(b) Define sporophyte and gametophyte. State their role in the life cycle of plants. **5**

PAPER NO. 22 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (06) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. Which career involves designing and making medical equipment to improve patient care?

(A) Public health (B) Biomedical engineering

(C) Genetic counselling (D) Microbiology

2. The domain Archeae contains kingdom:

(A) Eubacteria (B) Protista (C) Archaebacteria (D) Plantae

3. They are found in extremely salty environment:

(A) Mathanogens (B) Thermophites (C) Halophytes (D) Xerophytes

4. Which process in aerobic respiration produces the most ATP?

(A) Glycolysis (B) Krebs cycle

(C) Electron transport chain (D) Fermentation

5. Centrosomes make mitotic spindle in;

(A) Animal cells (B) Plant cells (C) Prokaryotic cells (D) All of these

6. The outermost layer of leaf is made of:

(A) Palisade mesophyll (B) Epidermal tissue (C) Spongy mesophyll (D) Vascular tissue

7. In amino acid alanine, the R group is:

(A) COOH (B) NH_2 (C) CH_3 (D) H

8. Which of the following are the examples of coenzymes?

(A) Vitamins (B) Nucleotides

(C) Nucleotides and vitamins (D) Nucleic acid

9. The details of dark reaction were discovered by:

(A) Melvin Calvin (B) Fritz Lipmann (C) Robert Whittaker (D) Ernst Hackle

10. In woody stems, the entire surface is covered by:

(A) Bark (B) Cuticle (C) Epidermis (D) endodermis

11. The male gametophyte in flowering plants is known as:

(A) Pollen grain (B) Embryo sac (C) Ovary (D) Carpel

12. It is the measure that helps summarize and understand data sets.

(A) Mean (B) Median (C) Mode (D) All of these

Roll No.(in Figures): ..... (in Words): .....

Annual (06)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Differentiate between qualitative observations and quantitative observations.

(ii) Define the term hypothesis.

(iii) Who did modify the five-kingdom classification system of Whittaker?

(iv) In which two domains did Carl Woese place the prokaryotes?

(v) Discuss functions of lysosomes.

(vi) Why mitochondria are called the power house of the cell?

(vii) What is the role of metastasis in cancer.

(viii) What is meiosis?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Difference between Palisade and spongy mesophyll.

(ii) Where vascular tissue is arranged?

(iii) Why Vascular tissue is categorized as complex tissue?

(iv) How many types of amino acids occur in organisms?

(v) What is an amino acid?

(vi) Which monosaccharides make a sucrose molecule?

(vii) Define an enzyme. What is its role in metabolism?

(viii) Provide two examples of enzymes that operate optimally at specific pH.

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write down the word equation for photosynthesis.

(ii) What are pigments?

(iii) How transport of water, salts and food is carried out in all land plants (except mosses and liverworts)?

(iv) What is epidermis?

(v) For propagation of which plants cuttings are used?

(vi) Which plants reproduce by grafting?

(vii) What is the formula of mean in data set?

(viii) What is median in data set?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Write a descriptive note on the experiment performed by Ross. 4

(b) What is the Cell cycle and what are its main phases? 5

Q6. (a) Explain the levels of organization in multicellular organism. How does each level contribute to the overall functioning of an organism? 4

(b) Describe the importance of oxidation reduction reactions. 5

Q7. (a) Discuss enzyme inhibition. 4

(b) Explain the internal structure of root and describe the uptake of salt and water by root. 5

PAPER NO. 23 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (07) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. Logical results of hypotheses are called:

(A) Theories (B) Hypothesis (C) Experiments (D) Deductions

2. Plant–like protists have:

(A) Cell walls made of cellulose (B) Chlorophyll

(C) Autotropic (D) All of these

3. Amoeba and paramecium are:

(A) Protozoans (B) Algae (C) Fungi (D) Bacteria

4. Leucoplasts are present in the cells of:

(A) Underground stems (B) Seeds (C) Roots (D) All of these

5. An organism has 4 pairs of chromosomes. After meiosis-I, how many chromosomes and chromatids will be present in each daughter cell?

(A) 8 chromosomes and 16 chromatids (B) 4 chromosomes and 8 chromatids

(C) 4 chromosomes and 4 chromatids (D) 8 chromosomes and 8 chromatids

6. At which level of organization gas exchange occurs between body and environment?

(A) Organelle level in mitochondria (B) Cellular level in alveolar cells

(C) Tissue level in epithelial tissues (D) Organ system level in the respiratory system

7. Collagen and Keratin make whole structures of:

(A) Cartilage (B) Hair (C) Nails (D) All of these

8. Primarily all enzymes are;

(A) Nucleic acids (B) Proteins (C) Carbohydrates (D) Lipids

9. The chemical formula of lactic acid is:

(A) $C_2H_6O_2$ (B) $C_3H_6O_3$ (C) $2\ C_2H_4O_3$ (D) $C_4H_2O_6$

10. For transportation in most plants, glucose is converted into:

(A) Lipids (B) Proteins (C) Sucrose (D) Lactose

11. What are the organs for sexual reproduction in angiosperms (flowering plants)?

(A) Roots (B) Flowers (C) Stems (D) Fruits

12. The middle value to understand data sets is given in:

(A) Mean (B) Median (C) Mode (D) All of these

Roll No.(in Figures): ..... (in Words): .....

Annual (07)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Define the term deduction.
(ii) Which is the most basic step of scientific method?
(iii) Which protist causes malaria?
(iv) What does kingdom protista include?
(v) What are plastids?
(vi) What is function of chloroplast?
(vii) What is synapsis?
(viii) What is chiasmata?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Enlist the levels of organization from cells to organ systems.
(ii) Name some organs present in human body.
(iii) ~~How does the human body maintain a stable internal temperature?~~
(iv) What is fibrin?
(v) What are antibodies?
(vi) What are lipids?
(vii) Provide an example of a specific enzyme-substrate pair.
(viii) What does happen to the rate of enzyme action upto optimum temperature?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) What are pigments?
(ii) What are main pigments and accessory pigments in photosynthesis.
(iii) Define the term transpiration.
(iv) How do the plants of rubber and keekar excrete their wastes?
(v) Which types of generation do plants have during sexual reproduction?
(vi) What sporophyte generation produces.
(vii) ~~How is the mean calculated?~~
(viii) ~~What is the value of median of the data set if the number of value is even?~~

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Describe the structure and functions of the cell wall. 4

(b) Describe the events that occur during the phases of mitosis. 5

Q6. (a) ~~What are the emergent properties when lower levels make higher levels?~~ 4

(b) Explain ATP as a molecule that is the chief energy currency of all cells. 5

Q7. (a) Write a note on metabolism. 4

(b) Define transpiration. Write types of transpiration. 5

PAPER NO. 24 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (08) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. The scientific method in which biological problems are solved is called:

(A) Geological problem (B) Non-biological method
(C) Biological method (D) All of these

2. The cell wall of fungi are made of:

(A) Cellulose (B) Lignin (C) Chitin (D) Pectin

3. Mosses, ferns, conifers and flowering plants are the examples of kingdom:

(A) Protista (B) Animalia (C) Plantae (D) Fungi

4. Plant cells are interconnected by:

(A) Golgi apparatus (B) Plasmodesmata (C) Microtubles (D) Centrosome

5. In meiosis, a diploid parent cell divides to produce ____ haploid daughter cells.

(A) 2 (B) 3 (C) 4 (D) 5

6. Which of the following proteins is involved in oxygen transport?

(A) Insulin (B) Haemoglobin (C) Collagen (D) Keratin

7. Lipids are soluble in:

(A) Alcohol (B) Ether (C) Benzene (D) All of these

8. Prosthetic groups are;

(A) Required by all enzymes. (B) Proteins in nature.
(C) Loosely attached with enzymes. (D) Tightly bound to enzyme.

9. The first step of aerobic respiration is:

(A) Krebs cycle (B) Dark reaction
(C) Glycolysis (D) Electron transport chain

10. The loss of excesss water in the form of vapours from plant surface is called:

(A) Translocation (B) Guttation (C) Transpiration (D) Excretion

11. Which of the following organisms commonly reproduce by binary fission?

(A) Yeast (B) Bacteria (C) Rhizopus (D) Plants

12. If the number of values is odd, the median is the:

(A) First value (B) Second value (C) Middle value (D) Last value

Roll No.(in Figures): ..... (in Words): .....

Annual (08)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) When does a theory become a law or principle?
(ii) What is a scientific law?
(iii) What are the characteristics of fungi?
(iv) Give some examples of kingdom plantae.
(v) What are vacuoles?
(vi) Which animals contain contractile vacuoles?
(vii) What is crossing over?
(viii) Differentiate between disjunction and non-disjunction.

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What functions does the liver and kidney perform?
(ii) What does the inner wall of stomach secrete?
(iii) Define amino acid and draw its structure.
(iv) What are glycerol and fatty acids?
(v) Differentiate between saturated fatty acids and unsaturated fatty acids.
(vi) What are phospholipids?
(vii) Which factors do affect the activity of enzymes?
(viii) Define the term optimum temperature. What is optimum temperature for enzyme in human body?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) What is cellular respiration?
(ii) What is the most common food used by Cells to get energy?
(iii) How is the transpirational pull important in plants?
(iv) Define transpiration write names of its types.
(v) What is the function of receptacle?
(vi) What does stamen consist of?
~~**(vii)** Define biostatistics.~~
~~**(viii)** What is mode in data set?~~

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Explain the fluid mosaic model of the cell membrane. **4**
~~**(b) Describe cytokinesis is in animal and plant cells.**~~ **5**

Q6. (a) Explain organs and organ systems in plants. **4**
(b) Outline the processes involved in Photosynthesis. **5**

Q7. (a) Can reactions take place without enzymes? **4**
(b) Describe the events involved in the opening and closing of stomata. **5**

PAPER NO. 25 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (09) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. ~~**Instead of man, Ross in his experiments used:**~~
   ~~(A) Parrots (B) Sparrows (C) Crow (D) Pigeon~~
2. **Viroids are composed of only:**
   (A) DNA (B) Circular RNA (C) Protein (D) Cell wall
3. **The scientific name of an organisms consists of:**
   (A) Two parts (B) Three parts (C) Four parts (D) Five parts
4. **Which blood cells are specialized to carry oxygen from the lungs to the body's tissues?**
   (A) Erythrocyte (B) Mesocytes (C) White blood cells (D) Liver cells
5. **Homologous chromosomes pair up in a process called:**
   (A) Metastasis (B) Binary fission (C) Synapsis (D) Crossing over
6. **The skeletal system consists of:**
   (A) Bones, cartilages and tendons
   (B) Mouth, esophagus, stomach, small and large intestines
   (C) Lungs, trachea and bronchi (D) Brain, spinal cord and nerves
7. **In a leaf, which tissue is responsible for photosynthesis?**
   (A) Xylem (B) Mesophyll (C) Epidermis (D) Phloem
8. **Induced Fit model was proposed by:**
   (A) Emil Fischer (B) Daniel koshland (C) Winhelm (D) Calvin
9. **Sir Hans Krebs discovered the:**
   (A) Light reaction (B) Dark reaction (C) Glycolysis (D) Krebs cycle
10. **Which metabolic waste is excreted by the ladyfinger?**
    (A) Gums (B) Resins (C) Mucilage (D) Latexes
11. **In the life cycle of flowering plants, which structure is triploid (3n)?**
    (A) Egg (B) Fusion nucleus (C) Endosperm nucleus (D) Sperm
12. ~~**It is the value that appears most frequently in a data set.**~~
    ~~(A) Median (B) Mode (C) Mean (D) All of these~~

Roll No.(in Figures): ..... (in Words): .....

Annual (09)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. (5×2=10)

(i) How Laveran did research on the cause of malaria?

(ii) What hypothesis was made for malaria?

(iii) What are viruses?

(iv) What does it mean "Viruses are acellular?

(v) What key role does the Golgi apparatus play in eukaryotic cells?

(vi) What is the function of centrioles ?

(vii) What is kinetochore?

(viii) How many cells are there in human body?

Q3. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Give few examples of organ systems that form the human body.

(ii) What does skeletal system consist of?

(iii) What does digestive system consist of?

(iv) How lipids provide energy when body needs it?

(v) Steroid hormones are derived from which lipid?

(vi) What are nucleic acids? How many types of nucleic acids are there? Name them.

(vii) Define the term optimum pH. Give example.

(viii) What is the effect of substrate concentration on enzyme activity?

Q4. Write short answers to any FIVE (5) questions. (5×2=10)

(i) Write the importance of oxidation-reduction reactions.

(ii) What is meant by anaerobes?

(iii) What do sources of food include?

(iv) Define mineral nutrition in plants.

(v) State how potatoes reproduce through tubers.

(vi) What does a megasporangium contain?

(vii) Define biostatistics.

(viii) What are the steps to calculate mode?

(PART - II)

Note: Attempt any TWO questions. (2×9=18)

Q5. (a) Explain any two careers concerned with Biology. 4

(b) Describe the events that occur during the phases of meiosis-I. 5

Q6. (a) Describe leaf as an organ in plants. 4

(b) What is cellular respiration? Explain its types. 5

Q7. (a) How do enzymes function affect by different factors. 4

(b) Describe temperature, wind and humidity as the factors affecting the rate of transpiration. 5

PAPER NO. 26 BIOLOGY ANNUAL

Roll No.(in figures): ..... (in words): .....

Annual (10) **OBJECTIVE TYPE** Time Allowed : 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. Multiple Choice Questions: **12**

1. "If mosquitoes are involved in the spread of malaria, then plasmodium should be present in mosquitoes." It is a:
(A) Result (B) Deduction (C) Observation (D) Hypothesis

2. *Solanum esculentum* is the scientific name of:
(A) Carrot (B) Potato (C) Pea (D) Tomato

3. The words of scientific name are taken from language:
(A) English (B) Arabic (C) Urdu (D) Latin

4. An unspecialized cell that has the ability to form different types of specizalized cells is called:
(A) Red blood cell (B) White blood cell (C) Muscle cell (D) Stem cell

5. Meiosis occur in:
(A) Somatic cells (B) Germ line cells (C) Daughter cells (D) Parent cells

6. In the wall of stomach; which tissue also contains blood vessels and nerves?
(A) Epithelial (B) Muscle (C) Inner connective (D) Outer connective

7. James Watson and Francis Crick proposed the double helix model of DNA in:
(A) 1925 (B) 1943 (C) 1935 (D) 1953

8. How does increasing temperature affect enzyme activity?
(A) Increases activity to a point (B) Always decreases activity
(C) Makes enzymes non-functional (D) No effect on enzyme

9. Which wavelengths of light are absorbed to maximum by chlorophylls?
(A) Green and blue (B) Green and red (C) Red and blue (D) Only green

10. Water lily is an example of:
(A) Halophytes (B) Mesophytes (C) Xerophytes (D) Hydrophytes

11. What is the primary method of reproduction in yeast?
(A) Binary fission (B) Spore formation (C) Budding (D) Fragmentation

12. A data set may have:
(A) One mode (B) More than one mode (C) No mode (D) All of these

Roll No.(in Figures): ..... (in Words): .....

Annual (10)

SUBJECTIVE TYPE
(PART - I)

Maximum Marks: 48
Time Allowed :1.45 Hours

Q2. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) How many blood samples did biologists examine to test the deduction of malaria?

(ii) What were some important observations of A.F.A king?

(iii) What is binomial nomenclature?

(iv) Which part of the scientific name comes first?

(v) What are mesophyll cells? What mesophyll cells are specialized for?

(vi) How do lysosomes contribute to the cell's functioning?

(vii) Why does cytokinesis occur in mitosis and meiosis?

(viii) What is the smooth endoplasmic reticulum responsible for?

Q3. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Explain the function of blood circulatory system.

(ii) How does sweating occur?

(iii) What is the role of the shoot system in plants?

(iv) What DNA is made of?

(v) On what achievement did James Watson and Francis Crick receive Nobel Prize?

(vi) What is RNA?

(vii) Where does pepsin work? And where does trypsin work?

(viii) What is enzyme Inhibition?

Q4. Write short answers to any FIVE (5) questions. **(5×2=10)**

(i) Why does glycolysis occur in anaerobic respiration?

(ii) State the main purpose of cellular respiration?

(iii) How excess oxygen is released by plants?

(iv) How guttation is different from dew?

(v) What does female gametophyte or embryo sac contain?

(vi) What is double fertilization?

(vii) What is bar chart?

(viii) What is the use of bar chart?

(PART - II)

Note: Attempt any TWO questions. **(2×9=18)**

Q5. (a) Write aims and principles of classification. **4**

(b) Describe the significance of meiosis. **5**

Q6. (a) Write a note on organs in human body. **4**

(b) Describe Importance of Fermentation (Anaerobic Respiration). **5**

Q7. (a) Describe the mechanism of transport of water and salts in plants. **4**

(b) Explain Food translocation by pressure Flow Mechanism. **5**

UNSOLVED ANNUAL PAPERS

PAPER NO. 01 BIOLOGY ANNUAL (UNSOLVED)

Roll No.(in Figures): ..... **(in Words):** .....

Annual Paper (1) **OBJECTIVE TYPE** **Marks: 12**

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. **12**

1. The study of bacteria and microscopic fungi is called:
(A) Biophysics (B) Biochemistry (C) Microbiology (D) Farming

2. Scientific name of human beings is:
(A) *Pisum satirum* (B) *Homo sapiens* (C) *Rosa Indica* (D) *Allium cepa*

3. Cell wall is absent in:
(A) Plants (B) Animals (C) Fungi (D) Bacteria

4. Main phases of cell cycle are:
(A) two (B) three (C) four (D) five

5. Molecules combine in a specific way and make:
(A) Organ system (B) Organism (C) Organ (D) Organelle

6. Percentage of carbohydrates in the dry mass of protoplasm is:
(A) 18% (B) 15% (C) 10% (D) 50%

7. Lipolysis is the breakdown of:
(A) Fats (B) Proteins (C) Lipids (D) Carbohydrates

8. The unique property of enzymes is that they are :
(A) Reactive (B) Specific (C) Non-specific (D) distinct

9. The study of energy transformation in living organisms is called:
(A) Phosphorylation (B) Fermentation (C) Bioenergetics (D) Metastasis

10. The minerals which are required in lower quantities are called:
(A) Micronutrients (B) Macronutrients (C) Nanoparticles (D) None of these

11. Endospores are the spores produces:
(A) Inside the cell (B) Outside the cell (C) Cytoplasm (D) Nucleus

12. What is the next step after analyzing biological data?
(A) Designing experiments (B) Interpreting results
(C) Predicting outcomes (D) Policy making

Roll No.(in Figures): ..... **(in Words):** .....

Marks: 48 **Time: 1.45 Hours**

SUBJECTIVE TYPE

(PART- I)

2. Write short answers to any Five (5) questions: **(5×2=10)**

(i) What is physiology? Give example.

(ii) What is embryology and genetics?

(iii) Why international biodiversity day is celebrated?

(iv) What is domain in taxonomy?

(v) What are the variations in the size of cell?

(vi) Differentiate between the primary and secondary wall of cell wall:

(vii) ~~What is the main purpose of S-phase in cell cycle?~~

(viii) Differentiate diploid and haploid cells.

3. Write short answers to any Five (5) questions: **(5×2=10)**

(i) Which is the smallest unit of matter? Define it.

(ii) Define organelle with example.

(iii) Write down any two names of organs of plants and animals.

(iv) How catabolism is different from anabolism?

(v) What is meant by metabolism? Write the name of its types.

(vi) Which monosaccharides make a sucrose molecule?

(vii) Why do humming birds have high metablic rates?

(viii) Define enzyme.

4. Write short answers to any Five (5) questions: **(5×2=10)**

(i) What is the difference between oxidation and reduction?

(ii) Write the function of ATP in a cell.

(iii) Differentiate between autotrophic and heterotrophic organisms.

(iv) Differentiate between micronutrients and macronutrients.

(v) What is the most common method of reproduction in bacteria?

(vi) Describe the process of spore formation in rhizopus.

(vii) ~~What is the importance of biostatistics?~~

(viii) ~~How biological data can be analyzed?~~

(PART – II)

Note: Attempt any TWO Questions. **(2×9 = 18)**

5. (a) Write a note on different branches of Biology. **(5)**

(b) Describe importance of Mitosis. **(4)**

6. (a) Write percentage of biomolecules in dry mass of protoplasm. **(5)**

(b) Describe the characteristics of enzymes. **(4)**

7. (a) Define nutrition and nutrients. Describe its types. **(5)**

(b) Explain the process of binary fission in bacteria and describe how it leads to the formation of two daughter bacteria. **(4)**

PAPER NO. 02 BIOLOGY ANNUAL (UNSOLVED)

Roll No.(in Figures): ..... **(in Words):** .....

Annual Paper (2) **OBJECTIVE TYPE** **Marks: 12**

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. **12**

1. The microsopic study of tissues is called:

(A) Embryology (B) Cytology (C) Physiology (D) Histology

2. Eukarya is the domain of:

(A) Fruit fly (B) Human (C) Pea (D) All of these

3. Jelly like material of nucleus is called

(A) Cytoplasm (B) Chromoplasm (C) Protoplasim (D) Nucleoplasm

4. Protein synthesis takes place in:

(A) G-0 Phase (B) G-1 Phase (C) S Phase (D) G-2 Phase

5. Unicellular organisms are made up of:

(A) Many cells (B) Two cells (C) One cell (D) Three cells

6. What is the general formula used for carbohydrates?

(A) $(C_2HO)_n$ (B) $(CH_2O)_{n2}$ (C) $Cn(H_2O)_n$ (D) $(CH_2O)_n$

7. The specific region of an enzymes where the substrate binds is called:

(A) Active site (B) Allosteric site (C) Catalytic site (D) Binding site

8. Which of the following is an example of an extracellular enzyme?

(A) DNA polymerase (B) Amylase (C) Catalase (D) ATP synthase

9. 7.3 kilo calories/mole energy is equal to:

(A) 73000 cal/mol (B) 73 cal/mol (C) 7300 cal/mol (D) 730 cal/mol

10. Movement of molecules from an area of higher concentration to an area of lower concentration is called:

(A) Active transport (B) Passive transport (C) Osmosis (D) Diffusion

11. Which generation of sexual reproduction is diploid (2n)?

(A) Saprophyte (B) Gametophyte (C) Both (A) and (B) (D) Binary fission

12. Biostatistics is used in which of the following fields to study the spread of diseases?

(A) Epidemology (B) Genetics (C) Ecology (D) Biochemistry

Roll No.(in Figures): ..... (in Words): .....

Maximum Marks: 48 **SUBJECTIVE TYPE** Time Allowed: 1.45 Hours

(PART- I)

2. Write short answers to any Five (5) questions: (5×2=10)

(i) What is meant by Bio-economics?

(ii) BDS degree is related to which carrer?

(iii) Differentiate between autotroph and heterotroph.

(iv) Write the down the characteristics of five kingdom classification system.

(v) Write down the function of cytoplasm.

(vi) Why nucleus is called the "control center"?

(vii) Write the key events of prophase in mitosis.

(viii) How cytokinesis takes place in animal cell?

3. Write short answers to any Five (5) questions: (5×2=10)

(i) What is meant by an organisms?

(ii) Differentiate between palisade mesophyll and spongy mesophyll.

(iii) Write down the function of xylem and phloem leaf.

(iv) Write about the polysaccharides stored in plants and animals.

(v) Compare essential and non-essential amino acids.

(vi) How glycine is different from alanine?

(vii) How the prosthetic group differ from co-enzyme?

(viii) How enzymes are used in paper industry?

4. Write short answers to any Five (5) questions: (5×2=10)

(i) What is the key pigment involved in light absorption?

(ii) What do you know about NAD?

(iii) How the deficieney of Magnesium affects the plant?

(iv) What is the role of xylem and phloem in transportation?

(v) Differentiate between natural vegetative propagation and artificial vegetative propagation.

(vi) Which plant reproduce by tubers?

(vii) Why epidemologists use biostatistics?

(viii) What is mean in biostatistics?

(PART – II)

Note: Attempt any TWO questions. (2×9=18)

5. (a) Explain how the study of Biology can lead to different professional studies. (5)

(b) Describe the Linnaean system of taxonomic hierarchy in detail, outlining the seven major taxonomic ranks and their relationships. (4)

6. (a) What are different sources and functions of carbohydrates? (5)

(b) Explain the mechanism of enzyme action. (4)

7. (a) Discuss the role of important micronutrients in Plants. (5)

(b) Discuss asexual reproduction by spores in rhizopus. (4)

PAPER NO. 03 BIOLOGY ANNUAL (UNSOLVED)

Roll No.(in Figures): ..... (in Words): .....

Annual Paper (3)

OBJECTIVE TYPE

Marks: 12
Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. **12**

1. The study of the process of development of organism from fertilized egg is called:

(A) Anatomy (B) Embryology (C) Histology (D) Physiology

2. Margulis and Schwartz modified the five kingdom classification system in:

(A) 1988 (B) 1968 (C) 1998 (D) 1958

3. Microfilaments are made up of protein:

(A) Haemoglobin (B) Tubulin (C) Actin (D) Myoglobin

4. Mitosis was discovered in year:

(A) 1890s (B) 1880s (C) 1870s (D) 1860s

5. What is emergent property?

(A) Single component (B) Interaction of components

(C) Living organisms only (D) Non-living organisms only

6. Which of the following disaccharides is composed of two glucose molecules?

(A) Sucrose (B) Lactose (C) Maltose (D) Glactose

7. Who proposed the lock and key model?

(A) Emil Fisher (B) Daniel Kashland (C) Winhelm (D) Calvin

8. When was induced fit model presented?

(A) 1956 (B) 1958 (C) 1957 (D) 1959

9. The main photosynthetic pigment is:

(A) Carotenoids (B) Chlorophyll-b (C) Chlorophyll-a (D) Chlorophyll-ab

10. Name the process responsible for the movement of water from soil into root hairs:

(A) Active transport (B) Diffusion (C) Osmosis (D) Transpiration

11. What is the possible structure that contains the megaspore mother cell?

(A) Stigma (B) Ovule (C) Style (D) Embryo sac

12. What is the mean of the following data set: 2, 4, 6, 8, 10:

(A) 4 (B) 6 (C) 8 (D) 10

Roll No.(in Figures): ..... (in Words): .....

Maximum Marks: 48 **SUBJECTIVE TYPE** Time Allowed: 1.45 Hours

(PART- I)

2. Write short answers to any Five (5) questions: (5×2=10)

(i) In which fields genetic counseling helps us?

(ii) Write the names of four important careers related to biology?

(iii) Write down the salient features of domain Bacteria.

(iv) Differentiate between algae and protozoans.

(v) Write down the function of ribosome.

(vi) How golgi apparatus is formed?

(vii) Define regeneration. Give example.

(viii) What is meant by tumors?

3. Write short answers to any Five (5) questions: (5×2=10)

(i) What is stomata?

(ii) What is the role of upper epidermis in leaf?

(iii) Describe the difference between tissue and cell.

(iv) How would you differentiate between saturated fatty acid and unsaturated fatty acids?

(v) In which ways oils are different from fats?

(vi) Write the sources of lipids obtained from plants and animals.

(vii) Why enzymes degrade starch and proteins?

(viii) What is meant by enzyme-substrate complex?

4. Write short answers to any Five (5) questions: (5×2=10)

(i) What is the role of accessory pigments.

(ii) Write the process of aerobic respiration.

(iii) What are the main parts of leaf involved in transpiration?

(iv) What are guard cells?

(v) Define suckers in vegetative propagation.

(vi) Write a note on vegetative propagation occurs through modified leaves.

(vii) Write the formula of mean.

(viii) What is the median of a data set?

(PART – II)

Note: Attempt any TWO questions. (2×9=18)

5. (a) Describe importance of Biodiversity. (5)

(b) Differentiate between meiosis and mitosis. (4)

6. (a) Write sources and functions of proteins. (5)

(b) Describe the importance of oxidation reduction reactions. (4)

7. (a) What is meant by transport in plants? Write about transport in plants. (5)

(b) Define sporophyte and gametophyte. State their role in the life cycle of plants. (4)

PAPER NO. 04 BIOLOGY ANNUAL (UNSOLVED)

Roll No.(in Figures): ..... **(in Words):** .....

Annual Paper (4) **OBJECTIVE TYPE** **Marks: 12**

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. **12**

1. Who analyse physical evidence from crime scenes?

(A) Pharmacologists (B) Biotechnology (C) Forensic scientists (D) Agriculturalist

2. Kingdom protista includes:

(A) Prokaryotes (B) Fungi (C) Eukryotes (D) Plants

3. Which type of plastids helping in the pollination and dispersal of fruit:

(A) Choroplasts (B) Leucoplasts (C) Chromoplasts (D) Lipids

4. Formation of metaphase plate takes place in:

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

5. Xyelm and phloem are present in:

(A) Root (B) Stem (C) Leaves (D) Flower

6. How many amino acid are present in insulin protein?

(A) 51 (B) 72 (C) 574 (D) 332

7. When temperature increases the rate of enzyme:

(A) Decreases (B) Remain same (C) Increases (D) No effect

8. In which medium trypsin enzyme works?

(A) Acidic (B) Alkaline (C) Neutral (D) Slightly basic

9. In which bonds of food are left unbroken in anaerobic process?

(A) P-P bonds (B) C-H bonds (C) C-N bonds (D) C-O bonds

10. How does wind affects transpiration?

(A) Decreases (B) Increases

(C) No effect (D) Increase only at night

11. What type of pollination occurs when pollen is transferred from the anther of one flower to the stigma of another flower on the same plants?

(A) Self-pollination (B) Cross-pollination (C) Wind pollination (D) Insect pollination

12. If number of values is even then median is:

(A) Average of middle value (B) Sum of middle values

(C) Greater middle value (D) Smaller middle value

Roll No.(in Figures): ..... **(in Words):** .....

Maximum Marks: 48 **Time Allowed: 1.45 Hours**

SUBJECTIVE TYPE

(PART- I)

2. Write short answers to any Five (5) questions: **(5×2=10)**

(i) Differentiate between qualitative and quantitative observations.

(ii) What is the most basic step of scientific method? Discuss it.

(iii) What is meant by acellular?

(iv) What are the symptoms of coronavirus?

(v) Differentiate between the function of mitochondria and ribosome.

(vi) What is called turgor pressure?

(vii) What do you known about metaphase I?

(viii) When cytokinesis occurs?

3. Write short answers to any Five (5) questions: **(5×2=10)**

(i) Discuss the importance of leaves.

(ii) What is transpiration?

(iii) How brain acts as an organ?

(iv) What are the base pairing rules in DNA according to Watson Crick model?

(v) Why did the G-C base pair more stable than A-T?

(vi) How does DNA passes genetic traits to offsprings?

(vii) How does high temperature affect enzymes?

(viii) How does substrate concentration affect reaction rate?

4. Write short answers to any Five (5) questions: **(5×2=10)**

(i) What is meant by lactic acid fermentation?

(ii) What is meant by anaerobes?

(iii) How water column is created in xylem vessels? Give reasons.

(iv) What is the role of cuticle in gaseous exchange?

(v) What is sporophyte generation?

(vi) What is calyx? Tell its unit.

(vii) How mode is calculated?

(viii) For what purposes bar charts are used?

(PART – II)

Note: Attempt any TWO questions. **(2×9=18)**

5. (a) Describe the structure and functions of the cell wall. **(5)**

(b) Describe the events that occur during the phases of mitosis. **(4)**

6. (a) Explain organs and organ systems in plants. **(5)**

(b) Outline the processes involved in Photosynthesis. **(4)**

7. (a) Why enzymes are vital to life? **(5)**

(b) Define transpiration. Write types of transpiration. **(4)**

PAPER NO. 05 BIOLOGY ANNUAL (UNSOLVED)

Roll No.(in Figures): ..... (in Words): .....

Annual Paper (5) **OBJECTIVE TYPE** Marks: 12

Time: 15 Minutes

	A	B	C	D		A	B	C	D		A	B	C	D
1	Ⓐ	Ⓑ	Ⓒ	Ⓓ	5	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7	Ⓐ	Ⓑ	Ⓒ	Ⓓ	11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8	Ⓐ	Ⓑ	Ⓒ	Ⓓ	12	Ⓐ	Ⓑ	Ⓒ	Ⓓ

NOTE:Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. **12**

1. Logical results of hypothesis are called:

(A) Theories (B) Hypothesis (C) Deductions (D) Results

2. The scientific name of organism consist of :

(A) 2 Parts (B) 3 Parts (C) 4 Parts (D) 5 Parts

3. The main function of mesophyll cells is:

(A) Photosynthesis (B) Respiration

(C) Fermentation (D) Anaerobic respiration

4. Meiosis was discovered by:

(A) Rudolf Virchow (B) Walther Flemming (C) August Weisman (D) Oscar Hartwig

5. Insulin and glucagon are present in:

(A) Stomach (B) Liver (C) Kidneys (D) Pancreas

6. What is the shape of the DNA?

(A) Linear (B) Circular (C) Helical (D) Branched

7. Pepsin enzyme works in:

(A) Small intestine (B) Stomach (C) Heart (D) Kidney

8. Which type of the enzyme inhibition changes the shape of enzyme and its active site?

(A) Competitive (B) Non-competitive (C) Allosteric inhibition (D) Allosteric activation

9. Which of the following organisms still utilize anaerobic respiration today?

(A) Plants (B) Animals

(C) Some bacteria and fungi (D) All of the above

10. What is the mechanisms of food transport in plants?

(A) Root pressure (B) Transpirational pull

(C) Pressure flow mechanism (D) Capillary action

11. Fruit produced through parthenocarpy

(A) Banana (B) Apple (C) Tomato (D) Mangoes

12. Most frequent value in a data set is called:

(A) Mean (B) Median (C) Mode (D) Average

Roll No.(in Figures): ..... **(in Words):** .....

Maximum Marks: 48 **Time Allowed: 1.45 Hours**

SUBJECTIVE TYPE

(PART- I)

2. Write short answers to any Five (5) questions: **(5×2=10)**

(i) Define experimental group and control group.

(ii) What is meant by scientific theory? Give example.

(iii) Write the scientific name of onion and potato.

(iv) What is the significance of bionomial nomenclature?

(v) What is the main function of mesophyll cells in plant?

(vi) Differentiate between dendrites and axons.

(vii) Why mitosis is not occur in prokaryotes?

(viii) Differentiate between disjunction and non-disjunctions.

3. Write short answers to any Five (5) questions: **(5×2=10)**

(i) What is meant by nervous system?

(ii) Why homeostasis is important for living organisms?

(iii) Which hormones are responsible for lowering and raising blood sugar level?

(iv) Give comparison between DNA and RNA.

(v) How proteins are formed?

(vi) What do you known about the concept of central dogma?

(vii) What is meant by saturation?

(viii) Differentiate between inhibitors and activators.

4. Write short answers to any Five (5) questions: **(5×2=10)**

(i) Write uses of fermentation in bacteria and yeast.

(ii) What are the end product of anaerobic respiration in animals and yeasts?

(iii) Define guttation.

(iv) How do mesophytes adopt to their environment?

(v) What are the parts of a carpel?

(vi) How microspores produced?

(vii) What does the height of a bar in a bar chart represent?

(viii) What is benefit of biostatistics in genetics?

(PART – II)

Note: Attempt any TWO questions. **(2×9=18)**

5. (a) Write a note on cytoplasm. **(5)**

(b) Describe the events that occur during the phases of meiosis-I and Meiosis-II. **(4)**

6. (a) Write a note on organs in human body. **(5)**

(b) Describe Importance of Fermentation (Anaerobic Respiration). **(4)**

7. (a) How do enzymes function in different conditions? **(5)**

(b) Describe temperature, wind and humidity as the factors affecting the rate of transpiration. **(4)**

— Answers —

Paper No. 1

Objective Type

Q.1: Multiple Choice Questions:

1. study **2.** Microbiology **3.** Anatomy
4. Histology **5.** over 30 trillion
6. Embryology **7.** Biogeography
8. Forensic scientists **9.** All of these
10. Deductions **11.** Both a and b **12.** 1878

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What are the major fields of biology? Name them.

Ans. Biology is a vast field that explores the incredible diversity of life. Scientists have divided biology into three main fields:
1. Zoology **2.** Botany
3. Microbiology

(ii) What is physiology? Give example.

Ans. Physiology: Physiology is the branch of biology that deals with the functioning of body parts.
Example: How the blood circulatory system transports vital substances through out the body.

(iii) What molecular biologists do?

Ans. Molecular biologists study fundamental life processes, develop drugs and create genetically modified organisms.

(iv) What is embryology and genetics?

Ans. Embryology: Embryology is the study of the processes of development of organisms from fertilized egg.
Genetics: Genetics is the branch of biology that deals with the study of transfer of characteristics from parents to offspring.

(v) What is the role of computational Biology in the field of Biology?

Ans. In computational Biology, scientists use Mathematical models, algorithms and computer simulations to understand biological systems and relationships. It involves analysis biological data, such as sequence of amino acids in a protein.

(vi) What is meant by Bio-economics?

Ans. Bio-economics: Bio-economics is the study of organisms from economical point of view. In bio-economics, scientists calculate the cost and profit of biological projects. e.g. production of new variety of crops.

(vii) BDS degree is related to which carrer?

Ans. BDS degree is required for dentistry. For this profession, students get a 4-year Bachelor of Dental Surgery (BDS) degree.

(viii) What kind of jobs do fisheries and wildlife department offers to biologists?

Ans. Fisheries and wildlife department offer jobs to the biologists after a BS and Master of Studies (MS) degree in Zoology, Fisheries or Aquaculture.

Q.3: Short Answer Questions:

(i) What do forensic scientists do?

Ans. Forensic scientists analyse physical evidence from crime scenes in criminal investigations. A 4-year BS degree in Forensic science is needed for this.

(ii) In which fields genetic counseling helps us?

Ans. Genetic counseling providing support to people on genetic conditions and testing.

(iii) Write the names of four important careers related to biology?

Ans. The careers related to biology are as follow:
1. Medicine and Surgery
2. Pharmacology **3.** Horticulture
4. Farming

(iv) Which fields are involved in robotics and artificial intelligence (AI) and in which fields this collaboration has led to advancements?

Ans. The field of robotics and AI is highly interdisciplinary. It involves computer science, engineering, mathematics, neuroscience and psychology. This collaboration has led to significant advancements in robotic system, autonomous vehicles, machine learning and natural language processing.

(v) How is a scientific problem identified?

Ans. The first step in scientific method is identifying and defining a scientific problem that scientist want to investigate. Such problem is either asked by someone or comes in biologist's mind by himself.

(vi) Differentiate between qualitative and quantitative observations.

Ans. Quantitative Observations: Quantitative observations involves observation that cannot be measured with numbers.
For example: The colour and texture of a flower.
Quantitative Observations: Quantitative observations involves measurements or numerical data that can be expressed in terms of quantity.
For example: The number of birds in a tree.

(vii) What is meant by deduction?

Ans. Scientists develop logical results from their hypothesis such logical results of hypothesis are called deductions.

(viii) What is the most basic step of scientific method?

Ans. To do experiments is the basic step of scientific method scientists perform experiments to test all hypothesis. In a successful experiment, one hypothesis is proved correct and the alternate hypotheses are proved incorrect. The incorrect

hypothesis are rejected and the proved one accepted.

Q.4: Short Answer Questions:

(i) Define experimental group and control group.

Ans. Experimental group: This is the group in an experiment that receives the independent variable the specific factor or treatment being tested.

Control group: This group does not receive independent variable. Instead it is kept under normal or standard conditions.

(ii) Differentiate between Morphology and Physiology.

Ans.

Morphology	Physiology
The branch of biology deals with the study of form and structures of living organism.	Physiology is the branch of Biology that deals with the functioning of body parts. For example, how the blood circulatory system transports vital substances throughout the body.

(iii) How scientists report their results?

Ans. Scientists publish their findings in scientific journals and books. They also share their findings with other scientists.

(iv) What is meant by scientific theory? Give example.

Ans. Scientific theory: A theory is supported by extensive evidence and is repeatedly validated by multiple researches.

For example: The theory of evolution.

(v) How Laveran did research on the "Cause of malaria"?

Ans. In 1878, a French army physician Laveran did research on the "cause of malaria". He took the blood from a malarial patient and examined it under microscope. He noticed some microorganisms in the blood. The microorganisms was given a name plasmodium.

(vi) What was the cause of malaria according to the hypothesis of biologists?

Ans. According to the hypothesis of biologists. "Plasmodium is the cause of malaria."

(vii) Write down any two observations of A.F.A King?

Ans. Some important observations of A.F.A King are as follow:

- People who slept outdoors had more chances to get malaria than those who slept indoors.
- Individuals who slept near a smoky fire usually did not get malaria.

(viii) Which mosquito is responsible for transmitted malaria in sparrow and which mosquito is responsible for transmitted malaria in man?

Ans. Malaria in sparrow and man is transmitted by Culex and Anopheles mosquitoes respectively.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 2

Objective Type

Q.1: Multiple Choice Questions:

1. May 22nd **2.** ~~1735~~
3. *Homo sapiens* **4.** Fruit fly
5. All of these **6.** Turnefort **7.** ~~1988~~
8. a and b both **9.** Eukryotes **10.** Animals
11. DNA and RNA **12.** Two Parts

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Write down the factors on which biodiversity depends.

Ans. Biodiversity depends on some environmental factors, such as:

- climate • altitude • soil type

(ii) Why international biodiversity day is celebrated?

Ans. The United Nations has designated May 22nd as international biodiversity day. It is celebrated to promote the protection of biodiversity.

(iii) Write down the aims of classification.

Ans. The main aims of classification are:

1. To determine similarities and differences among organisms so that they can be studied easily.
2. To find the evolutionary relationship among organisms.

(iv) What is domain in taxonomy?

Ans. Domain is the highest taxonomic rank. All organisms are divided into three domains.

1. Bacteria **2.** Archaea **3.** Eukarya

(v) Differentiate between class and order.

Ans. Class: Each phylum/division is divided into related classes.

Order: Each class is further divided into related orders.

(vi) Write down the scientific name of fruit fly and pea.

Ans. The scientific name of fruit fly is *Drosophila melanogaster* and that of pea is *Pisum Stivum*.

(vii) What are the contribution of Aristotle and Ibn Rushd in classification?

Ans. The Greek philosopher Aristotle was the first who classify organisms into two groups i.e., plants and animals. In 1172 Ibn Rushd translated Aristotle's book "de Anima (on the soul)" into Arabic.

(viii) Differentiate between autotrophs and heterotrophs.

Ans. Autotrophs: The organisms that can prepare their own food are called autotrophs. e.g. Plants.

Heterotrophs: The organisms that cannot prepare their own food are called heterotrophs. e.g. Animals.

Q.3: Short Answer Questions:

(i) Why some biologists disagreed about the position of fungi in kingdom Plantae.

Ans. Some taxonomists disagreed about the position of fungi in kingdom Plantae. Fungi resembles plants in many ways but are heterotrophs. They get their food by absorption. They do not have cellulose in their cell walls but possess chitin.

(ii) List the three main domains that encompass all living organisms.

Ans. Following are the three main domains that encompass all living organisms:
(i) Domain Archaea **(ii)** Domain Bacteria
(iii) Domain Eukarya

(iii) Who introduced the Domain-classification system?

Ans. In 1977, American microbiologist Carl Woese introduced the three domain classification system.

(iv) Write down the classification of Carl Woese.

Ans. Car Woese classified organisms into three domains i.e., Archaea, Bacteria and Eukarya. It was actually a dividion of the prokaryotes in two domains (Archaea and Bacteria). While all eukaryotes were placed in a single domain i.e., Eukarya.

(v) Write down some characteristics of Domain Archaea.

Ans. Characterists of Domain Archea.
1. Archaea are prokaryotes.
2. Their cell membrane contains unique lipids which unable, them to live in extreme enviornments.

(vi) Write down the salient features of domain Bacteria.

Ans. Salient features of domain Bacteria:
1. Bacteria are prokaryotic and have cell wall made up of peptidoglycan.
2. Many bacteria live solitary although but some form chains, clusters or colonies of cell.

(vii) Differentiate between algae and protozoans.

Ans. **Algae:** Algae are plants like protists and have cell was made up of cellulose. They have chlorophyll in chloroplasts and are autotrophs. e.g. Euglena, diatoms.
Protozoans: Protozoans are animal-like protists. They are heterotrophs and ingest food. They have no cell wall. e.g. Amoeba, Paramecium.

(viii) How fungi differ from plants?

Ans.
1. Fungi cannot produce their own food while plants can produce their own food.
2. Fungi are decomposers while plants are producers.

Q.4: Short Answer Questions:

(i) What is meant by acellular?

Ans. Acellular means that they are not made up of cells and do not have organelles.

(ii) What are the symptoms of coronavirus?

Ans. Common symptoms include fever, cough, shortness of breath, fatigue, body aches, loss of taste or smell, sore throat and headache.

(iii) How vaccination is helpful against COVID-19?

Ans. Vaccination plays a crucial role in protecting from COVID-19. Vaccine help immune system recognize and fight the virus, reducing the severity of the disease.

(iv) What is meant by binomial nomenclature?

Ans. Bionomial nomenclature is the system of giving scientific names to living organisms. Carlous Linnaeus was the founder of the scientific naming system of organisms.

(v) Write the scientific name of onion and potato.

Ans. Scientific name of onion is *allium cepa* and potato is *solanum tuberosum*.

(vi) What is the significance of binomial nomenclature?

Ans.
- In bionomial nomenclature, two organisms cannot have the same name.
- The scientific name of an organism is the same anywhere in the world.
- The words of scientific name are taken from Latin language so that no country is favoured.

(vii) Write down the scientific name of Honey bee and Tiger?

Ans. The scientific name of Honey bee is *Apis cerana* and Tiger is *Panthera tigris.*

(viii) Write down the classification of fruit fly?

Ans.

Taxonomic rank	Fruit fly
Domain	Eukaraya
Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Dptera
Family	Drosophilidae
Genus	*Drosophila*
Species	*Drosophilad melanogaster*

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 3

Objective Type

Q.1: Multiple Choice Questions:

1. Animals **2.** Cellulose **3.** Nucleoplasm
4. Prokaryotic **5.** Actin **6.** Lysosomes
7. Chromoplasts
8. Light energy to chemical energy
9. Photosynthesis **10.** Neurons
11. Axon **12.** Haemoglobin

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What are the variations in the size of cell?

Ans. Most of the cells are very small and cannot be seen with naked eye. Some cells are large enough to be seen with naked eyes e.g. the egg cell of ostrich.

(ii) Who discovered the cell and how?

Ans. In 1665, Robert Hook discovered cells. By using a microscope Hook examined a thin slice of cork And discovered tiny, box - like structures that he called cells:

(iii) What do you know about cell wall?

Ans. The cells of bacteria, fungi, plants and some protists have a rigid non-living wall around cell membrane. It is called cell wall.

(iv) Differentiate between the primary and secondary wall of cell wall:

Ans. Primary wall: The primary wall is present just above the cell membrane. It is mainly composed of cellulose, hemi-cellulose and pectin.

Secondary wall: Secondary wall is on the inner side of primary wall. It is mainly made up of cellulose, lignin and other chemicals.

(v) Define plasmodesmata.

Ans. Plasmodesmata (singular plasmodesma) are the channels in cell walls that allow the exchange of molecules between adjacent cells.

(vi) Write down the function of cytoplasm.

Ans. Cytoplasm provides a medium for organelles to move and function. It helps in the transport of materials through out the cell. It acts as the site for various metabolic reactions e.g. Glycolosis. It also stores food.

(vii) Why nucleus is called the "control center"?

Ans. Nucleus controls all the activities of the cell. That's why it is called control center.

(viii) Define cytoskeleton. Write the name of its parts.

Ans. Cytoskeleton is a network of thin tubes and filaments present throughout the cytoplasm. It consists of three parts i.e. microtubules, microfilaments and intermediate filaments.

Q.3: Short Answer Questions:

(i) Write down the function of ribosome.

Ans. Ribosomes are tiny granular structures. Their main function is to synthesize protein.

(ii) How golgi apparatus is formed?

Ans. Golgi discovered a set of flattened sacs in the cytoplasm. These flattened sacs, called cisternae, are stacked over each other and make a structure known as golgi apparatus.

(iii) Give the function of centriole.

Ans. Centriole helps in formation of spindle fibre during cell division, in some cells they are also used to form cilia and flagella.

(iv) Differentiate between the function of mitochondria and ribosome.

Ans. Mitochondria and the sites of aerobic respiration and are the major energy production centres, while ribosomes are the sites of protein synthesis.

(v) Define cristae. Write down their function.

Ans. The inner membrane of mitochondria forms many folds. These folds are called cristae. They increase the surface area for respiration.

(vi) Write about leucoplasts.

Ans. Leucoplasts are plastids that have no pigments. They are involved in the storage of starches, lipids and proteins They are present in underground stens, seeds, roots etc.

(vii) What is called turgor pressure?

Ans. The pressure of the vacuole on the cytoplasm and cells wall of the plant cell makes plant cells turgid this pressure is called turgor pressure. This process is called turgor.

(viii) Define basal bodies. Write down their function.

Ans. The cells which have cilia or flagella contain centriole near cell membranes. These centrioles are called basal bodies. Basal bodies are responsible for the formation of cilia and flagella.

Q.4: Short Answer Questions:

(i) What is the main function of mesophyll cells in plant?

Ans. Mesophyll cells are present in leaves. The main function of mesophyll cells is to carry out photosynthesis.

They contain large number of chloroplasts, which contain chlorophyll i.e. necessary for capturing light.

(ii) Differentiate between skeletal muscle cells and cardiac muscle cells.

Skeletal muscle cells:

Ans.
- Skeletal muscle cells are long and striated.
- They are attached to bones.
- They are voluntary in action.

Cardiac muscle cells:
- Cardiac muscle cells are branched and striated.
- They are found in the heart walls.
- They are involuntary in action.

(iii) Differentiate between dendrites and axons.

Ans. Dendrites: Dendrites, the shorter extensions, receive nerve impulses and transmit them to the cell body.

Axons: Axons are the longer extentions that carry nerve impulses away from the cell body.

(iv) What is the function of a neurons?

Ans. Neurons are the specialized cells of the

nervous system. They are responsible for transmitting messages (nerve impulses) throughout the body.

(v) Where are liver cells located in the body?

Ans. Liver cells also known as hepatocytes, are located in the liver.

(vi) What is the role of mitochondria and lysosemes?

Ans. The role of mitochondria is to generate energy and the role of lysosomes is to break down waste materials.

(vii) Can stem cells be used to regenerate? Give example.

Ans. Yes, Stem cells have the ability to regenerate damaged tissue. For example, stem cells present in skin helps in wound healing.

(viii) What are the main functions of cell membrane?

Ans. The main function of cell membrane is to allows only few molecules to pass through it while blocks many other molecules.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 4

Objective Type

Q.1: Multiple Choice Questions:

1. two	**2.** Somatic cells	**3.** ~~G-2 Phase~~
4. Binary fission	**5.** 1880	**6.** Prophase
7. Metaphase	**8.** Animal cells	**9.** Oscar Hartwig
10. ~~Prophase I~~	**11.** ~~Prophase II~~	**12.** Spores

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Differentiate between interphase and mitotic phase.

Ans. Interphase: During interpahase, the cell performs the life functions according to its speciality and prepares itself for next division. It is divided into three phases: G1, S and G2.

Mitotic Phase: It is also called division phase. In this phase the cell divides its genetic material equally into two new, identical cells.

(ii) What is the main purpose of S-phase in cell cycle?

Ans. The main purpose of S-phase in cell cycle is DNA replication. It results in the duplication of chromosomes.

(iii) What do you know about G0 phase?

Ans. Many cells stop dividing and start performing their specific functions. This phase is called G0 phase. Many cells (e.g. neurons) remain in G0 for indefinite periods. Some cells (e.g. cell of liver and kidney) remain in G0 phase temporarily. Other cells (e.g. epithelial cells) ~~do not enter G0 and continue to divide throughout life.~~

(iv) Differentiate diploid and haploid cells.

Ans. Diploid cells: Those cells in which chromosomes are found in pair i.e. 2n. They are known as diploid cells.

Haploid cells: Those cells which have half number of chromosomes i.e. 1n. They are known as haploid cells.

(v) By whom and when was the process of mitosis discovered?

Ans. In 1880s, Walther Flemming discovered the process of mitosis.

(vi) Differentiate between chromatin and chromosomes.

Ans. Chromatin: During interphase of cells, chromosomes are in the form of fine thread like structure known as chromatin.

Chromosomes: Chromosomes are the one of the rod shaped bodies found in the nucleus of cells that contain genetic information (DNA).

(vii) Write the key events of prophase in mitosis.

Ans. In prophase chromatin condenses, nuclear envelope breaks down and spindle fibres from.

(viii) What happens during anaphase?

Ans. During anaphase, the spindle fibres attached with chromosomes pull towards the poles. Due to this pulling, the chromosome's sister chromatids separate.

Q.3: Short Answer Questions:

(i) How cytokinesis takes place in animal cell?

Ans. In animal cells, a furrow develops at the equator. At this furrow, the cytoplasm has a ring of microfilaments. The ring contracts and the furrow moves inward. In this way, parents cell is pinched into two.

(ii) Write down the roles of mitosis in growth.

Ans. Growth in organisms means an increase in size and number of cells. Mitosis plays a crucial role in growth by producing new cells that are identical to the original cell.

(iii) Define regeneration with example.

Ans. Regeneration is the ability of an organisms to regenerate its lost body part.

Example: sea star regenerates its lost arm by mitosis.

(iv) Define metastasis.

Ans. Metastasis is the spread of cancer cells from original site to the other parts of body.

(v) What is meant by tumors? Write it types.

Ans. Due to the uncontrolled division, masses of cells are formed. These masses are called tumors.

Tumors are of two types:

1. Benign **2.** Malignant

(vi) When and who discovered meiosis?

Ans. Meiosis was discovered in 1876 by a German biologist Oscar Hertwig.

(vii) Differentiate between chiasmata and crossing over.

Ans. Chiasmata: Non-sister chromatids of homogous chromosomes become "Zipped" together, forming X-shaped structures called chiasmata.

Corssing over: The exchange of segments between the non-sister chromatids of homologous chromosomes during meiosis-I, this process is called crossing over.

(viii) What do you known about metaphase-I?

Ans.
- The tetrads attached with spindle fibres align along the equator. In this way, they form both poles attach with chromosomes of the pair.
- Two spindle fibers from both sides bind with one chromosome.

Q.4: Short Answer Questions:

(i) When cytokinesis occurs?

Ans. Cytokinesis, the division of cytoplasm, often occurs simultaneously with telophase-I, resulting in two haploid cells, each with a unique set of chromosomes.

(ii) What is difference between prophase of mitosis and prophase-I of meiosis?

Ans. Chromosome pair up, forming tetrads and crossing over occurs in prophase I but not in the prophase of mitosis. Prophase-I of Meosis-I is more complicated than mitosis.

(iii) Why mitosis does not occur in prokaryotic cell?

Ans. Mitosis occurs only in eukaryotic cells. In multicellular organisms mitosis occurs in somatic cells. But in prokaryotic cells binary fission take place which is different from mitosis.

(iv) What are gametes and spores?

Ans.
- **Gametes:** Reproductive cells that fuse during fertilization to form a zygote.
- Haploid
- **Examples:** Sperm and egg cells in animals.
- **Spores:** reproductive cells that can develops into new organisms without fusing.
- Haploids or diploid.
- **Examples:** fungal spores, endospores.

(v) Differentiate between disjunction and non-disjunctions.

Ans. Disjunction: The normal separation of chromosomes in meiosis is called disjunction.

Non-disjunction: When the separation between the chromosomes in meosis is not normal. It is called non-disjunctions.

(vi) What are sister chromotids and when do they separate during meiosis?

Ans. Sister chromatids are identical copies of a single chromosomes that are joined together at a region called centromere.

Sister chromatids separate during anaphase-II of meiosis.

(vii) Define centromere.

Ans. Centromere is the region on a chromosome where sister chromatids are attached. It plays a crucial role during cell division.

(viii) How mitosis is different from meiosis?

Ans. Mitosis produces two daughter cells with same number of chromosomes as in parents but meiosis produces four daughter cell with half number of chromosomes.
- Mitosis occurs in somatic cells but meiosis occurs in germ line cells.
- No crossing over occurs in mitosis but in meiosis crossing over occurs during prophase.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 5

Objective Type

Q.1: Multiple Choice Questions:

1. Organelle **2.** One cell
3. Conduct photosynthesis
4. Interaction of components **5.** Leaf
6. Stem
7. Organ system level in the respiratory system
8. Pancreas
9. Nervous system **10.** 37°C
11. Insulin **12.** Lungs

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Which is the smallest unit of matter?Define it.

Ans. Atoms are the smallest unit of matter. They maintain the property of an element.

For example: Carbon, Hydrogen, Oxygen etc.

(ii) Define organelle with example.

Ans. Molecules combine in specific way and make the subcellular level i.e., organelle. Each organelle is specialized to do a particular function.

For example: Mitochondria are responsible for cellular respiration.

(iii) Write down any two names of organs of plants and animals.

Ans.
- In animals heart and lungs are present.
- In plants leaves and roots are present.

(iv) What is meant by an organisms?

Ans. An organism is a living entity that can function independently on behalf of proper functioning of its organs systems.

Examples: Human and trees.

(v) Differentiate between palisade mesophyll and spongy mesophyll.

Ans. Palisade mesophyll: Palisade mesophyll is located just beneath the upper epidermis. It consist of tightly Packed elongate cells.

Spongy mesophyll: Spongy mesophyll is present below the palisade mesophyll. It is composed of loosely arranged cells with air spaces between them. These air spaces facilitate the diffusion of gasses throughout the leaf.

(vi) Write down the function of xylem and phloem leaf.

Ans. Xylem: The xylem of leaf conducts water and dissolved minerals from the xylem of stem to leaf cells.

Phloem: phloem tissue transports the products of photosynthesis (sugars) from leaf cells to the phloem of stem.

(vii) What is stomata?

Ans. The lower epidermis of leaf contains guard cells. Two guard cells enclose a stoma (plural stomata), stomata are the tiny pores that regulate gas exchange and water vapour loss.

(viii) What is the role of upper epidermis in leaf?

Ans. The upper epidermis of leaf is usually covered by waxy cuticle, which reduce water loss and provide protection.

Q.3: Short Answer Questions:

(i) Describe the difference between tissue and cell.

Ans. Cell: When organelles assemble and interact with each other, they make cell. Cell is the smallest unit with characteristics of life.

Tissue: In multicellular organism, cells make tissues. A tissue is a group of similar cells that work together to perofrm one or more specific functions.

(ii) Define organ also give examples.

Ans. Organ: An organ is a structure made up of related tissues working together to perform specific function.

Examples:

- Heart and lungs are the examples of animal organs.
- Leaves and roots are the examples of plant organs.

(iii) What does happen when organelles interact within cells?

Ans. When organelles interact within a cell, they create a complex system capable of carrying out various cellular processes, such as metabolism of protein synthesis and energy production.

(iv) What is the importance of leaf?

Ans. Leaves are the primary sites of photosynthesis and respiration.

(v) What is transpiration?

Ans. The loss of water vapour through small pores called stomata in leaves is called transpiration.

(vi) Write a short note on epidermal tissue.

Ans. The outermost layer of leaf is made of epidermal tissue. The upper epidermis is usually covered by waxy cuticle which reduce water loss and lower epidermis contains guard cells.

(vii) How brain acts as an organ?

Ans. The brain is a control centre of the body, responsible for thoughts, emotions and movements.

(viii) How do the smooth muscles contribute to the stomach's function?

Ans. There are three layers of smooth muscles. The outer longitudinal layer, the middle circular layer and the inner oblique layer. These muscle churn and mix the food in stomach.

Q.4: Short Answer Questions:

(i) What is meant by nervous system?

Ans. Nervous system includes brain, a spinal cord and nerves. The nervous system coordinates and controls body functions through nerve impulses.

(ii) Why homeostasis is important for living organisms?

Ans. Homeostasis is crucial for living organism because it ensures that their internal environment remains stable, despite change in the external environment. This stability is essential for optimal functioning of cells, tissues and organs.

(iii) How does the human body maintains its body temperature?

Ans. The human body maintains its body temperature through a variety of mechanisms including sweating, shivering and adjusting blood flow to skin.

(iv) Why shivering produced in body?

Ans. When body's temperature falls, the temperature controlling center sends message to muscles to produce more heat that's why shivering occurs.

(v) Which hormones are responsible for lowering and raising blood sugar level?

Ans. Insulin is responsible for lowering blood sugar level and glucagon is responsible for raising blood sugar level.

(vi) How respiratory system maintain homeostasis?

Ans. Respiratory system ensures that the body receives enough oxygen for cellular respiration. It also expels excess carbon dioxide from the body.

(vii) What is the importance of integumentary system?

Ans. Integumentary system ads as a barrier to

protect the body from external factors. It also helps to regulate temperature through sweating.

(viii) Describe how cardiovascular system regulates homeostasis?

Ans. Cardiovascular system plays role in regulating body temperature and pH levels. It also ensures that all cells receive the necessary substances for proper functions.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 6

Objective Type

Q.1: Multiple Choice Questions:

1.	93%	**2.**	15%	**3.**	Anabolism
4.	$C_n(H_2O)_n$	**5.**	6	**6.**	Maltose
7.	Peptide bond	**8.**	51		
9.	Phospholipids	**10.**	Helical		
11.	Transcription	**12.**	Provide energy		

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) How catabolism is different from anabolism?

Ans. Catabolism: Catabolism is the type of metabolism in which complex molecules are broken down into simpler ones.

- Energy is released in these reactions.

Anabolism: Anabolism is the type of metabolism in which simpler substances are combined to from complex substances.

- Energy is absorbed in these reactions.

(ii) What is meant by metabolism? Write the name of its types.

Ans. All the chemical reactions that occur in an organism are collectively called metabolism.

Types of metabolism:

1. Anabolism **2.** Catabolsim

(iii) How do the three groups of carbohydrates differ in taste?

Ans. Monosaccharides are sweet in taste. Disaccharidies are less sweet in taste while polysaccharides are tasteless.

(iv) Which monosaccharides make a sucrose molecule?

Ans. Sucrose (table sugar) is made of two monosaccharides i.e., glucose and fructose.

(v) Which are the most abundant carbohydrate define it.

Ans. Polysaccharides are the most abundant carbohydrates in nature. Polysaccharides are large molecules composed of hundreds or thousands of monosaccharide units. They are insoluble in water and tasteless.

(vi) Write about the polysaccharides stored in plants and animals.

Ans. Starch: Starch is a storage polysaccharide found in plant. It is composed of glucose units.

Glycogen: Glycogen is the animal starch mainly stored in liver and muscles. It is broken down into glucose when energy is needed.

(vii) From which sources disaccharides are obtained?

Ans. Sucrose is found in sugar beet, sugarcane and fruits. Lactose is found in milk and dairy products. Maltose is found in cereals.

(viii) Compare essential and non-essential amino acids.

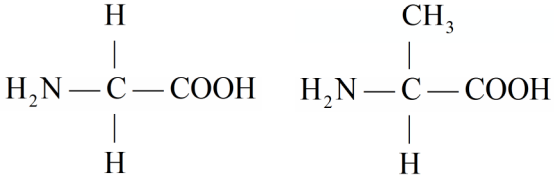
Ans. The 09 amino acids which cannot be synthesized by our body and are supplied by our foods are called essential amino acids.

The 11 amino acids that can be synthesized in our bodies are called non-essential amino acids.

Q.3: Short Answer Questions:

(i) How glycine is different from alanine?

Ans. In amino acid glycine the R group is H and in amino acid alanine, the R group is CH_3.



Glycine ***Alanine***

(ii) Discuss about the sources of proteins.

Ans. Good sources of proteins include meat (mutton, chicken), fish eggs, milk, pulses, beans etc.

(iii) How would you differentiate between saturated fatty acid and unsaturated fatty acids?

Ans. Saturated fatty acids: Saturated fatty acids have internal carbon atoms bonded with maximum number of hydrogen atoms.

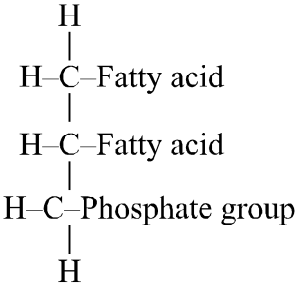
- They do not have double bonds between carbon atoms.
- They are solid at room temperature.

Unsaturated fatty acids:

- Unsaturated fatty acids have one or more double bonds between carbon atoms.
- They are liquid at room temperature.

(iv) Draw the general structure of phospholipids.

Ans. General structure of phospholipicd.



Phospholipid general structure

(v) In which ways oils are different from fats?

Ans.
- Oils contains unsaturated fatty acids while fats contain saturated fatty acids.
- Oils are liquid at room temperature and fats and solid at room temperature.

(vi) Write the sources of lipids obtained from plants and animals.

Ans. Sources of lipids from plants are nuts, seeds, olive oil while the sources of lipids from animals are fat and dairy products.

(vii) Write the use of lipids as an insulator.

Ans. Lipids acts as insulators and protect vital organs. For example, adipose tissue surrounding organs provide cushioning and heat insulation.

(viii) What are the base pairing rules in DNA according to Watson Crick model?

Ans. The pairing of nitrogenous bases is specific i.e, adenine of one strand forms a pair with thymine of opposing strand. Similarly, cytosine forms a pair with guanine.

Q.4: Short Answer Questions:

(i) Why did the G-C base pair more stable than A-T?

Ans. G-C has 3 bonds while A-T has two hydrogen bonds. Therefore, G-C base pairs are more stable.

(ii) How does DNA passes genetic traits to offsprings?

Ans. During reproduction, DNA is passes from one generation to the next. In this way, DNA carries the heredity information to the next generation.

(iii) Give comparison between DNA and RNA.

Ans.
- **DNA:** DNA is made of deoxyribonucleotides.
- DNA is a double helix molecule.
- In DNA the nitrogenous base may be adenine, thymine, cytosine or guanine.
- **RNA:** RNA is made of riboncleotides.
- RNA is a single stranded molecule.
- In RNA the nitrogenous base may be adenine, uracil, cytosine or guanine.

(iv) What are the types of RNA? Write their functions.

Ans. There are three types of RNA:

1. **Messenger RNA (mRNA):**
   Carries the genetic information from DNA to the ribosomes during protein synthesis.
2. **Transfer RNA (tRNA):**

Transfer amino acids to the ribosomes.

3. **Ribosomal RNA (rRNA):**
   Constitutes the structural and functional components of ribosomes, the cellular machinery for protein synthesis.

(v) How proteins are formed?

Ans. The mRNA carries the sequence of its nucleotides to the ribosome. The ribosome reads this sequence and join specific amino acids, according to it, to form proteins.

(vi) Discuss the process of transcription.

Ans. During the working of a gene, the specific sequence of DNA nucleotides copies in the form of messenger RNA. This process is called transcription.

(vii) What do you known about the concept of central dogma?

Ans. The central dogma of molecular biology is a fundamental concept that describes the flow of genetic information is passed from DNA to RNA and from RNA to proteins.

(viii) Why vitamins are not considered as food components.

Ans. It is because body cannot synthesize vitamins. They must be supplied through diet. While carbohydrates, proteins and fats can be prepared by body.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 7

Objective Type

Q.1: Multiple Choice Questions:

1.	Lipids	**2.**	Specific	**3.**	Active site
4.	Amylase	**5.**	Ribozyme	**6.**	Amylase
7.	Emil Fisher	**8.**	1958	**9.**	Increases
10.	Alkaline	**11.**	Stomach		
12.	Non-competitive				

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Why do humming birds have high metabolic rates?

Ans. Humming birds have one of the highest metabolic rates of any animal. They need to eat constantly to keep up their energy levels.

(ii) What do you mean by optimum temperature and pH?

Ans. **Optimum temperature:** It is a specific temperature at which each enzyme works at maximum rate. The optimum temperature for most of the human enzyme is 37°C.

Optimum pH: It is a specific pH at which each enzyme shows maximum activity. The optimum pH for pepsin is 1.5 to 2.0

(iii) How would you define the term "enzyme"?

Ans. Enzymes are the biological catalysts that speed up chemical reactions in living organisms without being consumed in the process. They are primarily proteins and are highly specific.

(iv) Write about the structure of enzymes.

Ans. Enzymes possess a three-dimensional globular structure. This structure allows them

to form active sites that can bind specifically to substrates.

(v) How can you point out about extra cellular and intracellular enzymes?

Ans. Extra cellular enzymes: Extra cellular enzymes are secreted outside the cells where they catalyze reactions. For example enzymes sectred by cells of stomach walls into stomach cavity.

Intracellular enzymes: Intracellular enzymes operate within cells.

Example: Enzymes of cellular respiration.

(vi) How the prosthetic group differ from co-enzyme?

Ans. If organic cofactors are tightly bound to enzymes. They are called prosthetic group e.g. vitamins but if they are loosely attach with enzymes they are called coenzymes. e.g. nucleotides.

(vii) Name the two main groups of cofactors.

Ans. There are two main groups of cofactors:

1. Inorganic cofactors
2. Organic cofactors

(viii) How enzymes are used in paper industry?

Ans. Enzymes degrade starch to lower its viscosity that aid in making paper.

Q.3: Short Answer Questions:

(i) What are the uses of protease and amylase enzymes?

Ans. Protease enzymes are used for the removal of protein stain from cloths. Amylase enzymes are used in dish washing to remove starch residues.

(ii) Why enzymes degrade starch and proteins?

Ans. Enzymes degrade starch and proteins to produce simple sugars, amino acids and peptides that are used by yeast for fermentation.

(iii) Define Active site.

Ans. An enzymes has one or more packets or clefts on its surface called active, site. The active sites are directly involved in catalysis.

(iv) What is meant by enzyme-substrate complex?

Ans. When enzyme attaches with the substrate, a temporary enzymes-substrate (ES) complex is formed. Enzyme catalyzes the reaction and substrate is transformed into product. Then the product is released from the enzyme.

(v) Why induced fit model is more acceptable than lock and key model?

Ans. The "induced fit model" is more acceptable than the ''lock and key'' model of enzyme action. According to this model, the active site of enzyme is not rigid. When substrate interacts with the enzyme, its active site is reshaped to perform its function.

(vi) What do you mean by De-naturation of enzyme?

Ans. When temperature is raised well above the optimum temperature, heat breaks the bonds in enzyme molecule. In this way the globular structure of enzyme is lost. This is called denaturation of enzyme.

(vii) How does high temperature affect enzymes?

Ans. When temperature raises to a certain limit, the heat add in the movement of molecules. So, the rate of enzyme action increases. When temperature is raised well above optimum temperature, the globular structure of enzyme is lost.

(viii) Write the optimum pH for pepsin and trypsin.

Ans. Pepsin works in acidic medium at pH 1.5 to 2 and trypsin works in alkaline medium at pH 7.8.

Q.4: Short Answer Questions:

(i) How does substrate concentration affect reaction rate?

Ans. An increase in substrate concentration increases the rate of reaction. At high substrate concentration all active sites are occupied and any more substrate molecules do not find free active site. This state is called saturation.

(ii) Name the factors that affect the activity of enzymes.

Ans. The factors which affect the reaction rate are:

1. Temperature **2..** pH
3. Substrate concentration

(iii) What is saturation of active sites?

Ans. Saturation: At high substrate concentration, all active site of the enzymes are occupied. In this condition, any more substrate molecules do not find free active sites. This state is called saturation.

(iv) What is meant by inhibitors?

Ans. Inhibitors are the molecules that binds with the enzyme and decrease its activity.

(v) Differentiate between inhibitors and activators.

Ans. Inhibitors: Molecules that decreases the activity of an enzyme are called inhibitors.

Activators: Molecules that increase the activity of an enzyme are called activators.

(vi) How non-competitive inhibition occurs?

Ans. Some enzyme inhibitors attach to some other location of enzyme rather than active site. This attachment changes the overall shape of enzyme and also the active site. So, this changed active site does not fit substrate and enzyme is inhibited.

(vii) Discuss competitive inhibition.

Ans. Some inhibitors resemble the enzyme's substrate. They compete with the substrate

to attach to the active site of enzyme. When the inhibitor is attached to the active site it blocks it and does not allows the substrate to attach.

(viii) Write down the examples of competitive inhibitors and non-competitive inhibitors.

Ans. Examples of competitive inhibitors:
Antibiotics are the examples of competitive inhibitors.

Examples of Non-competitive inhibitors:
Examples include heavy metals like mercury and certain drugs used in cancer therapy.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 8

Objective Type

Q.1: Multiple Choice Questions:

1. Bioenergetics **2.** 3 **3.** 7300 cal/mol
4. To produce glucose
5. Thylakoid membrane
6. Chlorophyll-a **7.** Stroma **8.** 03
9. C-H bonds **10.** C_2H_5OH
11. Some bacteria and fungi **12.** Mitochondria

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What is meant by bioenergetics?

Ans. Bioenergetics is the study of energy relationship and energy transformations in living organisms. It is the study of how living organisms acquire, convert, store and utilize energy to fuel their life processes.

(ii) What is the difference between oxidation and reduction?

Ans. Oxidation: The loss of electrons is called oxidation.

Reduction: The gain of electrons is called reduction.

(iii) Describe the molecular structure of ATP.

Ans. Each ATP molecule has three sub units.
1. Adenine (a nitrogen containing base)
2. Ribose (a five-carbon sugar)
3. Three phosphate groups.

(iv) Write the function of ATP in a cell.

Ans. ATP is often referred as "energy currency of the cell". It stores and releases energy through its high-energy phosphate bonds.

(v) Write the contributions of Firtz Lipmann regarding ATP.

Ans. In 1941, the Nobel prize winner, Fritz Lipmann proposed that ATP is the main energy-transfer molecule in the cell.

(vi) What is the key pigment involved in light absorption?

Ans. Chlorophyll absorbs light coming from the sun.

(vii) What are the products of light reactions?

Ans. The products of light reactions are ATP, NADPH and oxygen gas.

(viii) What do you know about NAD?

Ans. Nicotinamide adenine dinucleotide is a co-enzyme. It's one form contains phosphate and called NADP.

Q.3: Short Answer Questions:

(i) Discuss about dark reactions.

Ans. The series of reaction in photosynthesis, which occurs in the absence of light called dark reactions. The dark reactions take place in the stroma of chloroplasts. During this phase carbon dioxide is reduced to from glucose.

(ii) What is the role of accessory pigments.

Ans. Chlorophyll-b and carotenoids are accessory pigments. Accessory pigment broaden the range of light wavelength that a plant can absorb. They capture light energy that chlorophyll-a might miss and transfers it to chlorophyll-a for photosynthesis.

(iii) Define cellular respiration.

Ans. Cellular respiration is a process by which C-H bond are broken down by oxidation reduction reactions and energy produced in the form of CO_2 and water.

(iv) Write the process of aerobic respiration.

Ans. In first phase of aerobic respiration, a molecule of glucose is broken down into two molecules of pyruvic acid. In the second phase, the molecules of pyruvic acid are completely oxidized and all energy is released.

(v) Define fermentation. Name its two types.

Ans. Fermentation: In the absence of oxygen glucose is incompletely oxidized with less amount of energy is released.

Types of Fermentation:
1. Alcoholic Fermentation
2. Lactic acid fermentation

(vi) What is meant by lactic acid fermentation?

Ans. During anaerobic respiration in the skeletal muscles of humans and other animals, pyruvic acid is converted into lactic acid. This type of anaerobic respiration is called lactic acid fermentation.

(vii) How many ATPs are produced during aerobic and anaerobic respiration?

Ans. 36 ATPs are produced during aerobic respiration while 2 ATPs are produced in anaerobic respiration.

(viii) What is meant by anaerobes?

Ans. Even today when free oxygen is available, some organisms including some bacteria and fungi get energy from anaerobic respiration and are called anaerobes.

Q.4: Short Answer Questions:

(i) Write uses of fermentation in bacteria and yeast.

Ans. The fermentation in bacteria is used for making cheese and yogurt. Fermentation in yeasts is used in brewing and baking industries.

(ii) What is glycolysis and where it occurs?

Ans. Glycolysis is the first step in cellular respiration, converting glucose into energy (ATP and NADH) two molecules of pyruvic acid.
It occurs in the cytoplasm.

(iii) What are the end product of anaerobic respiration in animals and yeasts?

Ans. The endproducts of anaerobic respiration in animals and yeast are ethyl alcohol, lactic acid and carbon dioxide,.

(iv) How do muscles respond to oxygen deficiency during intense exercise?

Ans. When skeletal muscles of humans work hard (during exercise etc.) but oxygen supply is not sufficient to fulfill the demand, the skeletal muscles carry out anaerobic respiration to get energy.

(v) Write the summary of krebs cycle?

Ans. **1.** Before entering in kreb's cycle, pyruvic acid is changed into a 2 carbon compound called acetyl CoA.
2. In kreb's cycle, the Acetyl-CoA molecules are completely oxidized, along with the formation of ATP, NADH and $FADH_2$.

(vi) Which compound enters into kerb's cycle?

Ans. Acytyl-CoA enters into kreb's cycle. Where it is converted into compounds like $FADH_2$ and NADH.

(vii) Describe the role of electron transport chain during cellular respiration.

Ans. In electron transport chain, NADH and $FADH_2$ change back to NAD and FAD by releasing electrons and hydrogen ions. The released electrons pass through an electron transport chain and release energy. This energy is used to make ATP. At the end of chain, electrons and hydrogen ions combine with oxygen and form water.

(viii) Write about the site and time of occurance of photosynthesis and respiration.

Ans. Photosynthesis occurs only in daytime in the chloroplast, while respiration occurs all the time in the cytoplasm and mitochondria of cells.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 9

Objective Type

Q.1: Multiple Choice Questions:

1. Fungi **2.** Micronutrients **3.** Older leaves
4. Diffusion **5.** Epidermis **6.** Osmosis
7. All of the above **8.** To transport water
9. Increases **10.** Through the xylem
11. Pressure flow mechanism **12.** Leaf

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Differentiate between autotrophic and heterotrophic organisms.

Ans. **Autotrophic organisms:** Autotrophic organisms obtain water, carbon dioxide and minerals from their environment and prepare their food.
For example: Some bacteria, all algae and all plants.
Heterotrophic organisms: Heterotrophic organisms obtain their food from other organisms.
For example: most bacteria, fungi and animals.

(ii) Define mineral nutrients.

Ans. Mineral nutrients are the chemical elements absorbed from soil that are essential for the plants to grow.

(iii) Differentiate between micronutrients and macronutrients.

Ans. **Micronutrients:** The minerals which are required in small quantities are called micronutrients e.g. iron, boron, copper etc.
Macronutrients: The minerals which are required in larger quantities are called macronutrients. e.g. carbon, hydrogen, oxygen magnesium etc.

(iv) How carnivorous plants, fulfill their need of nitrogen?

Ans. Carnivorous plants trap and digest small animals. Such plants fulfill their needs of nitrogen from the prey animals.

(v) How the deficiency of Mg affects the plant?

Ans. If sufficient amount of magnesium are not available, plants begin to break the chlorophyll in leaves. This cause the yellowing of leaves. After prolonged magnesium deficiency leaves may also drop.

(vi) What is meant by osmosis?

Ans. Osmosis is the movement of water molecules through a semi-permeable membrane from a region of lower solute concentration to a region of higher solute concentration.

(vi) What is the role of xylem and phloem in transportation?

Ans. Xylem is responsible for the transport of

water and salts while phloem is responsible for the transport of food.

(viii) What is pericycle?

Ans. It is a narrow layer of cell present on the inner side of endodermis.

Q.3: Short Answer Questions:

(i) What are the main parts of leaf involved in transpiration?

Ans. Transpiration occurs through stomata in leaves, through the cuticle present on leaf epidermis or through special openings called lenticels.

(ii) How transpiration occurs through stomata?

Ans. In leaves water moves from the xylem into the cell walls of mesophyll cells. From the moist walls of mesophyll cells, water evaporates into the air space of leaf. These water vapours then move towards the stomata and then to the outside air.

(iii) What are guard cells?

Ans. The sausage-shapes cells that contains the chloroplasts are called guard cells. When guard cells become turgid, they become bean-shaped.

(iv) What is the role of potassium ions in stomatal opening and closing?

Ans. Potassium ions increase the solute concentration in guard cells leading to water uptake to regulate turgor pressure. Water enters guard cells by osmosis. They become turgid. Thus stomata open. Similarly in night, stomata close dueo to lower glucose concentration.

(v) Write the names of types of transpiration.

Ans. There are three types of transpiration.

1. Stomatal transpiration
2. cuticular transpiration
3. Lenticular transpiration

(vi) Why the transcription at the lower surface of leaf is greater than on the upper surface?

Ans. In most plants the number of stomata on the lower leaf surface is greater than on the upper surface. Therefore, the rate of transpiration on the lower surface is greater than from the upper surface.

(vii) How water column is created in xylem vessels? Give reasons.

Ans. Reasons:

1. The force of attraction among water molecules.
2. The narrow diameter of xylem vessels.
3. The force by which water molecules are adhere to the walls of xylem vessels.

(viii) How does sucrose enter the phloem at the source?

Ans. Sucrose enters the phloem by active transport using he energy provided by companions cells.

Q.4: Short Answer Questions:

(i) What is the role of cuticle in gaseous exchange?

Ans. The cuticle is a waxy layer on the epidermis of leaves and stems. It allows the exchange of gases.

(ii) Write the names of two ways through which plants excrete extra water.

Ans. If plants have extra water, they remove it in two ways: **i.** Transpiration **ii.** Guttation.

(iii) Define guttation.

Ans. Guttation involves the release of water droplets through small pores located at the tips or edges of leaves. This process helps to regulate the plants water content.

(iv) How plants excrete metabolic wastes?

Ans. Ways to excrete metabolic wastes:

- Some plants can store wastes in the form of harmless crystals.
- Some plants keeps their waste in their leaves. When leaves fall, plants body also get rid of these wastes.
- Some plants exretes waste through special pores.

(v) How do mesophytes adapt to their environment?

Ans. Mesophytes are terrestrial plants which live in land where medium quantity of water is available. They absorb water through roots. Most of their body is covered with cuticle, which prevents water loss. They also control extra traspiration by losing their stomata.

(vi) What adaptions do xerophytes have to survive in dry conditions?

Ans. The body surface of xerophytes have very few stomata. It is also covered with thick waxy cuticle to reduce the loss of water.

(vii) Differentiate between hydrophytes and xerophytes.

Ans. Hydrophytes: Hydrophytes live in freshwater or in wet soil. In these plants the absorption of water, in these plants the absorption of water occurs through the whole surface. They use large number of stomata for removal of extra water.
Example: Water lily.
Xerophytes: Xerophytes live in extreme dry environments. They have deep roots to absorb water from almost dry soil. They have thick waxy cuticle to reduce water loss.
Example: Cactus.

(viii) What are halophytes?

Ans. Halophytes live in habitats with salty waters. Water tries to move out from their hypotonic bodies into the hypertonic environment.
Example: Many sea grasses.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 10

Objective Type

Q.1: Multiple Choice Questions:

1. Genetically identical
2. DNA replication **3.** Inside the cell
4. Suckers **5.** Sporophyte **6.** Flowers
7. Ovule **8.** Pollination
9. Self-pollination **10.** Two
11. Double fertilization **12.** Banana

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What is the most common method of reproduction in bacteria?

Ans. Bacteria reproduce by binary fission. It is the usual method of reproduction in bacteria.

(ii) How does binary fission take place in protists?

Ans. Many protist (e.g. Amoeba, Euglena etc) reproduce by binary fission. In protists, the nucleus of parent organism divides into two. This is followed by the division of cytoplasm. So, two daughter protists are formed.

(iii) Describe the process of spore formation in rhizopus.

Ans. When rhizopus reaches reproductive age, its body cells form thick walled spore sac called sporangia. When spores are mature, the sporangium bursts and spores are released.

(iv) What are endospores?

Ans. Endospores are highly resistant structures formed by certain bacteria in response to unfavourable conditions. These spores are produced inside the cell.

(v) What is meant by vegetative propagation?

Ans. Vegetative propagation is a method of asexual reproduction in plants. In this method, new plant is produced from the vegetative part (root, stem or leaf) of the parent plant.

(vi) Differentiate between natural vegetative propagation and artificial vegetative propagation.

Ans. Natural vegetative propagation: Natural vegetative propagation is a process where plants reproduce on their own, using structures like stems, roots or leaves.

Artificial vegetative propagation: Artificial vegetative propagation means the processes in which humans use the vegetative part of plants for their reproduction by methods like cutting, grafting or layering.

(vii) Write about vegetative propagation through rhizome.

Ans. Rhizome is a horizontal stem that grows below the ground. It has nodes where new leaves and roots grow. In this way, a new plant grows from each node. Ferns, ginger and sugar cane reproduce by using rhizome.

(viii) Which plant reproduce by tubers?

Ans. Potatoes reproduce by tubers.

Q.3: Short Answer Questions:

(i) How vegetative propagation occurs by corms?

Ans. Corms are the short underground stems. Buds are present at the top of corm. From a bud, shoot grows and forms a new plant. Dasheen and garlic reproduce by corms.

(ii) Define suckers in vegetative propagation.

Ans. Suckers are new shoots that emerge from the base of the parent plant or from its underground roots.

Example: Banana and raspberry plants.

(iii) Write a note on vegetative propagation occurs through modified leaves.

Ans. The leaves of some plants (e.g. Bryophyllum) are modified for vegetative propagation. Such leaves have buds at their margins. When leaf falls on ground, the buds grow into new plants.

(iv) Why artificial propagation is used?

Ans. Artificial propagation is used to cultivate plants with desirable characteristics or to increase crop production.

(v) Differentiate between cutting and grafting.

Ans. Cutting: A piece of stem or root that are cut from a plant and used to grow new plant is called cutting.

Grafting: Grafting is the joining of two or more plant parts of the same type to form a single plant. In grafting, a bud or small stem of one plant is attached to the roots or stems of a second plant.

(vi) What is sporophyte generation?

Ans. The diploid generation in plant life cycle which produces spores is called sporophyte generation.

(vii) Discuss the phenomenon of alternation of generation.

Ans. The sporophyte generation produces spores which grow and make the new gametophyte generation. The gametophyte generation produces gametes. Which unite and make the new sporophyte generation. The phenomenon in which two different generations alternate with each other is called alternation of generation.

(viii) What is calyx? Tell its unit.

Ans. Calyx is the outermost whorl. Its unit is sepal. Sepal protects the inner parts of the developing flower before its opens.

Q.4: Short Answer Questions:

(i) Write the function of anther and filament.

Ans. Anther contains pollen sacs (microsporongia), which produces microspores. Filament is stalk-like structure. It supports the anther.

(ii) What are the parts of a carpel?

Ans. A carpel consists of three parts:
1. Ovary **2.** Style **3.** Stigma

(iii) What is the final structure formed after the development of female gametophyte?

Ans. The resulting structure is embryo sac which contains seven cells (one egg cell, one fusion nucleus and five non-functional cells).

(iv) How microspores produced?

Ans. The pollen sac present in anther act as microsporangia. Each pollen sac contains many diploid microspore mother cells. Each microspore mother cell undergo meiosis and produces four haploid microspores.

(v) Define pollination.

Ans. Pollination is the transfer of pollen grains from an anther to a stigma. This process allows plants to reproduce and produce seeds.

(vi) What is double fertilization?

Ans. The process of fusion of one sperm with egg and other sperm with fusion nucleus is called double fertilization.

(vii) What is meant by parthenocarpy?

Ans. In some plants, ovaries develop into fruits without fertilization of egg in ovule. So, there is no seed in fruit. This process is called parthenocarpy. It results in seedless fruits.
Examples: Bananas and seedless varieties of grapes.

(viii) Define cloning.

Ans. Cloning is the latest method of vegetative propagation. It is the technique of producing identical offsprings from small pieces of tissue taken from shoot tips or other suitable parts of the plant.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 11

Objective Type

Q.1: Multiple Choice Questions:

1. Taking average
2. Analyzing biological data **3.** Epidemology
4. 12 **5.** 6 **6.** Average of middle value
7. Ascending or descending **8.** 9
9. All of these **10.** Graphic representation
11. x-axis **12.** Gather the data

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What is meant by biostatistics?

Ans. Biostatistics is the branch of statistics that applies the statistical methods to biological sciences.

(ii) What is the mode of a data set?

Ans. **Mode of a data set:** The mode is the value that appear most frequently in a data set. A data set may have one mode, more than one mode, or no mode at all.

(iii) What does the height of a bar in a bar chart represent?

Ans. The height of a bar in a bar chart represents the number of units or observations in that category or simply the value of the variable.

(iv) How biological data can be analyzed?

Ans. Biostatistics involves applying statistical techniques to analyze data. This analysis can uncover trends, correlations and patterns.

(v) What is the role of biostatistics in public health?

Ans. In public health, biostatistics provides evidence-based insights that guide policy decisions and health guidelines.
For example: Statistical analysis of data on COVID-19 rates can lead to the implementation of COVID-19 vaccination campaign.

(vi) Why epidemologists use biostatistics?

Ans. Epidemologists use biostatistics to study the distribution and determinates of diseases and health in populations.

(vii) How biostatistics used in the field of genetics?

Ans. Biostatistics is used in genetic research to analyze the inheritence of traits and the association of genetic variations for diseases.

(viii) What is mean in biostatistics?

Ans. The mean, also known as average. It is the sum of all the values in a data set divided by the number of values. It represents the central value of the data set.

Q.3: Short Answer Questions:

(i) Write the formula of mean.

Ans. The formula of mean is:

$$\text{Mean} = \frac{\text{Sum of All Data Points}}{\text{Number of Data Points}}$$

(ii) Consider the following data set representing the weight (kg) of six students:
55, 60, 65, 70, 75, 80. What is the mean weight?

Ans. Mean $= \frac{\text{Sum of All Data Points}}{\text{Number of Data Points}}$

$$= \frac{55+60+65+70+75+80}{6}$$

$$= \frac{405}{6}$$

$$= 67.5$$

So the mean weight is 67.5 kg.

(iii) If the mean of a dataset is 12 and the number of values is 8. What is the sum of values?

Ans. Mean = $\frac{\text{Sum of All Data Points}}{\text{Number of Data Points}}$

Mean = 12
Number of values = 8
Put the values in formula:

$12 = \frac{\text{Sum of all values}}{8}$

Sum of all values = 12 × 8
= 96
So the sum of all values is 96.

(iv) What is the median of a data set?

Ans. The median is the middle value of a data set where the values are arranged in ascending to descending order.

(v) Write the steps to calculate median.

Ans.
1. Arrange the data in ascending order.
2. If the number of values (n) is odd, the median is the value at the position $\frac{n+1}{2}$.
3. If the number of values (n) is even, the median is the average of the values at position $\left(\frac{n}{2}\right)$ and $\frac{n}{2}+1$.

(vi) Define mode with example.

Ans. The mode is the value that appears most frequent in a data set. A data set may have one mode, more than one mode or no mode at all.

For example:
Data set: 150, 160, 165, 155, 160
Repeatition: 150(1), 160(2), 165(1), 155(1)
Most frequent value is 160.

(vii) How mode is calculated?

Ans. There are following steps to calcculate mode:
1. Count the frequency of each value in the data set.
2. The value with the highest frequency is the mode.

(viii) Define bar chart.

Ans. A bar chart is the graphical representation of data using bars of different heights or lengths.

Q.4: Short Answer Questions:

(i) For what purposes bar charts are used?

Ans. Bar charts are used to compare the quantities of different catagories. Bar charts are effective for comparing different categories and visually representing the distribution fo data.

(ii) What are the steps to create a Bar Chart?

Ans. Steps to create or Bar Chart:
1. Collect Data
2. Organize data
3. Draw axis
4. Label the axis
5. Scale the axis
6. Draw bars
7. Label the bars

(iii) What does the height of a bar in a bar chart represent?

Ans. The height of a bar in a bar chart represent its value.

(iv) How biostatistics is helpful in analysing biological data?

Ans. Biostatistics involves applying statistical techniques to analyse data. This analysis can uncover trends, correlations, and patterns. For example, analysing the growth rates of plants under different environmental conditions can reveal how factors like light and water affect growth.

(v) What is benefit of biostatistics in agriculture?

Ans. In agricultural research, biostatistics helps in analysing crop yields, the effectiveness of fertilizers and the resistance of plants to perts and diseases.

For example: Comparing the yields of different wheat varieties under various famous practices involves statistical analysis.

(vi) What is Average?

Ans. Average represents the central value of data set.

(vii) How is the mean different from the median?

Ans. Mean is the sum of all the values in a data set divided by the number of values, while median is the middle value of a data set when the values are arranged in ascending or descending order.

(viii) What is the important part of a bar graph.

Ans. The most important part of a bar graph is the data it contains.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 12

Objective Type

Q.1: Multiple Choice Questions:

1. Zoology **2.** Immunology **3.** Biotechnology
4. Medical research **5.** Aristotle
6. Protozoans **7.** Viruses **8.** Onion
9. Lipid **10.** Rough endoplasmic reticulum
11. Root hairs **12.** Hepatocytes

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Define microbiology.

Ans. Microbiology: The study of microorganisms, such as bacteria and microscopic fungi is called microbiology.

(ii) What do you know about cytology?

Ans. Cytology is the study of cells. Cytologists study the fundamental structures of cells

and their organelles. They also study the mechanism of cell division.

(iii) Define fossils. What is the oldest known fossil?

Ans. Fossils: Fossils are the remains of plants and animals that were preserved in rocks and other geological formations. The oldest known fossil is a cyanobacterium, estimated to be 3.5 billion years old.

(iv) What is the difference between pathology and immunology?

Ans. Pathology: Pathology is the study of diseases, their causes and effects.

Immunology: Immunology is the branch in which we study the components of the immune system and their role against diseases.

(v) What is the different between surgery and medicine?

Ans. Medicine: The profession medicine deals with the diagnosis and treatment of disease.

Surgery: In surgery the defective parts of the body are repaired.

(vi) When human genome project completed and what was the important aim of it?

Ans. Human genome project was completed in 2003. The aim of human genome project is to sequence and map the entire human genome.

(vii) What is meant by scientific law? Give example.

Ans. Scientific laws: A scientific law is a uniform or constant fact of nature.

Examples: Hardy-Weinberg law and Mendel's laws of inheritance.

(viii) What deduction was made for malaria?

Ans. The deduction was:

"If plasmodium is the cause of malaria, then all malarial patients should have plasmodium in their blood."

Q.3: Short Answer Questions:

(i) What is meant by classification?

Ans. Classification is a method by which biologists divide organisms into groups and subgroups on the basis of similarities found in them.

(ii) What was the contribution of E-Chatton in classification?

Ans. In 1937, French biologist E-Chatton suggested the terms, "Prokaryotic" to describe bacteria and "Eukaryotic" to describe Protista, fungi, animal and plant cells.

(iii) Write down the taxonomic hierarchy of Carl Linnaeus?

Ans. The Swedish biologist Carlous Linnaeus created a taxonomic hierarchy of organisms with six taxa i.e., kingdom, Class, Order, Family, Genus and Species.

(iv) Define viruses.

Ans. Viruses are ultramicroscopic creatures that are at the borderline of living and non-living. A virus consists of nucleic acid (DNA or RNA) surrounded by a protein coat.

(v) 43. What is the classification of Pea?

Ans.

Taxonomic rank	Pea
Domain	Eukaraya
Kingdom	Plantae
Phylum	Magnoliophyta
Class	Magnoliopisda
Order	Fabales
Family	Fabaceae
Genus	*Pisum*
Species	*Pisum Sativum*

(vi) Why cell membrane is called selectively permeable membrane?

Ans. Cell membrane functions as a semi-permeable barrier, It allows very few molecules to pass through it while blocks many other molecules. In this way cell membrane maintains the internal composition of cell.

(vii) What is the difference between microtubules and microfilaments.

Ans. Microtubules: Microtubules are hollow tubes made up of tubulin protein. It holds organelles in place, maintains a cell's shape and act as a tract for organelle.

Microfilaments: Microfilaments are made us of contractile proteins mainly actin. They help in cell movement.

(viii) Write the function of chloroplasts.

Ans. Chloroplasts are green plastids.

Their function is to perform photosynthesis with the help of their photosynthetic pigments, they capture light energy and convert it into chemical energy in the form of glucose.

Q.4: Short Answer Questions:

(i) Differentiate between cilia and flagella.

Ans. Cilia:

- Some cells have thin, tail-like projections called cilia.
- Cilia are short in length and numerous in number.
- Function of cilia is movement

Flagella:

- Flagella are longer but less in number.
- The function of flagella is movement.

(ii) Write any two advantages of plant cell structures.

Ans. 1. Plant cells have a rigid cell wall made of cellulose that provide support and protection to cell.

2. They contain chloroplasts, which are responsible for photosynthesis.

(iii) Write down the advantages of animal cell structures.

Ans. 1. Animal cells contain lysosomes, filled

with enzymes that break down waste material.

2. Animal cells have centriole which make spindle fibres.

(iv) What is the role of muscle cell in body?

Ans. Muscle cells also known as muscle fibre helps in contraction and relaxation. They allow movements, support and stability of the body.

(v) What is the role of liver cells in detoxification?

Ans. Liver cells play a crucial role in detoxification by removing toxins and waste products from the blood. There are large number of peroxisomes which contain enzymes to neutralize toxic substances. And excreting them through bile or urine.

(vi) What is division of labour within cells?

Ans. The division of labour within cells refers to the specialization of different organelles to perform specific functions, increasing efficiency. For example: Mitochondria produces energy, endoplasmic reticulum forms proteins and lipids.

(vii) What is the role of muscle cells and nerve cells?

Ans. Muscle cells: Muscle cells contract and relax to produce movement.

Nerve cells: Nerve cells transmit and process information throughout the body.

(viii) How stem cells differentiate into specialized cells?

Ans. During development, when the earliest stem cell (zygote) divides, it makes different cell lines, the cells of each line differentiate into specific type like skin cells, muscle cells, nerve cells etc.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 13

Objective Type

Q.1: Multiple Choice Questions:

1. S Phase **2.** Metaphase **3.** Synapsis
4. Organ system **5.** Mesophyll tissue
6. All of the above **7.** Provide energy
8. All of the above **9.** Lipid
10. Amino acids **11.** Proteins
12. Induced fit model

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What happens in G2 phase of cell cycle?

Ans. In G2 phase, cell prepares proteins that are essential for mitosis, mainly for the production of spindle fibres. Cell prepares itself for mitosis.

(ii) How is metaphase plate formed?

Ans. When spindle fibres grown to sufficient length. Two spindle fibres from both sides bind with one chromosome. The chromosomes attached with spindle fibres arrange themselves along the equator of the cell. In this way a plate is formed called metaphase plate.

(iii) Write down the process of budding in Hydra.

Ans. Hydra reproduces by budding. During this process mitosis forms a mass of cells called bud on the surface of hydra. Mitosis continues in the cells of the bud and it grown into a new individual.

(iv) How does crossing over contribute to genetic variations in meiosis?

Ans. Crossing over contributes to genetic variations by exchanging genetic material between homologous chromosomes during meiosis. In this way new combinations are formed, leading to increase in diversity of offsprings.

(v) Write down the similarities between mitosis and meiosis.

Similarities:

Ans. 1. DNA replication occurs during interphase (S-phase) of both divisions.
2. Both mitosis and meiosis involve the formation of spindle apparatus.
3. Cytokinesis occurs at the end of both divisions.

(vi) Explain the example of organ and organ system form emergent properties.

Ans. Multiple organs working together to form organ systems, which carry out vital functions. For example, the digestive system is composed of organs like mouth, esophagus, stomach and liver. These individuals organs cannot digest food but the coordinated actions of these organs unable the digestion and absorption of nutrients.

(vii) Differentiate between root system and shoot system.

Ans. Root system: The root system anchors the plant and absorbs water and nutrients.

Shoot system includes stems, leaves and reproductive structures like flowers. These components work together to enable processes like photosynthesis and reproduction.

(viii) Tissue has more properties than cell. Explain with an example.

Ans. Tissue has more properties than cell. For example muscle cell combine to form muscle tissue, which can contract and generate force.

Q.3: Short Answer Questions:

(i) What is the important function of stem? Which tissue do stem contain?

Ans. Function: Stem supports leaves, flowers and fruits.

Tissues: Stem contain vascular tissues (xylem and phloem).

(ii) Differentiate between skeletal system and muscular system.

Ans. Skeletal System: It consists of bones, cartilages and tendons. It provides structure, support and protection for the body.

Muscular System: It includes skeletal muscles, which attach to bones and contract to produce movements.

(iii) What is the mechanism for cooling the body?

Ans. When we do hard work or exercise, our muscles produce heat that rises the body temperature. In this situation brain sends message to sweat glands. These glands produce sweat and sweating cools down the body.

(iv) How nervous system and endocrine system maintain homeostasis?

Ans. Nervous system and endocrine system regulate and coordinate activities such as heart rate, respiration and metabolism. They also respond to changes in the environment.

(v) How can you define the term "macromolecules"? Give examples.

Ans. Macromolecules are relatively larger molecules with a high molecular weight.

Example: Carbohydrates, Proteins, lipids etc.

(vi) Explain about the percentage of biomolecule in the dry mass of protoplasm.

Ans. Biomolecules make the 93% of the dry mass of protoplasm. Proteins contains 50%, Nucleic acid 18%, carbohydrates 15% and lipids 10%. The remaining 7% of dry mass comprises of vitamins and inorganic substances.

(vii) What are the main functions of carbohydrates in the body?

Ans.
1. Carbohydrates are the primary source of energy.
2. Plants convert their monosaccharides to disaccharides between body parts.
3. Cellulose provide supports to plant cells and ultimately the whole body.

(viii) How lipids are the energy rich molecules? Explain.

Ans. Lipids are the most energy-rich biomolecules. They serve as a long term energy reserve in the form of fats in adipose tissues. When body required energy, these stored lipids are broken down to release fatty acids and glycerol, which can be used as fuel for energy.

Q.4: Short Answer Questions:

(i) How many components combine to form a nucleotide? Write their names.

Ans. A nucleotide is made up of three components. These are as follow:

1. Pentose sugar (ribose or deoxyribose)
2. Nitrogenous base (A, T, C, G, U)
3. Phosphate group (PO_4)

(ii) Why and when Watson and Crick awarded noble prize?

Ans. In 1962, James Watson and Francis Crick received Nobel prize for the discovery of the double helix structure of DNA.

(iii) What is the primary function of DNA?

Ans. The primary function of DNA is that is stores genetic information. This information is in the form of a sequence of nucleotides.

(iv) Where are the ribozymes found?

Ans. Ribozymes are found in ribosome. They are also found in specific viruses and bacteria.

(v) Define co-factors.

Ans. Many enzymes require additional non-protein molecules to be fully active. Such non-protein molecules are called cofactors.

(vi) Justify "Lock and Key Model" of enzymes action.

Ans. Lock and key model was proposed by a German Chemist Emil Fischer in 1894. according to it, the active site of enzyme has a fixed structure. The substrate molecule precisely fit into it to form a enzyme-substrate complex. The enzyme catalyzes the reaction and substrate is transformed into product.

(vii) What is optimum temperature? Write the optimum temperature for human enzyme.

Ans. Each enzyme works at maximum rate at a specific temperature called the optimum temperature. Optimum temperature for human enzymes is 37° C.

(viii) How does pH affect enzyme activity?

Ans. Enzymes show maximum activity at a specific pH called optimum pH. Change in pH can affect the ionization of the amino acids. It slows down enzyme activity or blocks it completely.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 14

Objective Type

Q.1: Multiple Choice Questions:

1. Fritz Lipmann **2.** Chloroplasts **3.** ~~Lactic acid~~ **4.** ~~Carnivorous~~ **5.** Root hairs **6.** Stomata **7.** Artificial vegetative propagation **8.** Calyx **9.** All of these **10.** Parthenocarpy **11.** Both a and b **12.** 96

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What is the role of ATP in metabolic processes?

Ans. ATP serves as an energy carrier, transferring energy from energy-releasing processes (like cellular respiration) to

energy-consuming processes (like muscle contraction and protein synthesis).

(ii) Write down any two events of light reactions.

Ans. **1.** When chlorophyll absorbs light, reactions start in it. High energy electrons are released from chlorophyll.
2. The high energy electrons are passed to an electron transport chain. They release energy which is used to produce ATP.

(iii) What is meant by pigments?

Ans. Pigments are the substances that absorbs visible light. Different pigments absorb light of different wavelengths (colours).

(iv) In which type of anaerobic respiration pyruvic acid is converted in ethyl alcohol. State it.

Ans. In alcoholic fermentation pyruvic acid is converted into ethyl alcohol. During anaerobic respiration in bacteria and yeast etc. Pyruvic acid is further broken down into alcohol and CO_2.

$2(C_3H_4O_3) \rightarrow 2(C_2H_5OH) + 2CO_2$
Pyruvic acid Ethyl alcohol

(v) Why glycolysis also occurs in anaerobic respiration?

Ans. Oxygen is not required for the glycolysis. That is why, it also occurs in anaerobic respiration.

(vi) Why does older leaves are more susecptible to nitrogen deficiency?

Ans. When a plant faces N or Mg deficiency, it transports these elements from older to younger leaves. So, the yellowing of leaves is seen in older leaves first than in younger leaves.

(vii) How transpiration is a necessary evil?

Ans. Transpiration is a necessary evil. Because transpiration is the loss of water from plant. Which is essential for important processes like cooling the plant, transporting minerals and maintaining water flow from roots to leaves.

(viii) How temperature affects the rate of transpiration?

Ans. Increase in temperature results in an increase in the rate of transpiration. It is due to the fact that at higher temperature, water evaporates more quickly.

Q.3: Short Answer Questions:

(i) What happens to the osmotic pressure in the phloem at the sink?

Ans. The osmotic pressure decreases as sucrose is uploaded from the phloem into the sink tissues.

(ii) What are succulent organs?

Ans. Some xerophytes store water in their specialized stems and roots such stems and roots are soft and juicy and are called succulent organs.

(iii) Why can spores tolerate unfavorable conditions?

Ans. Spores can tolerate unfavorable conditions due to their thick walls. When favorable conditions are available, the spores germinate to produce new fungus.

(iv) How vegetative propagation is better than sexual method?

Ans. Vegetative propagation takes much less time to produce new generation as compared to sexual method. Secondly, the offsprings are genetically identical to the parent plant.

(v) Write the names of types of stems take part in vegetative propagation.

Ans. The following types of stems take part in vegetative propagation.

1. Stolon **2.** Tuber
3. Rhizome **4.** Bulb
5. Corm

(vi) How reproduction of plants take place through bulb? Give any two examples.

Ans. Bulb is a very short stem that grows underground. It has bud and fleshy leaves. Bulb grows naturally to produce new plants. Tulip and onions reproduce by bulbs.

(vii) What is artificial propagation?

Ans. Artificial propagation includes the methods in which humans produce new plants by using the vegetative parts of plants.

(viii) How new plants are grown from cutting?

Ans. In some plants, a piece of stem or a piece of root can form a new plant. Such a piece of stem or root that are cut from a plant and used to grow new plant is called cutting. Roses and grapevines are grown from stem cutting.

Q.4: Short Answer Questions:

(i) What are the disadvantages of vegetative propagation?

Ans. Plants produce through vegetative propagation do not have genetic differences. In other words, all the offsprings are identical. Due to it, they are equally sensitive to environmental changes and prone to the same diseases or pests.

(ii) Define receptacle. Write its function.

Ans. Receptacle is the swollen tip of a flower stalk where all the floral parts are attached. It serves as the base that supports the flowers structure.

(iii) Write the names of the floral parts of a flower.

Ans. Floral parts are in the form of four concentric whorls or rings:

1. Calyx **2.** Corolla
3. Androecium **4.** Gynoecium

(iv) Name the main stages in the life cycle of angiosperm.

Ans. Following are the main stages in the life cycle of an angiosperm:

1. Development of embryo sac
2. Development of male gametophyte
3. Pollination
4. Fertilization
5. Seed and fruit formation
6. Development of saprophytes

(v) What do you known about pollen grain?

Ans. Pollen grain is a two-celled structure in which one cell is the tube cell, which will form the pollen tube and the other cell is the generative cell, which will form two sperms.

(vi) How would you differentiate self-pollination and cross pollination?

Ans. **Self pollination:** The transfer of pollens from the anther to the stigma of the same flower or another flower on the same plant is called self-pollination.

Cross-pollination: The transfer of pollens from the anther of one plant to the stigma of a flower on a different plant of the same species, is called cross-pollination.

(vii) How development of sporophyte takes place?

Ans. When seeds nature, they are dispersed. It seeds get suitable conditions, their embryos develop ito new plants (the sporophyte of the next generation).

(viii) How pistil is formed?

Ans. In some flowers, one or more carpels are fused to form a structure called pistil.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 15

Objective Type

Q.1: Multiple Choice Questions:

1. Microbiology **2.** Biophysics **3.** Biological laws
4. Species **5.** Cellulose **6.** Cell membrane
7. Protein synthesis **8.** Walther Flemming
9. Telophase **10.** Four haploid cells
11. Digestive System
12. Protection of plant

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) How is anatomy different from morphology?

Ans. Morphology studies the form and structure of organisms while anatomy studies the internal physical structure of organisms particularly humans.

(ii) Which branch of Biology involves the study of the development and growth of organisms from fertilization to birth or hatching?

Ans. Embryology is the branch of Biology that involves the study of the development and growth of organisms from fertilization to adulthood.

(iii) Discuss the work of an agriculturists and a horticulturists.

Ans. **Agriculturalist:** Agricultural scientists improve farming practices, crop production and sustainable agriculture techniques.

Horticulturists: Horticulturists cultivate fruits, vegetables and flowers.

(iv) What thing do public health experts try to improve?

Ans. Public health experts improving the health of communities through education, policy-making and research.

(v) What was the only remedy for malaria from 17th to 20th century?

Ans. Quinine was the only remedy for malaria from 17th to 20th century.

(vi) Differentiate between prokaryotes and Eukaryotes.

Ans. **Prokaryotes:** Those organisms which do not have a well defined nucleus are called prokaryotes e.g.. Bacteria and Archaea.

Eukaryotes: Those organisms which have a proper nucleus are called eukaryotes. e.g. Plants and Animals.

(vii) What is Computational Biology?

Ans. In Computational Biology, scientists use Mathematical models, algorithms, and computer simulations to understand biological systems and relationships. It involves analysing biological data, such as sequence of amino acids in a protein.

(viii) How is the biodiversity crucial for humans and for the planet Earth?

Ans. Biodiversity is crucial for humans and for the planet Earth because we rely on nature to provide us with food, clean water, medicines, oxygen production, economic opportunities, recreational activities, cultural significance, scientific data, to prevent floods and other extreme weather effects etc.

Q.3: Short Answer Questions:

(i) What are the main functions of cell membrane?

Ans. The main function of cell membrane is to allows only few molecules to pass through it while blocks many other molecules.

(ii) Why mitochondria is called the "Powerhouse" of the cell?

Ans. Mitochondria is called the "powerhouse of the cell" because it generates most of the energy that the cell needs to function in the form of ATP.

(iii) Which type of cell is responsible for sending nerve signals?

Ans. Neuron is the cell that is responsible for sending nerve signals.

(iv) What do you know about the principle division of labour?

Ans. Division of labour refers to the specialization of different parts of a system to perform specific task more efficiently. It is a fundamental principle that enhances efficiency and functionality in biological systems.

(v) Define cytosol.

Ans. Cytosol is a liquid part of cytoplasm that includes molecules and small particles, such as ribosome's but not membrane bound organelles.

(vi) Differentiate between karyokinesis any cytokinesis.

Ans. Karyokinesis: The division of nucleus is called karyokinesis.

Cytokinesis: The division of cytoplasm is called cytokinesis.

(vii) What is diploid and haploid?

Ans. Diploid: Diploid means the cells in which chromosomes are in pairs (homologous pairs).

Haploids: Haploid means the cells with no pairs of chromosomes i.e.1n.

(viii) What is the function of the centrosome during cell division?

Ans. The function of centrosome during cell division is to organize microtubules that form the mitotic spindle, which separates replicated chromosomes into daughter cells.

Q.4: Short Answer Questions:

(i) What is meant by emergent properties?

Ans. In organisms, the components at each level do not work solely, instead, they interact. Due to their interactions, they create new functions called emergent properties.

These include the abilities that are present in higher level but are not possible for individual components.

(ii) How molecule is formed?

Ans. Atoms combine to form a molecule which can have entirely different properties than the atoms.

(iii) What is the function of epithelial tissue and vascular tissue?

Ans. Epithelial tissue: This tissue covers body surfaces and lines cavities.

Vascular tissue: This tissue transports water and nutrients.

(iv) Enlist the levels of organization from cells to organ systems.

Ans. The levels of organization from cells to organ systems are:

Cell ⟶ Tissue ⟶ Organ ⟶ Organ system

(v) What are the major roles of the epithelial tissue present in the stomach?

Ans. The inner walls of stomach is made up of epithelial tissue. It is glandular in nature and secretes mucus. The mucus lines the inner walls and protects it from acid.

This tissue also secrete gastric juice.

(vi) Define homeostasis. Give example.

Ans. Homeostasis is defined as the body's ability to maintain a stable internal environment despite the change external environment.

For example: Temperature, blood pressure, blood sugar and pH levels are maintained.

(vii) Write the names of the organ systems which maintain homeostasis:

Ans. 1. Nervous system
2. Respiratory system
3. Cardiovascular system
4. Digestive system
5. Urinary system
6. Intagumentary system

(viii) What is the role of urinary system in homeostasis?

Ans. Urinary system eliminates waste products from the body. It also regulates water and salt balance. In this way, it maintains blood volume, blood pressure and pH levels.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 16

Objective Type

Q.1: Multiple Choice Questions:

1. Provide energy **2.** It provides support
3. Uracil **4.** Proteins
5. Products **6.** Saturation **7.** Chlorophyll
8. $C_3H_6O_3$ **9.** Magnesium
10. Guard cells **11.** Two daughter cells
12. 20

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What are the types of RNA? Write their functions.

Ans. Types of RNA: There are three types of RNA:

- Messenger RNA (mRNA)
- Transfer RNA (tRNA)
- Ribosomal RNA (rRNA)

Functions of Messenger RNA (mRNA):
Carries the genetic information from DNA to the ribosomes during protein synthesis.

Functions of Transfer RNA (tRNA):
Transfer specific amino acids to the ribosomes, ensuring the correct sequence during protein synthesis.

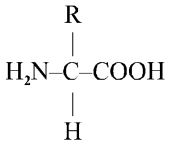
Functions of Ribosomal RNA (rRNA):
Constitutes the structural and functional components of ribosomes, the cellular machinery for protein synthesis.

(ii) Name two monosaccharides and two disaccharides.

Ans. Monosaccharides are fructose and glucose while the comon disaccharides are sucrose and maltose.

(iii) What is amino acid and draw its structure?

Ans. Amino acids are the organic molecules that join in specific number and sequence to make proteins. An amino acid is an organic molecule made of an amino group (NH_2), a carboxyl group (COOH), a hydrogen group (H) and a side group (R) are attached to central carbon atom.



Amino acid-general structure.

(iv) How do the three group of carbohydrates differ in taste?

Ans. Monosaccharides (simple sugars) is a group of carbohydrate that has sweet taste. Disaccharides is a group of carbohydrate that has less sweet in taste. While polysaccharides is a group of carbohydrate that is tasteless.

(v) What are the basic components of lipids?

Ans. Lipids are composed of glycerol and fatty acids.

Glycerol: Glycerol is an alcohol having 3 carbon atoms. Each carbon has a hydroxyl group (OH).

Fatty acids: fatty acids are long hydrocarbons chains with carboxyl group (COOH) at the end.

(vi) What is meant by phospholipids?

Ans. These lipids make the core of all membranes. A phospholipids molecule consists of one glycerol, two fatty acids and a phosphate group.

(vii) What do you know about metabolism?

Ans. Metabolism is the sum of all the chemical reactions that occurs within an organism to sustain life. There are two types of metabolism.

1. Catabolism **2.** Anabolism

(viii) Define lipolysis.

Ans. Lipolysis is the breakdown of lipids (fats) into fatty acids and glyceral which can be used for energy production.

Q.3: Short Answer Questions:

(i) What is the specificity of enzymes?

Ans. Enzymes are highly specific to the reactions they catalyze. They are also very specific for the nature of substrate.

For example: The enzyme amylase specifically catalyzes the breakdown of starch into simple sugars.

(ii) What are the uses of enzymes in food industry?

Ans. Enzymes that break starch into simple sugars are used in production of white bread, buns and rolls. Enzymes are also used for the production of cheese.

(iii) Differentiate between catabolism and anabolism.

Ans. Difference between catabolism and anabolism:

Catabolism: Catabolism involves the breakdown of complex molecules into simpler ones, releasing energy in the process.

Anabolism: Anabolism involves building up complex molecules from simpler ones. This process consumes energy.

(iv) What is meant by fermentation?

Ans. Fermentation is a metabolic process where microorganisms (e.g. bacteria, yeast) convert sugars into acid, gases or other compounds.

(v) Write down the word equation for photosynthesis.

Ans. The word equation for photosynthesis is:

Carbon dioxide + Water + Light energy $\longrightarrow$ Glucose + Oxygen + Water

(vi) Define light reactions.

Ans. The reactions which need light for their completion are called light reactions. during light reactions, light energy is used to make high energy molecules (ATP and NADPH).

(vii) What happens to the electrons released when chlorophyll absorbs light?

Ans. The excited electrons are transferred through a series of electron carriers in the thylakoid membrane, generating ATP and NADPH.

(viii) Name the final products of Aerobic and Anaerobic respiration.

Ans. Products of Aerobic respiration:

1. Carbon dioxide **2.** Water

3. Energy

Products of Anaerobic respiration:

1. Ethyl alcohol **2.** Lactic acid

3. Carbon dioxide

Q.4: Short Answer Questions:

(i) What causes stomata to open and close?

Ans. Stomata open and close because of changes in the turgor pressure of their guard cells. Further more, concentration of potassium ions control the opening and closing of stomata.

(ii) How does water moves from epidermal cells to guard cells in transpiration?

Ans. Water moves for epidermal cells to guard cells from epidermal cells to guard cells through osmosis due to the higher solute concentration in guard cells.

(iii) How do lenticels facilitate gas exchange in woody stems?

Ans. In woody stems, the entire surface is covered by a bark. Gaseous exchange cannot occurs through bark. The bark contains special pores called lenticels, which all the exchange of gasses.

(iv) How extra oxygen and carbon dioxide excreated from the plant?

Ans. Plants primarily excrete extra carbon dioxide and oxygen through the tiny pores present on the surface of leaves called stomata.

(v) Differentiate between guttation and dew.

Ans. Guttation: Guttation involves the release of water droplets through small pores located at the tips or edges of leaves.

Dew: Dew means the water drops on the surface of leaves formed by the condensation of water vapours present in air.

(vi) Differentiate between sexual and asexual reproduction.

Ans. Sexual reproduction: The reproduction that involves the fusion of male and female gametes is called sexual reproduction.

- In sexual reproduction, the offspring have variations among themselves.

Asexual reproduction: The reproduction that does not involve the fusion of gametes is called asexual reproduction.

- The offspring produced by sexual reproduction are genetically identical to the parents.

(vii) Write a short note on budding in yeast.

Ans. Yeast reproduce by budding. During budding, a part of the parent organism grows out from its body. This part is called a bud. When the bud has grown big, it may seperate from parent body or may remain attached.

(viii) State how potatoes reproduce through tubers.

Ans. Potatoes reproduce by tubers. It is fleshy stem that grows underground. It has eyes which are actually its buds. Eyes can grow into new plants.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 17

Objective Type

Q.1: Multiple Choice Questions:

1. Physiology **2.** May 22nd **3.** 0.2 million
4. Robert Hooke **5.** Interphase
6. molecule **7.** Molecular Biology
8. 2 **9.** ATP
10. Sugar **11.** Binary fission **12.** ~~Biostatistics~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Define physiology.

Ans. Physiology: It is the study of Biology that deals with the functioning of body parts, for example, how the blood circulatory system transports vital substances throughout the body.

(ii) What is histology?

Ans. Histology is the microscopic study of tissues. Tissues are groups of cells that have similar functions. Tissue examination helps in disease diagnosis, drug studies, and understanding organ structure and function.

(iii) How many kinds of organisms have been named and classified by biologists?

Ans. Biologist have named and classified almost 2 million kinds of organisms.

(iv) Which region has more biodiversity, tropical or polar?

Ans. Tropical regions have more biodiversity than polar regions.

(v) Give examples of some cells that can be seen with naked eye.

Ans. An egg cell of ostrich, a unicellular green algae and a unicellular giant Amoeba are some cells that can be seen with naked eye.

(vi) What is cell wall?

Ans. Cell wall is a rigid non-living wall around the cell membrane in the cells of bacteria, fungi, plants and some protists.

(vii) During which phase of mitosis sister chromatids separate?

Ans. During anaphase of mitosis the sister chromatids separate and move towards the poles of the cell.

(viii) Which phase of interphase is called growth phase?

Ans. G1 phase (First Gap Phase) is also called the growth phase.

Q.3: Short Answer Questions:

(i) What are atoms?

Ans. Atoms are the smallest unit of matter that maintain the property of an element. For example, carbon, hydrogen, oxygen etc.

(ii) How molecules are formed?

Ans. Atoms combine to form molecules e.g; water, protein, nucleic acid etc.

(iii) What key role does the Golgi apparatus play in eukaryotic cells?

Ans. In eukaryotic cells golgi apparatus is responsible for transporting, modifying and packaging proteins and lipids into vesicles for delivery to targeted destinations.

(iv) What are biomolecules?

Ans. The molecules produced by organisms are called biomolecules or biological molecules. They include carbohydrates, lipids, proteins and nucleic acids (DNA and RNA).

(v) What is location of carbohydrates in the cell?

Ans. The location of carbohydrates in the cell are cytoplasm and cell membrane.

(vi) Explain main functions of carbohydrates.

Ans.
- Carbohydrates act as source of energy.
- They also act as energy storage molecules.

(vii) What are enzymes?

Ans. Enzymes: Enzymes are proteins that speed up chemical reactions in living organisms without being consumed in the process.

(viii) What is Lipolysis?

Ans. Lipolysis: It is the breakdown of lipids (fats) into fatty acids and glycerol, which can be used for energy production.

Q.4: Short Answer Questions:

(i) Who proposed that ATP is the main energy transfer molecule in the cell?

Ans. Fritz Lipmann proposed that ATP is the main energy transfer molecule in the cell.

(ii) What does ATP stand for?

Ans. ATP stands for adenosine triphosphate.

(iii) Define the term nutrition.

Ans. The process in which food is prepared or obtained and converted into body substances for growth and energy is called nutrition.

(iv) Define mineral nutrition in plants.

Ans. The materials that plants need for the synthesis of biomolecules are called mineral nutrients. The process of absorption of mineral nutrients from soil is called mineral nutrition.

(v) What is asexual reproduction?

Ans. The reproduction that does not involve the fusion of male and female gametes is called asexual reproduction.

(vi) Write a short note on spore formation in fungi.

Ans. Most fungi (e.g. Rhizopus; bread mold) produce spores in special sac like structures called sporangia. When spores are mature, the sporangium bursts and spores are released.

(vii) What is biostatistics?

Ans. Biostatistics is a branch of statistics that applies statistical methods to biological sciences.

(viii) What is the mode of a data set?

Ans. Mode of a data set: The mode is the value that appear most frequently in a data set. A data set may have one mode, more than one mode, or no mode at all.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 18

Objective Type

Q.1: Multiple Choice Questions:

1. Biotechnology **2.** Class **3.** Species
4. cellulose **5.** G1 phase **6.** Mitochondria
7. Anabolism **8.** P-P bonds
9. Thylakoids of chloroplasts
10. Potassium **11.** Hydra **12.** Results

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Define pathology.

Ans. Pathology, is the study of diseases, their causes, and effects. Pathology helps in disease diagnosis, treatment development, and disease prevention. Cancer, for instance, is characterized by uncontrolled growth and spread of abnormal cells.

(ii) What is biochemistry?

Ans. Biochemistry is the study of the structure and reactions of different chemical substances present in living systems. The study of the chemical reactions of photosynthesis and respiration are examples of Biochemistry.

(iii) What is classification?

Ans. Classification is a method by which biologists divide organisms into groups and subgroups on the basis of similarities found in them.

(iv) What are taxonomic ranks?

Ans. The groups into which organisms are classified are known as taxonomic ranks.

(v) What is fluid mosaic model?

Ans. The structure of cell membrane is described as fluid-mosaic model. According to this model the lipids make a fluid like bilayer in which protein molecules are submerged. The lipids and proteins can move laterally. Due to these movements, the pattern or "mosaic" of lipids and proteins constantly changes.

(vi) What is cytosol?

Ans. The liquid part of the cytoplasm that includes molecules and small particles, such as ribosomes, but not membrane-bound organelles is called cytosol.

(vii) In which phase of interphase DNA of each chromosome is replicated (copied)?

Ans. During S phase (Synthesis phase), the DNA of each chromosome is replicated (Copied).

(viii) What is G0 phase?

Ans. It is a phase during which many cells stop dividing and start performing their specific functions. Many cells, for example neuron cells remain in G0 phase for unlimited time.

Q.3: Short Answer Questions:

(i) What is the function of epithelial tissue?

Ans. Epithelial tissue covers body surfaces and lines cavities (e.g, skin).

(ii) How do the smooth muscles contribute to the stomach's function?

Ans. Smooth muscles in the stomach contribute to the stomach's function by contracting and relaxing to mix and move food through the stomach.

(iii) What does an organ system consist of?

Ans. An organ system consists of multiple organs that work together to perform related functions. Circulatory system and digestive system in animals, root system and shoot system in plants are examples of organ systems.

(iv) Define metabolism.

Ans. Metabolism: All the chemical reactions that occur in an organism are collectively called metabolism.

(v) Differentiate between anabolism and catabolism.

Ans. Anabolism: It is the type of metabolism in which simpler substances are combined to form complex substances. Energy is used in anabolism.

Catabolism: It is the type of metabolism in which complex molecules are broken down into simpler ones. Energy is released in catabolism.

(vi) Which monosaccharides make a sucrose molecule?

Ans. Sucrose (table sugar) is made of two monosaccharides i.e.; glucose and fructose.

(vii) What are ribozymes?

Ans. RNA molecules that act as enzymes are called ribozyme.

Ribozymes are primarily found in ribosome.

(viii) What is the advantage of globular structure of the enzymes?

Ans. The globular structure of enzymes allow them to form active sites that can bind specifically to substrates.

Q.4: Short Answer Questions:

(i) What amount of energy is released when the bonds between phosphates is broken?

Ans. When the covalent bonds between two phosphates in the molecule of ATP is broken. It release 7.3 kilo calories i.e 7300 calories energy is released.

(ii) Why is chlorophyll important for photosynthesis?

Ans. Chlorophyll is the green pigment located in the chloroplasts that are the site for the photosynthesis. Chlorophyll-a absorbs light of blue and red wavelength and converts it to make high energy molecules (ATP and NADPH) that is used to make the food of the plants.

(iii) Define macronutrients and micronutrients and give examples.

Ans. Macronutrients: The minerals which are required in larger quantities are called macronutrients.

Examples: Carbon, hydrogen, oxygen, phosphorous, potassium, nitrogen, sulphur, calcium and magnesium

Micronutrients: The minerals which are required in lower quantities are called micronutrients.

Example: Iron, molybdenum, boron, copper, zinc, manganese, chlorine and nickel.

(iv) Which macronutrients is necessary for cellular respiration?

Ans. Oxygen is the macronutrients that is necessary for cellular respiration.

(v) Name the animals that reproduce by binary fission.

Ans. Bacteria, amoeba, euglena and planarians reproduce by binary fission.

(vi) Name the animals that reproduce by budding.

Ans. Fungus and hydra reproduce by budding.

(vii) How biostatistics does help in interpreting results?

Ans. After analysing data, biostatistics helps to interpret the results in a meaningful way. For example, interpreting the results of a survey on the prevalence of a disease in a population can guide health interventions.

(viii) How biostatistics is helpful in public health and policy making?

Ans. In public health, biostatistics provides evidence based insights that guide policy decisions and helath guidelines. For example, statistical analysis of data on COVID-19 rates can lead to the implementation of COVID-19 vaccination campaign.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 19

Objective Type

Q.1: Multiple Choice Questions:

1. ~~Surgery~~ **2.** Cordata **3.** Human
4. nucleoplasm **5.** ~~G2 phase~~

6. Inner connective **7.** Monosaccharides
8. Increases activity to a point **9.** 5
10. Nitrogen **11.** Stolon **12.** Results

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Which degree is required for the career of pharmacology?

Ans. For career of pharmacology, a bachelor of studies (BS) degree in pharmacy or Doctor of Pharmacy (D. Pharm) degree is required.

(ii) According to Sura Ambia, Verse 30 what all living things were created from?

Ans. According to Sura Ambia, Verse 30 all living things were created from water.

(iii) What are the four kingdoms of domain Eukarya?

Ans. The four kingdoms of domain Eukarya are: Animalia, Plantae, Fungi and Protista.

(iv) In which rank each kingdom is subdivided?

Ans. Each kingdom is subdivided into related phyla or divisions.

(v) What is chromatin?

Ans. Nucleoplasm contains fine thread like material known as chromatin.
Chromatin is composed of de oxyribonucleic acid (DNA) and proteins.

(vi) Why DNA is called the hereditary material?

Ans. DNA contains genes which control all the activities of the cell. DNA is also responsible for the transmission of characteristics to the next generation. That is why DNA is called the hereditary material.

(vii) Differentiate between diploid and haploid cells.

Ans. Diploid cells:
Those cells in which chromosomes are found in pair form i.e. (2n), are Known as diploid cells.
Haploid cells:
Those cells which have half number of chromosome i.e. (1n), are known as haploid cells.

(viii) Who discovered mitosis?

Ans. The German biologist, Walther Flemming discovered the events of mitosis in 1880s.

Q.3: Short Answer Questions:

(i) What does happen when organelles interact within a cell?

Ans. When organelles interact within a cell, they create a complex system capable of carrying out various cellular processes, such as metabolism protein synthesis and energy production.

(ii) What emergent properties arise from the interactions of various organ systems in an individual?

Ans. In an individual, the interactions of various organ systems bring emergent properties such as consciousness, thinking and the ability to adapt to environment.

(iii) Tissue has more properties than cell. Explain with an example.

Ans. Tissue has more properties than cell. For example, muscle cells combine to form muscle tissue, which can contract and generate force.

(iv) What is general formula of carbohydrates?

Ans. The general formula of carbohydrates is $C_n(H_2O)_n$, where 'n' is the number of carbon atoms.

(v) What are characteristics of monosaccharides?

Ans.
- Monosaccharides (simple sugars) are made of single sugar molecule.
- They are easily soluble in water.
- They have sweet taste.

(vi) How do the three group of carbohydrates differ in taste?

Ans. Monosaccharides (simple sugars) is a group of carbohydrate that has sweet taste. Disaccharides is a group of carbohydrate that has less sweet in taste. While polysaccharides is a group of carbohydrate that is tasteless.

(vii) Differentiate between intracellular enzymes and extracellular enzymes.

Ans. Intracellar enzymes:
Intracellar enzymes operate within cells.
Example:
Enzymes of cellular respiration.
Extracellular enzymes:
Extracellular enzymes are secreted outside the cells to catalyse reactions.
Example:
Enzymes working in stomach cavity for the digestion of food.

(viii) What are cofactors?

Ans. Cofactors:
Cofactors are the non-protein molecules that are required by enzymes to be fully active.

Q.4: Short Answer Questions:

(i) How is oxygen produced during photosynthesis?

Ans. During photosynthesis, sunlight absorbed by

chlorophyll breaks water molecule. When hydrogen atoms give electrons to chlorophyll and becomes hydrogen ions, then oxygen is produced.

(ii) Which are the most energy rich biomolecules?

Ans. Lipids are the most energy rich biomolecules.

(iii) What is the function of Molybdeum?

Ans. Molybdeum is a micronutrient that converts nitrate to ammonia in plants.

(iv) Name the micronutrient that is involved in osmosis of water in plants.

Ans. Chlorine is involved in osmosis of water in plants.

(v) How spores are released?

Ans. When spores are mature, the sporangium bursts and spores are released.

(vi) Describe how vegetative propagation occurs through runners.

Ans. Runner is a horizontal stem that grows above the ground. It produces through vegetative propagation.

During vegetative propagation in runner, new leaves and roots grow from nodes of the runner. The leaves grow upwards and roots grow down. In this way, a new plant is formed at the node.

(vii) Why do epidemiologists use biostatistics?

Ans. Epidemiologists use biostatistics to study the distribution and determinants of health and diseases in populations.

(viii) What is benefit of biostatistics in genetics?

Ans. Biostatistics is used in genetic research to analyse the inheritance of traits and the association of genetics variations with diseases.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 20

Objective Type

Q.1: Multiple Choice Questions:

1. 2003 **2.** 350 **3.** Andrea Caesalpinia
4. Intermediate filaments **5.** 2 daughter cells
6. All of these **7.** Two Glucose molecules
8. 100 to 1000 **9.** All of these
10. Increase surface area for absorption
11. Active transport
12. The value of the corresponding category

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Researchers from which disciplines were involved in the Human Genome Project?

Ans. The Human Genome Project involved researchers from various disciplines, including biology, genetics, informatics and computer science.

(ii) What does cancer research involve?

Ans. Cancer research involves oncologists (cancer consultants), biologists, biochemists, genetics, pharmacologists and statiscians.

(iii) What are the main functions of cell membrane?

Ans. The main function of cell membrane is to allows only few molecules to pass through it while blocks many other molecules.

(iv) What could happen if lysosomal enzymes stop working properly?

Ans. Lysosomal enzymes break cellular wastes. When lysosomal enzymes do not work properly, sugars and fats build up in the cell instead of being used or excreted.

(v) What are ribosomes?

Ans. Ribosomes are tiny granular structures. They are sites of protein synthesis.

Ribosomes float freely in the cytoplasm and are also attached on the surface of rough endoplasmic reticulum.

(vi) What is endoplasmic reticulum. Where it is located in eukaryotic cells?

Ans. It is a network of membrane bounded channels present throughout the cytoplasm of eukaryotic cells.

(vii) Differentiate between chromatin and chromosomes.

Ans. Chromatin:

During interphase (non-dividing phase) of cell, chromosomes are in the form of fine thread like structure known as chromatin.

Chromosomes:

One of the rod shaped bodies fecund In the nucleus of cells that contain genetic information (GNA).

(viii) What are the key events of anaphase in mitosis?

Ans. Key events of Anaphase in mitosis:

- The spindle fibres attached with chromosomes pull towards the poles.
- The chromosomes sister chromatids separate.

- Two similar sets of chromatids move towards the poles of the cell.

Q.3: Short Answer Questions:

(i) What is the function of the centrosome during cell division?

Ans. The function of centrosome during cell division is to organize microtubules that form the mitotic spindle, which separates replicated chromosomes into daughter cells.

(ii) What is the reproductive part of the plant?

Ans. Flower is the reproductive part of the plant.

(iii) Name the tissues that form a leaf.

Ans. A leaf is formed of various related tissues such as epidermal tissue, mesophyll tissues and vascular tissue.

(iv) What is maltose?

Ans. Maltose is disaccharide that is made of two glucose molecules.

(v) Which is the most abundant carbohydrates in nature?

Ans. Polysaccharides are the most abundant carbohydrates in nature.

(vi) Give some examples of polysaccharides.

Ans. Starch, glycogen, cellulose and chitin are some examples of polysaccharides.

(vii) What are uses of enzymes in food industry?

Ans. Use of enzymes in food industry:

- Enzymes that break starch into simple sugars are used in production of white bread, buns, and rolls.
- Enzymes are also used for the production of cheese.

(viii) Which enzymes are used for the removal of protein stains from clothes?

Ans. Protease enzymes are used for the removal of protein stains from clothes

Q.4: Short Answer Questions:

(i) In how many phases does photosynthesis occur?

Ans. Photosynthesis occurs in two phases i.e;

- Light reactions
- Dark reactions

(ii) On which organelles do light reactions take place?

Ans. Light reactions take place on the thylakoid membranes of chloroplasts.

(iii) State the role of nitrogen in plants.

Ans. In plants, nitrogen is a necessary part of all proteins, enzymes and nucleic acids. Nitrogen promotes the growth in plants. It also improves the quality of leaves.

(iv) How do carnivorous plants fulfil their needs of nitrogen?

Ans. Carnivorous plants trap and digest small animals. Such plants fulfil their needs of nitrogen from the prey animals.

(v) What is stolon or runner?

Ans. Stolon or runner is a horizontal stem that grows above the ground. It has nodes, from where new roots and leaves emerge out. e.g. strawberry

(vi) What is tuber?

Ans. Tuber is a fleshy stem that grows underground. It has buds which grow into new plant. e.g potatoes.

(vii) How does biostatistics help in agriculture?

Ans. In agricultural research, biostatistics helps in analysing crop yields, the effectiveness of fertilizers and the resistance of plants to perts and diseases.

For example: Comparing the yields of different wheat varieties under various famous practices involves statistical analysis.

(viii) What are the measures that help summarize and understand data sets?

Ans. The mean median and mode are the measures that help summarize and understand data sets.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 21

Objective Type

Q.1: Multiple Choice Questions:

~~1. Oncologists~~ ~~2. Ernst Hackel~~ ~~3. Bacteria~~
4. Mitochondria **5.** Somatic cells **6.** Animal cells
7. Cellulose **8.** Substrate
9. Provide energy
10. Stomata **11.** Both (A) and (B)
~~12. Epidemiologist~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) What is meant by scientific method?

Ans. Scientific Method: Specific steps taken to do scientific work or research are collectively called scientific method.

(ii) How is the profession of medicine and surgery different from animal husbandry?

Ans. Difference between Medicine and surgery and animal Husbandary

Medicine and surgery	Animal Husbandry
The profession medicine deals with the diagnosis and treatment of diseases. In surgery the defective parts of the body are repaired, replaced or removed. For this profession, students need to complete a 5-year Bachelor of Medicine,Bachelor of Surgery (MBBS) degree.	This field involves breeding and caring for livestock to improve their quality and productivity. For it, students can pursue a 4-year BS degree in Animal Husbandry.

(iii) Who created a taxonomic hierarchy of organisms with six taxa?

Ans. The Swedish biologist Carl Linnaeus created a taxonomic hierarchy of organisms with six taxa i.e.; kingdom, class, order, family, Genus and species.

(iv) How is the biodiversity crucial for humans and for the planet Earth?

Ans. Biodiversity is crucial for humans and for the planet Earth because we rely on nature to provide us with food, clean water, medicines, oxygen production, economic opportunities, recreational activities, cultural significance, scientific data, to prevent floods and other extreme weather effects etc.

(v) Define the term "Stem cell".

Ans. Stem cell: Such unspecialized cell which has the ability to differentiate into a variety of specialized cell types is called stem cell.

(vi) What is the function of golgi apparatus?

Ans. Golgi apparatus modifies molecules coming from rough endoplasmic reticulum and packs them into small membrane bound sacs called golgi vesicles.

(vii) What is regeneration?

Ans. Regeneration is the process that cells in an organism go through to restore damage to or replace cells in order to repair them.

(viii) How does hydra reproduce?

Ans. Hydra reproduces asexually by budding.

Q.3: Short Answer Questions:

(i) Enlist the events that occur during the G1 phase of interphase?

Ans. Following events occur during the G1 phase of interphase.

- Cell makes proteins and organelles and so grow in size.
- Cells also make enzymes that are required in S phase for the replication of DNA.

(ii) What is the function of cuticle?

Ans. Cuticle is a layer on upper epidermis. It prevents water lose, provide protection and allows the exchange of gases.

(iii) What is the function of stomata?

Ans. Stomata regulate gas exchange and the loss of water vapours.

(iv) What are the main functions of carbohydrates in the body?

Ans. Functions of Carbohydrates:

- Carbohydrates are the primary source of energy. Glucose is used by cells to produce energy through cellular respiration.
- Cellulose is the most abundant carbohydrate. It provides support to plant cells and ultimately to the whole plant.

(v) Which is the most abundant biomolecules in the cell?

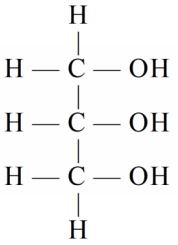
Ans. Proteins are the most abundant biomolecules in the cells.

(vi) What are the basic components of lipids? Draw their structures.

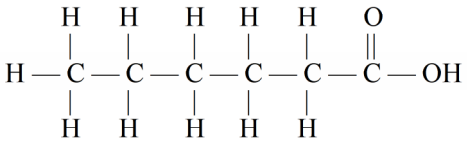
Ans. Basic components of Lipids:

Lipids are organic compounds that are insoluble in water but are soluble in organic solvents (e.g.; alcohol, ether, benzene). They are composed of glycerol and fatty acids.

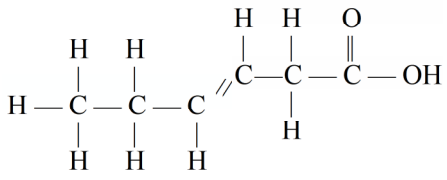
Structure of Basic components of Lipids:



Glycerol



Saturated fatty acid



Unsaturated fatty acid

(vii) What two models have been proposed to explain the mechanism of enzyme action?

Ans. Following two models have been proposed to explain the mechanism of enzyme action.

1. Lock and key model of enzyme action
2. Induced fit model

(viii) What is the active site of enzyme? State its importance in enzyme specificity.

Ans. Active site of enzyme: The catalytic region of enzyme molecule is known as active site of enzyme.

Importance of active site in enzyme specificity: The active site of an enzyme is important for enzyme specificity because it is the part of the enzyme that binds to a specific substrate and catalyzes a chemical reactions.

Q.4: Short Answer Questions:

(i) Which organisms carry out photosynthesis? Which cell organelle is responsible for the absorption of light for photosynthesis?

Ans. The organisms that carry out photosynthesis are plants, algae and some bacteria. Chloroplasts are the cell organelles that are responsible for the absorption of light for photosynthesis.

(ii) What is used to reduce NADP into NADPH?

Ans. The electrons of chlorophyll after the production of ATP and the hydrogen ions of water are used to reduce a NADP into NADPH.

(iii) In which form do plant roots absorb Nitrogen?

Ans. Plant roots absorb nitrogen in the form of nitrates.

(iv) Define osmosis.

Ans. It is the movement of water molecules through a semi-permeable membrane from a region of lower solute concentration to a region of higher solute concentration.

(v) Write a short note on spore formation in fungi.

Ans. Most fungi (e.g. Rhizopus; bread mold) produce spores in special sac like structures called sporangia. When spores are mature, the sporangium bursts and spores are released.

(vi) Write a short note on budding in yeast.

Ans. Budding in Yeast:

This method is very common in yeast (a unicellular fungus). During budding, a part of the parent organism grows out from its body. This part is called a bud. When the bud has grown big, it may separate from parent body or may remain attached.

(vii) What is mean in biostatistics?

Ans. The mean is also known as the average. In biostatistics, the sum of all the values in a data set divided by the number of values. It represents the central value of the data set.

(viii) What does the height of a bar in a bar chart represent?

Ans. The height of a bar in a bar chart represents the number of units or observations in that category or simply the value of the variable.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 22

Objective Type

Q.1: Multiple Choice Questions:

1. ~~Biomedical engineering~~ **2.** Archaebacteria
3. Halophytes **4.** Electron transport chain
5. Animal cells **6.** Epidermal tissue
7. CH_3 **8.** Nucleotides and vitamins
9. Melvin Calvin **10.** Bark
11. Pollen grain **12.** ~~All of these~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Differentiate between qualitative observations and quantitative observations.

Ans. Qualitative observations: They involves characteristics that cannot be measured with numbers. **For examples:** Describing the colour and texture of a flower.

Quantitative observations: They involve measurements of numerical data that can be expressed in terms of quantity. **For example:** Counting the number of birds in a tree (e.g.; 5 birds).

(ii) Define the term hypothesis.

Ans. Hypothesis: Tentative answer of scientific problem is called hypothesis.

(iii) Who did modify the five-kingdom classification system of Whittaker?

Ans. In 1988, American biologist Margulis and Schwartz modified the five kingdom classification system of Whittaker.

(iv) In which two domains did Carl Woese place the prokaryotes?

Ans. Carl Woese placed in prokaryotes in two domains (Archaea and Bacteria).

(v) Discuss functions of lysosomes.

Ans. Functions of Lysosomes:

- Cell engulfs the food material in the form of food vacuole. Lysosome buds off from Golgi apparatus, fuses with food vacuole and its digestive enzymes break down the food present in the vacoule.
- They also engulf the damaged organelles and break them down.
- Lysosomes can store certain molecules for later use.

(vi) Why mitochondria are called the power house of the cell?

Ans. Mitochondria are called the powerhouse of the cell because they produce energy.

(vii) What is the role of metastasis in cancer.

Ans. Metastasis:

Malignant tumors can send the cancer cells to other parts of body where new tumors may form. This phenomenon is called metastasis.

Role:

In metastasis when tumors spread within body they destroy further normal cells to form cancerous tumors. This process help in spread of cancer.

(viii) What is meiosis?

Ans. Meiosis is the type of cell division, in which each daughter cell receives half the number of chromosomes as compared to parental cell.

Q.3: Short Answer Questions:

(i) Difference between Palisade and spongy mesophyll

Ans. Difference between Palisade and spongy mesophyll:

Palisade mesophyll	Spongy mesophyll
● It is located just beneath the upper epidermis. ● It consists of tightly packed elongated cells. ● It performs photosynthesis.	● It is present below the palisade mesophyll. ● It is composed of loosly arranged cells with air spaces between them. ● It allows diffusion of gases throughout the leaf.

(ii) Where vascular tissue is arranged?

Ans. Vascular tissue is arranged in the midrib and veins in the leaf.

(iii) Why Vascular tissue is categorized as complex tissue?

Ans. Vascular tissue is categorized as complex tissue because it consists of two tissues i.e; xylem and phloem.

(iv) How many types of amino acids occur in organisms?

Ans. About 170 types of amino acids occur in organisms.

(v) What is an amino acid?

Ans. An amino acid is an organic molecule made of an amino group (NH_2), a carboxyl group (COOH), a hydrogen group (H) and a side group (R) which are attached to a central carbon atom.

(vi) Which monosaccharides make a sucrose molecule?

Ans. Sucrose (table sugar) is made of two monosaccharides i.e.; glucose and fructose.

(vii) Define an enzyme. What is its role in metabolism?

Ans. Enzyme: Enzymes are proteins that catalyze (i.e. speed up) biochemical reactions.

Role of enzyme in metabolism: Enzyme helps in speed up metabolism. For example, lipolysis. It breaks down lipids (fats) into fatty acids and glycerol, which can be used for energy production.

(viii) Provide two examples of enzymes that operate optimally at specific pH.

Ans. Following are the examples of enzymes that operate optimally at specific pH.

- **Pepsin:** Breaks down proteins in the stomach with an optimal pH of around 2.
- **Amylase:** Breaks down carbohydrates in the mouth, with an optimal pH of around 7.

Q.4: Short Answer Questions:

(i) Write down the word equation for photosynthesis.

Ans. The word equation for photosynthesis is:

Carbon dioxide + Water + Light energy $\longrightarrow$ Glucose + Oxygen + Water

(ii) What are pigments?

Ans. Pigments are the substances that absorb visible light. Different pigments absorb light of different wavelengths (colours).

(iii) How transport of water, salts and food is carried out in all land plants (except mosses and liverworts)?

Ans. In all land plants (except mosses and liver worts), the transport of water, salts and food is carried out by xylem and phloem tissues.

(iv) What is epidermis?

Ans. Epidermis is the single layer of cells that covers the root. The cells of epidermis possess hair like extensions.

(v) For propagation of which plants cuttings are used?

Ans. Cuttings are widely used to propagate house plants, ornamental trees and shrubs, and some fruit crops.

(vi) Which plants reproduce by grafting?

Ans. All commercial fruit trees (e.g. almond, plum, cherries etc.) and many ornamental trees and shrubs reproduce by grafting.

(vii) What is the formula of mean in data set?

Ans.

$$\text{Mean} = \frac{\text{Sum of All data Points}}{\text{Numbers of Data Points}}$$

(viii) What is median in data set?

Ans. The median is the middle value of a data set when the values are arranged in ascending or descending order.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 23

Objective Type

Q.1: Multiple Choice Questions:

1. Deductions **2.** All of these
3. Protozoans **4.** All of these
5. 4 chromosomes and 8 chromatids
6. Organ system level in the respiratory system
7. All of these **8.** Proteins **9.** $C_3H_6O_3$
10. Sucrose **11.** Flowers **12.** Median

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) Define the term deduction.

Ans. Deduction: Logical results of hypothesis are called deductions.

(ii) Which is the most basic step of scientific method?

Ans. Experiment is the most basic step of scientific method.

(iii) Which protist causes malaria?

Ans. *Plasmodium* causes malaria.

(iv) What does kingdom protista include?

Ans. Kingdom protista includes eukaryotic which are unicellular or colonial or filamentous or simple multicellular.

(v) What are plastids?

Ans. Plastids are membrane-bound organelles that only occur in plants and photosyntheic protists (algae).

(vi) What is function of chloroplast?

Ans. Chloroplasts carry pigment chlorophyll. They carry out photosynthesis with the help of their photosynthetic pigments, they capture light energy and convert it into chemical energy in the form of glucose.

(vii) What is synapsis?

Ans. Homologues chromosomes move close together. They pair up in a process called Synapsis.

(viii) What is chiasmata?

Ans. Chiasmata is a X-shaped structures formed when non-sister chromatids of homologues chromosomes become zipped together.

Q.3: Short Answer Questions:

(i) Enlist the levels of organization from cells to organ systems.

Ans. The levels of organization from cells to organ systems are:

Cell ⟶ Tissue ⟶ Organ ⟶ Organ system

(ii) Name some organs present in human body.

Ans. Heart, lungs, brain, liver, kidneys stomach, intestines and pancreas are some organs present in human body.

(iii) How does the human body maintain a stable internal temperature?

Ans. When the body temperature falls, the temperature regulatory centre sends message to muscles. As a result, shivering occurs to generate heat. In this way the human body maintains a stable internal temperature.

(iv) What is fibrin?

Ans. Fibrin is a blood clotting protein that makes blood clot to prevent the loss of blood after an injury.

(v) What are antibodies?

Ans. Antibodies are proteins that are part of our immune system. They defend the body against harmful pathogens.

(vi) What are lipids?

Ans. Lipids are organic compounds that are insoluble in water but are soluble in organic solvents (e.g: alcohol, ether, benzene).

(vii) Provide an example of a specific enzyme-substrate pair.

Ans. Example of a specific enzyme substrate pair:

- Lipase helps our body to digest fats.
- Amylase breaks down starch.
- Trypsin converts proteins into amino acids.

(viii) What does happen to the rate of enzyme action upto optimum temperature?

Ans. When temperature rises to a certain limit the rate of enzyme action increases due to increased kinetic energy.

Q.4: Short Answer Questions:

(i) What are pigments?

Ans. Pigments are the substances that absorb visible light. Different pigments absorb light of different wavelengths (colours).

(ii) What are main pigments and accessory pigments in photosynthesis.

Ans. **Main Pigments** →Chlorophyll-a
Accessory Pigments →Chlorophyll-b and Carotenoids.

(iii) Define the term transpiration.

Ans. The loss of water in the form of vapours from plant surface is called transpiration.

(iv) How do the plants of rubber and keekar excrete their wastes?

Ans. **Rubber:** Rubber plant excretes its waste in the form of latexes.
Keekar: Keekar plant excretes its waste in the form of gums.

(v) Which types of generation do plants have during sexual reproduction?

Ans. The major groups of plants have two type of generations during sexual reproduction which come one after the other. There are sporophyte generation and gametophyte generation.

(vi) What sporophyte generation produces?

Ans. The sporophyte generation is diploid (2n) and produces haploid (1n) spores by meiosis. The spores develop into haploid gametophyte generation.

(vii) How is the mean calculated?

Ans. Mean is calculated by the following formula:

$$\text{Mean} = \frac{\text{Sum of all Data Points}}{\text{Number of Data Points}}$$

(viii) What is the value of median of the data set if the number of value is even?

Ans. If the number of values is even, the median is the average of the two middle values.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 24

Objective Type

Q.1: Multiple Choice Questions:

1. Biological method **2.** Chitin **3.** Plantae
4. Plasmodesmata **5.** 4 **6.** Haemoglobin
7. All of these **8.** Tightly bound to enzyme.
9. Glycolysis **10.** Transpiration
11. Bacteria ~~**12.** Middle value~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) When does a theory become a law or principle?

Ans. If a theory is proved again and again by experiments, it becomes a law or principle.

(ii) What is a scientific law?

Ans. A scientific law is a uniform or constant fact of nature. The examples of biological laws are Hardy-Weinberg law and Mendel's laws of inheritance.

(iii) What are the characteristics of fungi?

Ans. Fungi are eukaryotic, heterotrophic organisms that are unicellular or multicellular. Their cells are covered by cell wall made of chitin (a polysaccharide). They get food from surroundings.

(iv) Give some examples of kingdom plantae.

Ans. Give some examples of kingdom plantae.Mosses, ferns, conifers and flowering plants are some examples of kingdom plante.

(v) What are vacuoles ?

Ans. Vacuoles are single membrane bound sacs filled with fluid.

(vi) Which animals contain contractile vacuoles?

Ans. Some freshwater organisms like amoeba and sponges have contractile vacuoles, which collect and pump out entra water and other wastes.

(vii) What is crossing over?

Ans. The phenomenon in which non-sister chromatids of homologues chromosomes exchange their segments is called crossing over.

(viii) Differentiate between disjunction and non-disjunction.

Ans. **Disjunction:**
The normal separation of chromosomes in meiosis is termed as disjunction.
Non-disjunction:
If the separation of chromosomes during meosis is not normal it is known as non-disjunction.

Q.3: Short Answer Questions:

(i) What functions does the liver and kidney perform?

Ans. The liver performs many vital functions including filtering blood, producing bile and

storing glucose.

The kidneys are responsible for filtering waste products from the blood and producing urine.

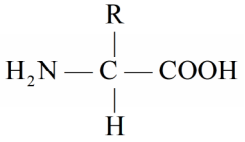
(ii) What does the inner wall of stomach secrete?

Ans. The inner wall of stomach secretes mucus and gastric juice.

(iii) Define amino acid and draw its structure.

Ans. Amino acid: Amino acids are the organic molecules that join in specific number and sequence to make proteins.

Structure of Amino acid:



(iv) What are glycerol and fatty acids?

Ans. Glycerol is an alcohol having 3 carbon atoms. Each carbon has a hydroxyl group (OH).

Fatty acids are long hydrocarbon chains with carboxyl group (COOH) at the end.

(v) Differentiate between saturated fatty acids and unsaturated fatty acids.

Ans. Saturated fatty acids: Saturated fatty acids do not have double bonds between carbon atoms. They are solid at room temperature.

Unsaturated fatty acids: Unsaturated fatty acids have one or more double bonds between carbon atoms. They are liquid at room temperature.

(vi) What are phospholipids?

Ans. Phospholipids are lipids make the core of all membranes. A phospholipid molecule consists of one glycerol, two fatty acids and a phosphate group.

(vii) Which factors do affect the activity of enzymes?

Ans. The activity of an enzyme is affected. by the following factors.

- Temperature
- pH
- Substrate concentration

(viii) What is optimum temperature for enzyme in human body?

Ans. Optimum temperature for enzymes in human body is 37°C.

Q.4: Short Answer Questions:

(i) What is cellular respiration?

Ans. Organisms get energy by breaking the C—H bonds of food. For this purpose, they carry out the oxidation of food inside cells. This oxidation of food is called cellular respiration.

(ii) What is the most common food used by Cells to get energy?

Ans. The most common food used by cells to get energy is glucose.

(iii) How is the transpirational pull important in plants?

Ans. Transpiration pull is the pulling force in leaves that is created by the transpiration of water from their surfaces. It helps in the upward movement of water into the xylem vessels.

(iv) Define transpiration write name of its types.

Ans. Transpiration: The loss of water in the form of vapours from plant surface is called transpiration.

Types of transpiration: There are three types of transpiration:

1. Stomatal trnanspiration
2. Cuticular transpiration
3. Lenticular transpiration

(v) What is the function of receptacle?

Ans. Receptacle serves as the base that supports the flowers structure.

(vi) What does stamen consist of?

Ans. Stamen consists of an anther and a filament.

(vii) Define biostatistics.

Ans. Biostatistics: Biostatistics is a branch of statistics that applies statistical methods to biological sciences.

(viii) What is mode in data set?

Ans. The mode is the value that appears most frequently in a data set. A data set may have one mode, more than one mode, or no mode at all.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 25

Objective Type

Q.1: Multiple Choice Questions:

1. ~~Sparrows~~ **2.** Circular RNA **3.** Two parts
4. Erythrocyte **5.** Synapsis
6. Bones, cartilages and tendons
7. Mesophyll **8.** Daniel koshland
9. Krebs cycle **10.** Mucilage
11. Endosperm nucleus **12.** ~~Mode~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) How Laveran did research on the cause of malaria?

Ans. In 1878 a French army physician Laveran did research on the cause of malaria. He took the blood from a malarial patient and examined it under the microscope. He noticed some microorganisms in the blood. The microorganisms was given a name Plasmodium.

(ii) What hypothesis was made for malaria?

Ans. For malaria following hypothesis was made: "Plasmodium is the cause of malaria."

(iii) What are viruses?

Ans. Viruses are ultramicroscopic creatures that are at the borderline of living and non-living. Viruses contain DNA or RNA which is wraped inside a protein structure.

(iv) What does it mean "Viruses are acellular?

Ans. Viruses are acellular i.e.; they are not made of cells and do not have organelles.

(v) What key role does the Golgi apparatus play in eukaryotic cells?

Ans. In eukaryotic cells golgi apparatus is responsible for transporting, modifying and packaging proteins and lipids into vesicles for delivery to targeted destinations.

(vi) What is the function of centrioles?

Ans. Centrioles help in the formation of spindle fibers during cell division.

(vii) What is kinetochore?

Ans. Kinetochore is a complex protein structure that is the point where spindle fibres attach.

(viii) How many cells are there in human body?

Ans. There are about 200 trillion cells in human body.

Q.3: Short Answer Questions:

(i) Give few examples of organ systems that form the human body.

Ans. Skeletal system, digestive system, respiratory system, muscular system, nervous system and blood circulatory system are few examples of organ systems that form the human body.

(ii) What does skeletal system consist of?

Ans. The skeletal system consists of bones, cartilages and tendons.

(iii) What does digestive system consist of?

Ans. The digestive system consists of organs such as mouth, oesophagus, stomach, small intestine and large intestine.

(iv) How lipids provide energy when body needs it?

Ans. Lipids reserve in the form of fats in adipose tissues. When the body requires energy, these stored lipids are broken down to release fatty acids and glycerol, which can be used as fuel for energy.

(v) Steroid hormones are derived from which lipid?

Ans. Steroid hormones are derived from a lipid i.e.; cholesterol.

(vi) What are nucleic acids? How many types of nucleic acids are there? Name them.

Ans. Nucleic acids are the biomolecules that are composed of units called nucleotides.

There are two types of nucleic acids:

- Deoxyribonucleic acid (DNA)
- Ribonucleic acid (RNA)

(vii) Define the term optimum pH. Give example

Ans. Optimum pH:

Enzymes show maximum activity at a specific pH, it is called their optimum pH. For example pepsin works at low pH. i.e. in acidic medium.

(viii) What is the effect of substrate concentration on enzyme activity?

Ans. Substrate Concentration: An increase in substrate concentration increases the rate of reaction. At high substrate concentration, all active sites of the enzymes are occupied. In this condition, any more substrate molecules do not find free active sites. This state is called saturation of active sites and reaction rate does not increase.

Q.4: Short Answer Questions:

(i) Write the importance of oxidation-reduction reactions.

Ans. Oxidation-reduction (redox) reactions are fundamental to the metabolism'of organisms. In these reactions, electrons are transferred between molecules. In oxidation, molecule loses electrons and in reduction, it gains electrons. This electron flow is essential for generating energy in the form of ATP during processes like cellular respiration and photosynthesis.

(ii) What is meant by anaerobes?

Ans. Even today when free oxygen is available, some organisms including some bacteria and fungi get energy from anaerobic respiration and are called anaerobes.

(iii) What do sources of food include?

Ans. Soruces include photosynthesis tissues (e.g; mesophyll of leaves) and storage tissues (e.g; roots).

(iv) Define mineral nutrition in plants.

Ans. The materials that plants need for the synthesis of biomolecules are called mineral nutrients. The process of absorption of mineral nutrients from soil is called mineral nutrition.

(v) State how potatoes reproduce through tubers.

Ans. Potatoes reproduce by tubers. It is fleshy stem that grows underground. It has eyes which are actually its buds. Eyes can grow into new plants.

(vi) What does a megasporangium contain?

Ans. Megasporangium contains a diploid megaspore mother cell which undergoes meiosis and produces four haploid megaspores.

(vii) Define biostatistics.

Ans. Biostatistics is the branch of statistics that applies statistical methods to biological sciences.

(viii) What are the steps to calculate mode?

Ans. Steps to calculate mode:

- Count the frequencies of each value in the data set.
- The value with the highest frequency is the mode.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

Paper No. 26

Objective Type

Q.1: Multiple Choice Questions:

1. ~~Deduction~~ **2.** Tomato **3.** Latin
4. Stem cells **5.** Germ line cells
6. Inner connective **7.** 1953
8. Increases activity to a point
9. Red and blue **10.** Hydrophytes
11. Budding **12.** ~~All of these~~

Subjective Part (Part - I)

Q.2: Short Answer Questions:

(i) How many blood samples did biologists examine to test the deduction of malaria?

Ans. Biologists examined the blood samples of 100 malarial patients and 100 healthy persons under microscope to test the deduction of malaria.

(ii) What were some important observations of A.F.A king?

Ans. Following were some important observations of A.F.A king.

- People who slept outdoors had more chances to get malaria then those who slept indoors.
- People who slept under fine nets had less chances to get malaria than those who did not use such nets.
- Individuals who slept near a smoky fire usually did not get malaria.

(iii) What is binomial nomenclature?

Ans. The system of scientific naming of organisms is termed as binomial nomenclature.

(iv) Which part of the scientific name comes first?

Ans. Every scientific name has two parts. The genus name always comes first followed by the species name.

(v) What are mesophyll cells? What mesophyll cells are specialized for?

Ans. Mesophyll cells are green cells present in leaves.

Mesophyll cells are specialized for photosynthesis.

(vi) How do lysosomes contribute to the cell's functioning?

Ans.

- Lysosomes fuse with food vacuole and its digestive enzymes break down the food present in vacuole.
- They also engulf the damaged organelles and break them.
- Lysosomes can store certain molecules for later use.

(vii) Why does cytokinesis occur in mitosis and meiosis?

Ans. Cytokinesis occurs at the end of both divisions. During Cytokinesis, the cytoplasm divides and two new cells are formed.

(viii) What is the smooth endoplasmic reticulum responsible for?

Ans. Smooth endoplasmic reticulum (SER) is involved in lipid metabolism.

- It is involved in the transport of materials from one part of the cell to the Other.
- It also detoxifies the harmful chemicals that have entered the cell.

Q.3: Short Answer Questions:

(i) Explain the function of blood circulatory system.

Ans. The blood circulatory system transports

oxygen, nutrients, hormones and waste products throughout the body.

(ii) How does sweating occur?

Ans. After hard work when our muscles produce heat, the temperature of the body increases. In this situation, the temperature regulating centre in the brain sends message to sweat glands. As a result, sweating occurs to cool down the body.

(iii) What is the role of the shoot system in plants?

Ans. Shoot system in plants includes stem, leaves and reproductive structure like flowers. All components of shoot system work together to enable processes like photosynthesis and reproduction.

(iv) What DNA is made of?

Ans. DNA is made of deoxyribonucleotide. In this nucleotide, the pentose sugar is deoxyribose while the nitrogenous base may be adenine (A), thymine (T), cytosine (C) or guanine (G).

(v) On what achievement did James Watson and Francise Crick receive Nobel Prize?

Ans. James Watson and Francis Crick received Nobel prize in 1962, for the discovery of the double helix structure of DNA.

(vi) What is RNA?

Ans. Ribonucleic acid (RNA) is single stranded nucleic acid. Its strand consists of ribonucleotides. A ribonucleotide contains ribose sugar instead of deoxyribose. In a ribonucleotide, the nitrogenous base may be adenine (A), Uracil (U), Cytosine (C) or guanine (G).

(vii) Where does pepsin work? And where does trypsin work?

Ans. Pepsin works:

Pepsin works in the stomach. (acidic medium, pH 1.5 to 2.0)

Trypsin works:

Trypsin works in small intestine. (alkaline medium pH 7 to 8)

(viii) What is enzyme Inhibition?

Ans. Enzyme Inhibition:

Some substances are called enzyme inhibitors. The process in which enzyme inhibitors, bind to enzyme and decrease its activity.

Q.4: Short Answer Questions:

(i) Why does glycolysis occur in anaerobic respiration?

Ans. Oxygen is not required for glycolysis. That is why, glycolysis occurs in anaerobic respiration.

(ii) State the main purpose of cellular respiration?

Ans. The purpose of cellular respiration is to provide cells with the energy (ATP) they need to function.

(iii) How excess oxygen is released by plants?

Ans. Excess oxygen is released by plants into the atmosphere through the stomata.

(iv) How guttation is different from dew formation?

Ans. Guttation is different from dew formation. Guttation is the release of water droplets through small pores while dew is water drops formed by condensation.

(v) What does female gametophyte or embryo sac contain?

Ans. Female gametophyte or embryo sac contains seven cells (one egg cell, one fusion nucleus and five non-functional cells).

(vi) What is double fertilization?

Ans. The process of fusion of two sperms (one with the egg and the other with the fusion nucleus) is called double fertilization.

(vii) What is bar chart?

Ans. A bar chart is a graphical representation of data using bars of different heights or lengths.

(viii) What is the use of bar chart?

Ans. Bar chart is used to compare the quantities of different categories.

(Part - II)

For Answers See "Hamdard Imtihani Biology 9th"

☆☆☆