BIOLOGY

UNIT ONE: QUESTIONS AND ANSWER.

1. **Define biology?**

Biology is branch of natural science that deals with the study of living things.

2. **Where the words of biology come from?**

The biology is derived from two Greek words "bios" which means life and "logos" which means knowledge

3. **Define the following**
   a) **Anatomy**: the study of internal structure.
   b) **Physiology:** the study of different types of body factions.
   c) **Morphology:** the study of external features of an organism.
   d) **Cytology:** the study of cells.

4. **DESCRIBE**
   a) **Entomology:** the branch of zoology concerned with the study of insect.
   b) **Ornithology:** the scientific study of birds.
   c) **Herpetology**: the branch of zoology concerned with reptiles and amphibians.
   d) **Histology:** the study of cells.
5. **Explain branches of biology?**

Branches of biology are

- Botany: is the branch of biology which deals with the study of plants.
- Zoology: is the branch of biology which deals with the study of animals.

6. **State two important of biology?**
   - It helps us t knows ourselves better, in biology we learn what our bodies and other living organism are made up of and this leads us to remember the greatness of Allah
   - The knowledge acquired from the study of biology can be very helpful in solving environmental problems such as food shortage, poor health services, pollution and environmental degradation.
7. **Define cell?**

Cells are the basic structural units of living things.

8. **Classify unicellular and multicellular organism and give example?**

Some living things consist of only single cell, these are called unicellular organism.

Example: amoeba and bacteria.

Some of living things consist of many cells, these are called multicellular organism.

Example: mango, butterfly, elephant and human being.

9. State five characteristics of living things?
   - **a)** Cellular organization
   - **b)** Nutrition
   - **c)** Metabolism
   - **d)** Growth
   - **e)** Excretion

10. Define nutrition?

Nutrition is the process of feeding.

11. Differentiate between autotrophic and heterotrophic nutrition?

Autotrophic= process that green plants make and feed their own food.

Heterotrophic= process that animals feed already made food.

12. Why all living organism need food?

Because they need energy to perform different activities

13. Define metabolism?

Metabolism is the sum of the total chemical reaction that takes place in cell.

14. Differentiate between anabolism and catabolism? And give example.

Catabolism; some of those chemical reactions in which large mocules are broken into simpler substance.

For example respiration is catabolic process.

Anabolism: those chemical reactions in which large mocules are formed from simpler substance.

For example the process of photosynthesis is anabolic process.

15. Describe growth?

Growth is a process of irreversible increase n bulk and complexity of an organism.

16. Describe excretion?

Excretion is the process of removal of metabolic waste materials from the body.

17. What are the excretory products that are removed from the body?

Urine, sweat, and carbon-dioxide

18. define reproduction

Reproduction is the ability of all living organism to produce young ones of their kind.

19. Describe respiration?

Respiration is the process by which living things release energy from the organic food substance and utilize this energy to perform various activities.

20. Explain gaseous exchange?

Gaseous exchange is a process whereby respiratory gases-oxygen and carbon-dioxide pass across a respiratory surface like the lungs and gills.

21. Define locomotion?

Locomotion is movement of an organism from place to another place.

22. Why animals move?

Animals move for two main reason= in search of foods and to escape from enemies.

23. Define irritability and give example?

Irritability is the ability of living organism to detect and respond to a stimulus.

Example= if we touch something hot by mistake, we respond quickly by withdrawing our hands.

24. Describe lifespan?

The period during which an organism completes its life cycle is called lifespan.

25. Compare and contrast between plants and animals?

NO	PLANTS	ANIMALS
1	Plants are generally rooted in one place and do not move on their own.	Most animals have the ability to move from one place to another.
2	Plants contain chlorophyll	Animals do not contain chlorophyll

Chose the correct answer

1) The branch of science that deals with the study of life called

a) Astronomy
b) Biology
c) Geology
d) Meteorology

2) The process by which cells produce energy is known as
a) Gaseous exchange
b) Respiration
c) Excretion
d) Reproduction

3) Genetics is a branch of biology that deals with the study of
a) Classification
b) Living things and their environment
c) Body faction
d) Inheritance and variation.

4) Which of the following is catabolic process?
a) Photosynthesis
b) Growth
c) Respiration
d) Irritability.

5) The branch of biology that deals with the study of insect is called.
a) Entomology
b) Ichthyology
c) Embryology
d) Ecology.

Unit two: QUENTIONS AND ANSWERS

1. **Define cell?**

A cell is defined as the smallest structure and functional unit of all living organism.

2. **What does cell theory states about?**
   - ❖ All organisms are composed of one or more cells.
   - ❖ Cells are the basic units of structure and function of all organisms.
   - ❖ Cells arise only by division of a previously existing cell.
3. **When and who discovered the cell?**

In 1665, Robert Hooke

4. **When and who discovered the nuclear?**

1831, Robert Brown.

5. **When and who discovered bacteria and sperm cells?**

In 1673 Anton van Leeuwenhoek.

6. **Sate the largest cell? And its size?**

The largest cell is an ostrich egg which is about 170✕135mm

7. **State the smallest cell? And its size?**

Mycoplasma bacteria cell is smallest cell which is about 0.25 um in size.

8. **List types of cell?**
   - ❖ Prokaryotic cells
   - ❖ Eukaryotic cells

9. **Compare prokaryotic cell and eukaryotic cell?**
   - ➢ Prokaryotic cells: are the cells that do not possess a well formed nucleus.
   - ➢ Eukaryotic cells: are cells that possess a well-defined nucleus

10. **Define microscope?**

Microscope: instrument used for magnifying very small object.

11. **State types of microscope?**
    - ➢ Light microscope
    - ➢ Electron microscope

12. **Sate parts of light microscope?**
    - ➢ Eyepiece
    - ➢ Nosepiece
    - ➢ Objective lens
    - ➢ Stage clips
    - ➢ Stage
    - ➢ Diaphragm
    - ➢ Light source
    - ➢ Base
    - ➢ Arm
    - ➢ Condenser
    - ➢ Coarse adjustment knob
    - ➢ Fine adjustment knob
    - ➢ Illumination intensity knows.

13. **Describe magnification?**

Magnification means how much larger the object appears compared to its real size.

14. **Define resolution?**

Resolution is the ability of the microscope to distinguish two structures that are very close together at distinct entities.

15. Calculate the magnification power of microscope that has eye piece lens that magnifies 10x and the objective lens that magnifies 20x?

Magnification of eye piece ✕ magnification of objective lens

=20✕10= 200X.

16. What is the major component of the cell?

- Cell membrane and cell wall in plant cells.
- Cytoplasm
- Nucleus

17. Define protoplasm?

The cytoplasm and the nucleus together are called the protoplasm.

18. Describe cell membrane (plasma membrane)?

Cells have a limiting boundary called the cell membrane (plasma membrane)

19. What the cell membrane is made up of?

It's made up of phospholipids bilayer embedded with proteins.

20. What scientists describe the cell membrane?

Scientist describes the cell membrane as fluid mosaic.

21. State the functions of plasma membrane?

- The plasma membrane encloses the cell contents.
- It provides cell shape.
- It allows transport of certain substances into and out of the cell but not all substances.

22. What are the two types of plasma membrane transmission?

Selectively permeable or semi permeable

23. Describe cell wall?

The cell membrane is surrounded by an outer boundary called cell wall.

24. What call wall is made up of?

Call wall is made up of a type of polysaccharide called cellulose.

25. State the function of cell wall?

- It protects and supports the plant cell; it also gives the plants cell its final shape.
- Since it is composed of cellulose which allows water and other substance to pass through it. It is a fully permeable membrane.

26. Define cytoplasm?

Cytoplasm is a fluid medium that is found between the cell membrane and the nucleus.

27. What cytoplasm contains?

It contains membrane-bound organelles and membrane-less organelles.

28. Define cytosol?

If the cytoplasm is removed from membrane-bound organelles the remaining portion is called the cytosol.

29. What is membrane-bound organelle?

These organelles are surrounded by membranes similar in structure to the plasma membrane.

30. List membrane-bound organelles?

- Mitochondria
- endoplasmic reticulum
- Iysosomes
- Golgi apparatus
- vacuoles and plastids

31. Describe mitochondria

Mitochondria (sing. Mitochondrion) are double-membrane-bound organelles that are spherical to elongate in shape and found in the cytoplasm of almost all eukaryotic cells.

32. Define matrix in the mitochondria?

The inner mitochondrial membrane encloses a semi fluid material called matrix.

33. What are the two layers of mitochondrion?

The outer membrane of the mitochondrion is smooth, while the inner membrane folds and doubles in on itself to form incomplete partitions called cristae

34. What the cristae increase?

The cristae increase the surface area available for the chemical reactions that trap usable energy for the cell.

35. What is the inner mitochondrial membrane encloses.

The inner mitochondrial membrane encloses a semi fluid material called matrix.

36. State the function of mitochondria?

The function of mitochondrion is to generate large quantities of energy in the form of adenosine triphosphate (ATP) during the process of cellular respiration

37. Describe endoplasmic reticulum (ER)?

The endoplasmic reticulum (ER) is a network of membranes that are spread throughout the cytoplasm.

38. How much can be divided endoplasmic reticulum?

a. Rough endoplasmic reticulum (RER)
b. Smooth endoplasmic reticulum (SER)

39. Differentiates between rough and smooth endoplasmic reticulum?

Rough endoplasmic reticulum (RER) has ribosome attached on its surface.

Smooth endoplasmic reticulum (SER) lacks ribosome on its surface.

40. What are the function of rough endoplasmic reticulum (RER) and smooth (SER)?

The function of rough endoplasmic reticulum (RER) is

- The function of rough endoplasmic reticulum (RER) is to synthesize proteins.
- ER stores proteins made by ribosome and transports them.

The function of smooth endoplasmic reticulum (SER) is

- Smooth ER involves in the synthesis of lipids.

41. Describe Golgi apparatus?

Golgi apparatus consists of flattened sacs called **cisternea**.

42. Where Golgi apparatus receive proteins and lipids?

Golgi apparatus receive proteins and lipids from endoplasmic reticulum (ER)

43. State the function of Golgi apparatus?

- They modify, package, and transport glycoprotein's
- They are involved in secretion of synthesized protein and carbohydrates.
- They manufacture lysosomes.

44. Define lysosomes?

lysosomes are membrane-bound spherical organelles.

45. State the function of lysosomes?

- They can digest proteins, fats and carbohydrates.
- They can digest worn out organelles and aged cells.

- Iysosomes of white blood cells can break down bacteria.

46. What is vacuole?

Vacuoles are large cavities found in plant cells.

47. State the function of vacuole?

The function of the vacuole is to store juices and excess products of cell.

48. Define plastid?

Plastids are large organelles found in plants cells.

49. List the three types of plastids?

The three types of plastids are

- Chloroplasts (green plastids)
- Chromoplasts (coloured-plastids)
- Leucoplasts (colourless plastids)

50. Describe chloroplasts?

Chloroplasts are oval shaped organelles that are found in plant cells.

51. What is surrounded by chloroplasts?

It is surrounded by double membranes.

52. What chloroplast contains?

The chloroplast contains stacks of **thylokoid membrane** which from the **grana (singular:** granum)

53. What is stroma?

The fluid-filled space that is outside the grana is called stroma.

54. What is the function of chloroplast?

The chloroplast is the site of photosynthesis in plant cells.

55. Describe Ribosomes?

Ribosome's are very fine granules, found in large numbers on the surface of rough endoplasmic reticulum or free in the cytoplasm.

56. State the function of ribosome?

Ribosomes are the centers of protein synthesis in the cell.

57. State the function of Ribosomes?

Ribosomes are the centers of protein synthesis in the cell.

58. Define Centrioles?

Centrioles are rod-shaped structures located near the nucleus of animal cells.

59. Define centrosome?

Two Centrioles which are perpendicular which another are called centrosome.

60. State the function of Centrioles?

- Centrioles have an important role in cell division by forming spindle fibres.
- They form cilia and flagella in cells and organisms where these structures occur.

61. Describe cytoskeleton?

The cytoskeleton is a network of interlinking proteins filament present in the cytoplasm of all cells.

62. State the three structural element of the cytoskeleton?

The three structural element of the cytoskeleton are:

- Microtubules
- Microfilaments
- Intermediate filaments.

63. State the function of cytoskeleton?

- The cytoskeleton supports the cell and gives its distinctive shape.
- It plays a role in cell movement and its organelles.

64. Tell the differences between plant and animal cells?

No	Plant cell	Animal cell
1.	Has a cell wall	Has no cell wall
2.	Has chloroplast	Has no chloroplast
3.	Usually has a large central vacole	Has no large vacole
4.	Has no Centrioles	Has Centrioles

65. Define nucleus?

Nucleus is a double membrane bound structure containing a viscous fluid known as Nucleoplasm in which nucleolus and chromatin reticulum are suspended.

66. What is the structure of nucleus?

Nucleus generally takes a spherical or oval shape.

67. Tell the other name of nuclear membrane?

Nuclear envelop.

68. What is the function of nuclear pores?

It allows materials to move in and out of the nucleus.

69. State the function of nucleolus and chromatin?

The nucleolus is responsible for manufacture of ribosome while

Chromatin contains the hereditary materials (DNA).

70. What is the function of nucleus?

The nucleus controls all the activities of the cell.

71. Define chromosome?

Chromosomes are threadlike structures found in the nucleus of the cell.

72. Tell what is chemically a chromosome consist of?

Chemically a chromosome consists of the deoxyribonucleic acid (DNA) and proteins.

73. Describe DNA?

DNA is the genetic material that carries the genetic information for each cell.

74. DNA has the ability to duplicate itself to forms? What

DNA has the ability to duplicate itself to forms a new complete copy.

75. Tell the number chromosomes of

Corns there are 20 chromosomes in each cell

Pea plants there are 14 chromosomes in each cell

Human being there are 46 chromosomes.

76. List the two types of cells in the body of living organism.

These are somatic cells and sex cells.

77. Tell the difference somatic cell and sex cell?

Points of comparison	Somatic cell	Sex cell
Location:	In the whole body	In gonads (reproductive organs)
Chromosomal number	Diploid (2n). Contains the total number of chromosomes.	Haploid (n) contains half the number of chromosomes

Kind of division	Mitotic cell division (Mitosis)	Meiotic cell division (meiosis)

78. What cell division?

Cell division is the process by which parent cell divides into two or more daughter cell.

79. What are the two forms in cell division usually occurs?

- mitosis (Somatic or vegetative cell division)
- meiosis (Reproductive cell division)

80. Describe mitosis?

Mitosis (Somatic or vegetative cell division): results in new cells with the genetic material that is identical to that of the original cell.

81. Where mitosis occurs?

Mitosis occurs in organisms undergoing growth, development, repair or asexual reproduction.

82. Define asexual reproduction?

Asexual reproduction is the production of offspring from one parent.

83. Define meiosis?

Meiosis (Reproductive cell division): occurs during the formation of gametes.

Each new cell has the potential to join with another haploid cell to produce a diploid.

84. State the major physiological processes that facilitate the movement of materials into and out of cells?

- Diffusion
- Osmosis
- Active transport

85. Define diffusion?

Diffusion is the movement of substances from their region of higher concentration to their region of lower concentration, this does not require energy.

86. List the role plays diffusion in living organism?

The role plays diffusion in living organism is:

- Absorption of materials like mineral salts in plant roots and digested foods in the intestine of animals.
- Gaseous exchange in plants and animals.

87. Define osmosis?

Osmosis is movement of water molecules from the region of high water concentration to the region of low water concentration through a semi permeable membrane.

88. Define isotonic solutions?

Solutions with the same solute concentration are called isotonic solutions.

89. Define hypertonic solution?

Hypertonic solution has a greater concentration of solutes than another solution.

90. Define hypotonic solution?

Hypotonic solution has a lower concentration of solutes than another solution.

91. Describe active transport and its significances in living organisms.

Active transport is the movement of substance from region of their lower concentration towards the region of their higher concentration; it would require an active effort by the cell for which energy is needed.

There are many significances of active transport such as:

- It is involved in active re-absorption of glucose and mineral salts in kidney tubules during urine formation.
- It enables the absorption of digested food from the alimentary canal/small intestines into the blood stream.

92. Differentiate between endocytosis and exocytosis?

Endocytosis; is the process of supporting substances in to the cell through a vesicle.

Exocytosis: is the reverse of endocytosis by which a cell ejects waste product or specific secretion products such as hormones by fusion of vesicle on the plasma membrane of the cell.

93. State the two ways endocytosis can occur.

- **Pinocytosis** (cell drinking)
- **Phagocytosis** (cell eating)

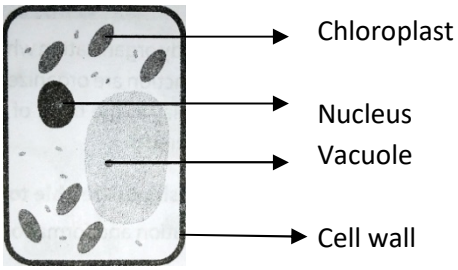
Chapter questions

1. Which one of the following is not part of the nucleus?
   a. **Ribosome**
   b. Nucleolus
   c. Chromosome
   d. Gene
2. A suitable term for the various components of cells is
   a. **Tissue**
   b. Cell organelles

c. Chromosomes
d. Genes

3. Green color of leaves is due to presence of the pigment
   a. Chlorophyll
   b. Ribosomes
   c. Mitochondria
   d. Chloroplast
4. The unit of measurement used for expressing dimension (size) of cells is
   a. Centimeter
   b. Millimeter
   c. Micrometer
   d. Meter
5. The thread-like structures present in the nucleus are
   a. Nucleolus
   b. Chromosomes
   c. Genes
   d. Ribosomes
6. Which of the following feature will help you in distinguishing a plant cell from an animal cell?
   a. Cell wall
   b. Cell membrane
   c. Mitochondria
   d. Nucleus
7. Where the Ribosomes are produces?
   a. Nuclear pore
   b. Chromatin
   c. Nucleolus
   d. Endoplasmic reticulum
8. Which is not part of the cell theory?
   a. The basic unit of life is the cell.
   b. Cells came from preexisting cells
   c. All living organism are composed of cells
   d. Cells contain membrane-bound organelles
9. Which type of transport requires energy input from the cell?
   a. Active transport
   b. Osmosis
   c. Facilitated diffusion
   d. Simple diffusion

10. Label the parts A to E in the diagram below.



CHAPTER THREE: Question and answer

1. **Define tissue?**

A group of cells that performs particular function forms is called **tissue**.

2. **Describe simple tissue and give example?**

A tissue that is composed of cells that are identical in shape and structure is called **simple tissue**

Example: parenchyma tissue

3. **Define complex tissue and give example?**

If the tissue is made up of more than one type of cells, it is known as **complex tissue**

Example: phloem tissues

4. **State types of tissues?**

Tissues can be classified into the

- Plant tissues
- Animal tissues

5. **State types of plant tissues?**
   - Meristematic (dividing)
   - Permanent (non-dividing)
6. **Where the growth of plant occurs?**

The growth of plants occurs in certain specific regions. This is because the dividing tissue.

7. **Define Meristematic tissues?**

Meristematic tissues: are tissues composed of immature or undifferentiated cells without intercellular spaces.

8. **How many steps may be Meristematic tissues?**

The cells may be rounded, oval or polygonal, always living and thin walled.

9. **List types of Meristematic tissues?**
   - ❖ Apical meristem
   - ❖ Intercalary meristem
   - ❖ Lateral meristem

Types	Location	Function
1. apical meristem	Root tip and shoot tip. Growth in length of plants	Growth in length of plants
2. intercalary meristem	At the base of leaves or at the base of internodes	Intermodal growth
3. lateral meristem	Cambium between xylem plant bodies. Cambium in the cortex of dicot plants	Growth in thickness of the and phloem and cork (secondary growth).

10. **Describe permanent tissue?**

Permanent tissues are those in which growth has stopped either completely or for the time being.

11. **Differentiated thin walled and thick walled in permanent tissue?**

Thin walled permanent tissues are generally living, whereas

Thick walled tissues may be living or dead.

12. **State types of permanent tissue and describe each one?**
    - ❖ **Simple tissue**: simple tissue is made up of only one type of cells
      Example: parenchyma, collenchymas and sclerenchyma
    - ❖ **Complex tissues:** complex tissue is made up of more than one type of cells working in together as unit. **Example: xylem and phloem**
13. **Classify xylem and phloem?**
    a. **Xylem: xylem** is conducting tissue, which conducts water and salts upward from roots and leave.
       - ➢ **Tracheids**
       - ➢ **vessels**
       - ➢ **fibers**
       - ➢ **xylem parenchyma**

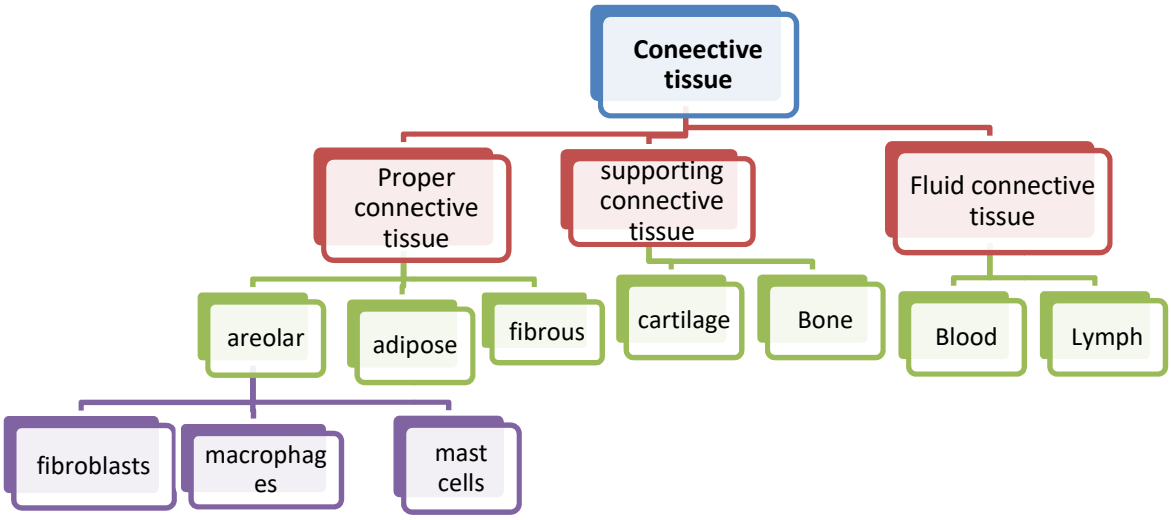
    b. **Phloem:** phloem is conducting tissue, which conducts food synthesized in the leave to different parts of the plant.
       - ➢ **Sieve tubes**
       - ➢ **Companion cells**
       - ➢ **Phloem fiber**
       - ➢ **Phloem parenchyma**

14. **State types of animal tissues**
    - ❖ **Epithelial tissue**
    - ❖ **Connective tissue**
    - ❖ **Muscle tissue**
    - ❖ **Nervous tissue**
15. **Define epithelial tissue?**

Epithelial tissues are widespread throughout the body.

16. **List the characteristics of epithelial tissue?**
    a. Are closely packed with no intercellular space.
    b. Arise from a non-cellular basement membrane
    c. Not supplied with blood vessels

17. **State the function of epithelial tissues?**
    a. Protection of the underlying tissues
    b. Absorption
    c. Secretion
    d. Reception of sensory stimuli



18. **Define connective tissue and tell some examples?**

Connective tissue is one of the most common tissues in our bodies.

Examples

- Bone
- Cartilage
- Lymph
- Blood

19. **State types of connective tissues?**
    - Proper connective tissues
    - Supporting connective tissues
    - Fluid connective tissues
20. **State types of proper connective tissues and describe each one?**
    - **Areolar**: most widely spread connective tissues
    - **Adipose tissues**: it has specialized cells storing fat called adipose cells. Helping in forming padding's
    - **Fibrous:** it is mainly made up of fibroblasts. It forms tendons and ligaments
21. **State types of Areolar and describe each one?**
    - **Fibroblasts:** which form the yellow (elastin) and white (collagen) fibres in the matrix
    - **Macrophages:** which help in engulfing bacteria and micro pathogens
    - **Mats cells:** which secrets heparin (helps in clotting blood).
22. **State types of bones?**
    - Spongy
    - Compact bones
23. **What is the difference between spongy bone and compact bone?**
    - **Spongy bone**: bone cells **(osteocytes)** are irregularly arranged, such bones are found at the ends of the long bones
    - **Compact bones**: cells are arranged in circles or lamellae around a central canal the Haversian canal.
24. **Define bone marrow?**

The substance contained in the bone cavity is called **bone marrow**

25. **State the two forms of fluid connective tissue.**

Blood and **Lymph** are the two forms of the fluid connective tissue

26. **Define blood?**

Blood: it is a complex of blood cells and plasma. Plasma forms the matrix

27. **List types of blood cells and their function?**
    - **Red Blood Cells (Erythrocytes)** – transport **oxygen (**O_2) and **carbon-dioxide** (CO_2)

- **White Blood Cells (Leukocytes)** – function in defense against bacteria, viruses and other invaders.
- **Platelets (Thrombocytes)** – help in the clotting of blood.

28. Define plasma?

Plasma is the extracellular fluid of the matrix, the ground substance

29. What plasma contains?

Plasma contains a large number of proteins such as **fibrinogen, albumin, and globulin** to be transported to various parts of the animal body for various purposes.

30. Describe muscle tissue?

Muscle tissue is composed of long excitable cells containing parallel microfilaments of contractile proteins like actin and myosin.

31. State the difference types of muscle tissues?

a) Striated muscles
b) Unstriated muscles
c) Cardiac muscles

32. List the characteristics of muscle tissues?

- Excitability, (respond to stimulus)
- Extensibility, (stretch)
- Contractility, (contract)
- Elasticity, (move back to the original position)

33. State the kinds of nervous tissue?

Nervous has two kinds of cells

- Neurons cells
- Neuralgia cells

34. Define neuron?

Neuron is the functional unit of nervous tissue

35. What are the constituents of nervous tissue?

Nervous tissue constitute the

- Brain
- Spinal cord
- Nerves
- Sensory cells
- Sense organs

36. Define axon and dendrites?

Axon: is the one of the usually very long,

Dendrites: the smaller but branching processes of the cyton

37. Describe neuralgia?

Neuralgia is also called glial cells or glia, any of several types of cells that function primarily to support neurons.

38. What are the levels of organization?

The levels of organization is

- Cellular level organization
- Tissue level
- Tissue system
- Organ level
- Organ system
- Organism

39. Describe

a. **Organ**: a distinct recognizable part of the body
b. **Organ system**: combination of a set of organs all of which are usually devoted to one general function.

Q1: Circle the letter represents the correct answer

1. Group of cells that are similar in structure and function are known as
   a. Organ
   b. System
   c. Tissue
   d. Cells
2. A tissue whose cells are capable of dividing is called
   a. Complex tissue
   b. Connective tissue
   c. Permanent tissue
   d. Meristematic tissue
3. Cartilage and bone are types of
   a. Muscular tissue
   b. Connective tissue
   c. Meristematic tissue
   d. Epithelial tissue
4. Sieve tubes and companion cells are present in
   a. Xylem
   b. Phloem

c. Cork
d. Cambium

5. The tissue that helps in the movement of our body is
   a. Muscular tissue
   b. Skeletal tissue
   c. Nervous tissue
   d. All of the above
6. The size of the stem increase with the width due to
   a. Apical meristem
   b. Intercalary meristem
   c. Primary meristem
   d. Lateral meristem
7. What is the correct order of the levels of organization in human body from the simplest to the most complex
   a. Tissue, cell, organ, system and organism
   b. Cells, tissue, organ, system and organism
   c. Cell, organ, tissue and system
   d. Organism, system, organ, tissue and cell
8. The study of tissue is
   a. Cytology
   b. Embryology
   c. Histology
   d. Pathology
9. Many kinds of tissues organize to form a/an
   a. Organ
   b. Organ system
   c. Body system
   d. organelle
10. fats are stored in human body as
    a. Cuboidal epithelium
    b. Adipose tissue
    c. Bones
    d. Cartilage
11. Which of the following is not a simple tissue?
    a. Xylem
    b. Parenchyma
    c. Collenchymas
    d. Sclerenchyma
12. Which meristem is present at the base of the leaves or internodes on twigs
    a. Apical meristem
    b. Cambium

c. Intercalary meristem

d. Epidermis

13. The tissue which has dead cells in the functional states is
    a. Collenchymas
    b. Sclerenchyma
    c. Parenchyma
    d. Phloem
14. Collenchymas are characterized by the presence of
    a. Elongated cells with deposits of cellulose and pectin all over the wall
    b. Isodiametric cells with deposits of cellulose and pectin at the corners
    c. Elongated cells with thickening at the corners
    d. Isodiametric cells with thickening all over the wall.
15. Which of the following is most likely to be found lining the inside of the intestines?
    a. Epithelial tissue
    b. Nervous tissue
    c. Connective tissue
    d. Muscular tissue

Q2: Which tissues are responsible for secondary growth in plants?

The tissue which responsible for secondary growth in plant is Lateral meristem

Q3: state the types of animal and plant tissues?

The types of animal tissue is

- Epithelial tissue
- Connective tissue
- Muscle tissue
- Nervous tissue

The types of plant tissue is

- Meristematic (dividing) tissue
- Permanent (non-dividing) tissue

Q4: write a short note on the comparison between parenchyma, collenchymas and sclerenchyma.

Features	Parenchyma	Collenchymas	Sclerenchyma
1. cell shape	Brick like shape	Elongated cells	Spherical, oval or cylinder
2. vacuoles	Have large central vacuole	Are absent	Have not

Q5: what are the functions of?

a. Epithelial tissues
   - Protection of underlying tissue

- Absorption
- Secretion
- Reception of sensory stimuli

b. Nerve tissue**: the function of nerve tissue is to transmit impulses**

c. Meristematic tissues: **are responsible for plant growth**

d. Permanent tissues: **in providing support, protection as well as in photosynthesis and conduction of water, minerals and nutrients.**

CHAPTER FOUR: QUESTION AND ANSWER

1. **Describe classification?**

Classification means identifying similarities and differences between different kinds of organism and then placing similar organisms in one group and different kinds of organisms in different groups.

2. **Define taxonomy?**
   - The science of describing, naming and classifying organisms is called taxonomy. or
   - Taxonomy: is the study of classification.
3. **Define taxon (plural taxa)?**

Any particular group within a taxonomic system is called a taxon (plural taxa)

4. **How does taxonomist classify organisms?**

Taxonomists classify organisms mostly according to their morphological features.

5. **How the classification of living organisms is important?**
   - Classification improves our ability to explain relationships among living organisms.
   - Classification helps in identifying living organisms to their correct groups for reference.
   - It makes the study of such a wide variety of organisms easy
6. **The early systems of classification it was difficult to classify organisms into proper categories, what did for all scientists to do?**

A classification system has be developed

7. **Explain Aristotle's classification?**

Aristotle classified living organisms according to their difference in general characteristics.

8. **How many types he classified living organism?**

He classified living organisms as plants and animals then he classified plants into **trees, shrubs and weeds**, and animals into **red blooded** and **bloodless animals** or **viviparous** and **oviparous animals**

9. **What is the difference between viviparous and oviparous animals?**
   - Viviparous are animals which give birth
   - Oviparous are animals which lay eggs.
10. **Explain John Ray's classification?**

John Ray is considered the first scientist who tried to classify living organisms on scientific bases.

11. **How he classified living organism?**

He classified living organisms according to similarities in their external feature.

12. **Define the term Species?**

Species: is a unit of classification

13. **Explain car Linnaeus classification?**

The Linnaean classification system was developed by Swedish botanist Carolus Linnaeus in the 1700s.

14. **How he classified living organism?**

He grouped together organisms that shared obvious physicals traits, such as number of legs or shape of leaves.

- *Linnaeus is known as the "father of taxonomy"*

15. **Linnaeus used scientific principle in taxonomy, which are still applied. What was it called?**

Natural taxonomy

16. **State the three main principles that Linnaeus followed for his classification?**
    - Using Latin language
    - Series of taxonomy (classification units)
    - Using the binomial system of nomenclature
17. **List the taxonomic units (taxa) or series of classification?**
    - Kingdom
    - Phylum/division
    - Class
    - Order
    - Family
    - Genus
    - Species
18. **Describe domain?**

Domain is a taxon that is larger and more inclusive than the kingdom

19. **List the three domains of life?**

- Domain bacteria
- Domain Archaea
- Domain Eukaryote

20. Describe the meaning of binomial nomenclature

Binomial nomenclature: simply means two name system of naming which consist of genus name followed by that of species name

21. What are the rules for writing scientific names?

a) The first part of the scientific name is the genus name and second name is the species name.
b) The genus name begins with a capital letter and species name starts with small letter.

E.g. the scientific name of the lion is *Panthera Leo*

c) The scientific name should be written in italics in books, but in hand wiring it should be underlined as separate words. Panthera leoin in text books or panthera-leo in hand written.

22. Describe the dichotomous key?

A dichotomous key is a tool used by biologists to identify organisms in a group through a process of answering yes or no questions about the organisms.

23. Define the term species. Give reason why a leopard and a lion cannot breed yet they belong to **the same genus?**

Species: an interbreeding organism that can produce fertile offspring

Because they are different species

Interbreeding is characteristics of a species.

lion and leopard don't interbreed in wild naturally because of pre and post reproductive barrier between them like- having different habitat , mating procedure , sperm ovum incompatibity etc

24. What is the relationship between a genus and species?

a) **Species**: an interbreeding organism that can produce fertile offspring
b) **Genus**: the genus comprises similar species together

25. A: what is the name given to the scientific system of naming living organisms?

B: give reason why scientific names are given in Latin?

a) Binomial nomenclature
b) Because it was a dead language

26. Distinguish between

a) Common names and scientific names of living organisms

Common names are written free handedly

b) Taxonomy and taxon

Taxonomy: is the study of classification

Taxon: is any particular group within taxonomic system

27. Why biologists consider the classifications of living organisms is useful?

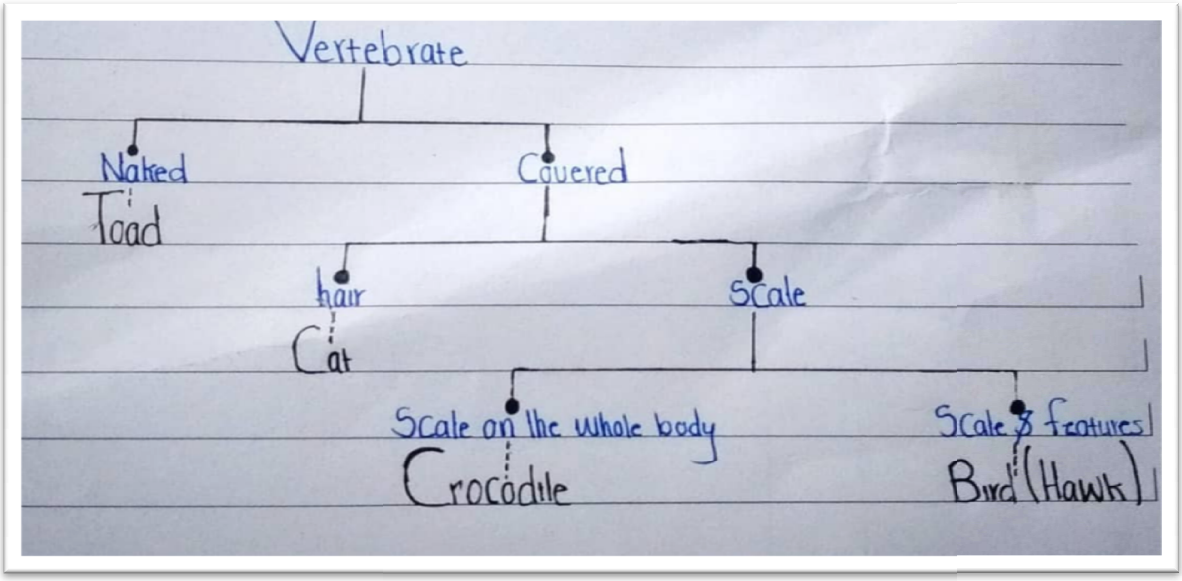
Because it helps in the identification of living organisms as well as in understanding the diversity of living organism

28. The following organisms represent a group of vertebrates:

a) Cat
b) Crocodile
c) Bird (Hawk)
d) Toad

Classify these organisms using the dichotomous key depending on the following characteristics according to their order:

I. **Type of skin (naked or covered)**
II. **Type of the skin cover (hair or scale)**
III. **The scales (scales on the whole body or scales and feathers)**



CHOOSE THE LETTER OF THE CORRECT ANSWER

1. In the system of binomial nomenclature, the 1st name represents the
   a. **Genus**
   b. Species
   c. Phylum
   d. Class
2. _____ Include number of orders
   a. **Class**
   b. Family
   c. Phylum
   d. Genus
3. The lowest taxonomic level of living organisms is the
   a. Kingdom
   b. Phylum
   c. Class
   d. **Species**
4. _____Is produces from mating of a female horse with a male donkey
   a. Donkey
   b. Mule
   c. Tigon
   d. Horse

5. *The taxonomic hierarchy of classification is*
    a. *Kingdom-class-family-order-phylum*
    b. *Kingdom-phylum-class-order-family*
    c. *Kingdom-family-order-class-phylum*
    d. *Kingdom-phylum-order-family-class*
6. *To which level of classification does a group of closely related species of organisms belong?*
    a. *Class*
    b. *Order*
    c. *Genus*
    d. *Kingdom*
7. *All of the following belong to the domain eukarye EXCEPT?*
    a. *Amoeba*
    b. *Bacteria*
    c. *Mushroom*
    d. *Mangoe*

CHAPTER FIVE: QUESTIONS AND ANSWER

1. **Define virology?**

Virology: the study of viruses

2. **Define virus?**

A **virus**: is an extremely small, infectious agent that is metabolically inert and only replicates in living hosts.

3. **Describe Lytic cycle?**

The Lytic cycle is one of the two cycles of viral reproduction

4. **Explain stages of Lytic cycle?**
    a. **Attachment**: in which the virus contracts the cell and becomes specifically bound to the cell.
    b. **Penetration**: inject its genetic material into the cell.
    c. **Biosynthesis**: the virus takes over the cell's replication and protein synthesis machinery in order to synthesize viral components
    d. **Assembly**: these components are then assembled to produce mature virus particles
    e. **Release**: mature virus particles are released, either through the action of enzymes that lyse the host cell or by budding through the host cell wall
5. **Differentiate between prophage and Lysogen?**
    - The viral DNA is called a **Prophage**
    - The cell containing a prophage is called **Lysogen**

6. **State the stage of lysogenic cycle?**
    a. Fusion of genetic material
    b. Propagation of the prophage
    c. Induction
7. **What are the characteristics of virus**
    a. Viruses are usually considered to be nonliving.
    b. They lack cytoplasm and cellular organelles
    c. They have host specificity
8. **Why the Lytic cycle is considered the main method of viral replication**

Because it results in the destruction of the infected cell and the release of new viruses

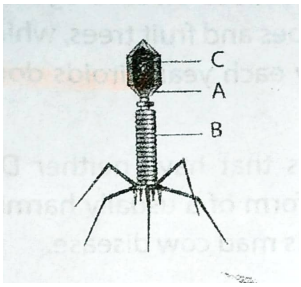
9. **Define capsid?**

A capsid is the protein shell of a virus, enclosing its genetic material.

10. **Define nana meter?**

A nanometer (nm) is a unit of microscopic measurement

Q1: choose the correct answer from the following



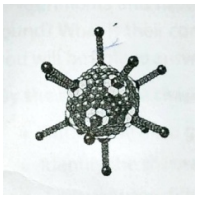
1. Using the figure above, which labeled structure, represents the genetic material of virus?
    a. A
    b. B
    c. C
    d. D
2. Using the figure above, which structure represents the capsid of a virus?

    a. A
    b. B
    c. C
    d. D
3. Which statement about prions is true?
    a. Prions are renegade pieces of RNA that infect cells
    b. Prions are infectious proteins
    c. Prion-based diseases only affect cows
    d. Prions are newly discovered type of genetic material
4. Which one of these is an example of a helical virus?

   a. ***Tobacco mosaic virus***
   b. Bacteriophage
   c. Corona virus
   d. Influence virus

5. Viruses contain which substance?
   a. ***Genetic material and a capsid***
   b. A nucleus, genetic material and a capsid
   c. A nucleus, genetic material, capsid and Ribosomes
   d. A nucleus, genetic material, a capsid Ribosomes and plasma membrane

6. Which organisms does this virus infect?



   a. **Humans**
   b. Bacteria
   c. Plants
   d. Fungi

Q2: what chemical substances are found in all viruses?

All true viruses contain nucleic acid

Q3: what kind of nucleic acid is found in retrovirus?

The nucleic acid found in retrovirus is RNA

Q4: name two diseases caused by corona virus?

- Covid-19
- Common cold

Q5: what are the types of viruses on the basis of their shapes?

- Helical
- Icosahedra
- Complex

Q6: viruses are host specific, clarify that?

Because they only can attach to and infect cells of certain organisms

Q7: discuss the importance of viruses?

a. Viruses are very much used as biological research tools due to their simplicity of structure and rapid multiplication.
b. They are widely used in research especially in the field of molecular biology, genetic engineering, medicine etc.
c. Biological Control Programs (BCP): viruses are used in eradicating harmful pests like insects
d. It's also beneficial in water treatment processes.

Q8: write short notes on:

a. **The life cycle of a Bacteriophage**: During infection a phage attaches to a bacterium and inserts its genetic material into the cell.
b. Classification of viruses

Viruses can be classified according to:

a) The shape of the viruses. E.g. helical, icosahedral and complex
b) The type of nucleic acid. (DNA or RNA)
c) Mode of transmission like oral, sexual, blood transfusion etc.
d) Presence of an envelope

Q9: define

a. **Viroid**: is a coiled RNA molecule which has no capsid (protein coat)
b. **Prion**: are just infectious protein particles that have neither DNA nor RNA to transmit infection.
c. **Viral latency**: the ability of a virus to remain dormant within the host cell, sometimes establishing lifelong occult infection.

CHAPTER SIX: QUESTION AND ANSWER

1. **Define bacteria?**

Bacteria are single-celled prokaryotic organisms that are made of very simple components.

2. **State 4 characteristics of bacteria?**
   - They are unicellular, prokaryotes and microscopic organisms.
   - They have varied body shapes
   - Reproduction is mostly asexual through binary fission.
   - Most of them move by use flagella
3. **Describe methanogenic bacteria?**

Methanogenic bacteria: are bacteria that can live in aerobic environments such as sewage and intestinal tracts of animals?

4. **Describe thermo acidophilic bacteria?**

Thermo acidophilic bacteria: these bacteria live at high temperatures up to 110^{o}C and pH less than 2

5. **Describe halophilic bacteria?**

Halophilic bacteria: these bacteria live in environments with very high salt concentration

6. **Explain phylum proteobacteria?**

Phylum proteobacteria: it is the largest group of true bacteria, which include different types of bacteria, such as chemoautotrophic bacteria and nitrogen-fixing bacteria.

7. **Why the cyanobacteria are called blue-green bacteria?**

Because they contain blue pigment called phycocyanin, and chlorophyll, the presence of these two pigments gives the name blue green to entire group of cyanobacteria.

8. **Describe prochloro bacteria?**

The prochlorobacteria are photosynthetic organisms that contain chlorophyll A and B as their principal pigments.

9. **Describe pili?**

Pili (singular: pillus) are short and thin thread-like structures projecting out from the cell wall in some bacteria

10. **State the function of pili?**

The function of pili is to attach the bacteria cell to specific surface or another cell

11. **Define capsule and state its function?**

Capsule: it is viscous layer that surrounds the cell wall and consists of polysaccharides or proteins.

- ❖ It protects the cell and helps it to attach other surfaces.

12. **Explain cytoplasm in bacteria?**

Cytoplasm in bacteria: it is a viscous liquid that is surrounded bacterial cell membrane, and consists of different components such as Ribosomes which is used for protein synthesis and enzymes necessary for metabolic reactions.

13. **Define nucleoid?**

Nucleoid: it is a dense irregularly shaped area that is not surrounded by a nuclear membrane, and contains a chromosome that is composed of a circular DNA

14. **Define plasmid and state its function?**

Plasmid: it is an extra chromosoma, small, circular DNA molecule within a cell that is separated from chromosomal DNA.

- ❖ Plasmids provide bacteria with genetic advantages such as antibiotic resistance.

15. **Explain classification of bacteria according to their nutrition?**

Bacteria can be classified according to their mode of nutrition into

a. **Autotrophs:** are the bacteria that can make their own food into two ways:
   - ➢ **Phototrophic Autotrophs**: they use the energy of sunlight for photosynthesis.
   - ➢ **Chemotrophic Autotrophs**: they obtain energy form inorganic molecules like hydrogen sulfide, nitrites, sulfur, and iron for the fixation of carbon dioxide and formation of food.

b. **Heterotrophs:** many bacteria obtain energy by taking in organic molecules and then breaking them down and absorbing them. These bacteria are called Chemotrophic Heterotrophs

16. **Describe endospore?**

Endospore: when growth conditions become unfavorable, many bacteria form structures called endospore.

17. **Describe conjugation?**

Conjugation: is a type of sexual reproduction that occurs in some bacteria which involves the exchange of genetic information.

18. **Describe flagella?**

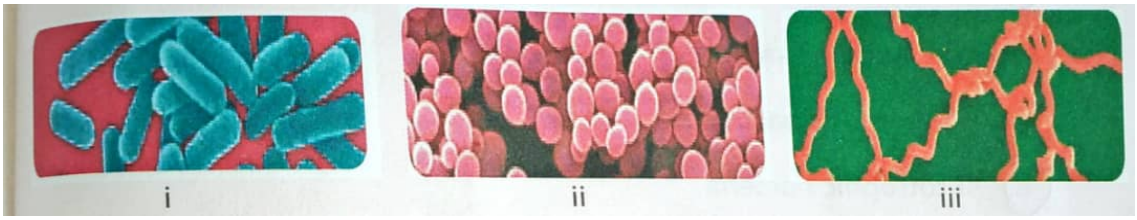
Flagella are longer and thicker than pili.

Circle the letter of the best suitable answer

1. Methanogens are members of the phylum
   a. Cyanobacteria
   b. Archaebacteria
   c. Prochlorobacteria
   d. Eubacteria
2. A rod-shaped bacterium is known as
   a. Spirillum
   b. coccus
   c. bacillus
   d. virus
3. organisms that need a constant supply of oxygen in order to live are called
   a. obligate anaerobes
   b. Chemotrophic Autotrophs
   c. Facultative anaerobes

d. Obligate aerobes

4. A structure that forms when bacterium produces a thick internal wall that encloses its DNA and part of its cytoplasm is called a (an)
   a. Endospore
   b. Prophage
   c. Capsid
   d. Spirillum
5. Which organisms are not included in domain Archaea?
   a. Cyanobacteria
   b. Methanogens
   c. Halophilic bacteria
   d. Thermo acid philic bacteria
6. Methane gas is produced by
   a. Eubacteria
   b. Mycoplasma
   c. Archaebacteria
   d. Cyanobacteria
7. Organisms that use the complex molecules of once-living organisms for energy and nutrition are called
   a. Parasites
   b. Saprophytes
   c. Viruses
   d. Eukaryotes
8. An example of disease caused by a bacterium is
   a. Influence
   b. AIDS
   c. Measles
   d. Syphilis
9. Bacteria which retain purple colour after staining with gram stain is
   a. Gram positive
   b. Gram negative
   c. Trichous
   d. Spirillum
10. Which is the correct identification for the bacteria shown above? Use the diagrams below



   a. I—cocci , II—bacilli, III—spirochetes
   b. I—bacilli, II—cocci, III—spirochetes
   c. I—spirochetes, II—cocci, III—bacilli
   d. I—bacilli, II—spirochetes, III—cocci

11. Bacterial cell wall is made up of a polymer that consists of sugars and amino acids and it is called
    a. Peptide chain
    b. Peptidoglycan
    c. Peptide bond
    d. Peptidase
12. A viscous layer that surrounds that cell wall of bacteria and consists of polysaccharides or proteins is
    a. Capsule
    b. Pili
    c. Flagella
    d. Murein
13. An extra chromosomal, small, circular DNA molecules within a cell that is separated from chromosomal DNA is referred
    a. Chromosome
    b. Genetic material
    c. Plasma
    d. Plasmid
14. Cyanobacteria is an example of
    a. Heterotrophic bacteria
    b. Autotrophic bacteria
    c. Chemotrophic bacteria
    d. Chemotrophic Autotrophs
15. A spherical bacteria that forms colonies containing two cells are termed as
    a. Diplobacilli
    b. Streptobacilli
    c. Diplococcic
    d. Streptococci

Q2: outline the main groups of Eubacteria and Archaebacteria

Kingdom Archaebacteria

- Methanogenic bacteria
- Thermoacidphilic bacteria
- Halophilic bacteria

Kingdom Eubacteria

- Phylum proteobacteria
- Phylum cyanobacteria
- Prochloro bacteria

Q3: identify the shapes of bacteria

- Rod-shaped

- Spherical-shaped
- Spiral shaped

Q4: explain the following

a. Bacterial respiration: are classified
   - Obligate aerobes
   - Obligate anaerobes
   - Facultative aerobes

b. Bacterial reproduction: are classified
   - Asexual reproduction
   - Sexual reproduction

Q5: discuss the role of bacteria in the fields of environments, agriculture and biotechnology.

a. The role of bacteria in the fields of environments is
   - It is utilized in waste recycling to produce methane gas which is used in energy production

b. The role of bacteria in the agriculture is
   - Some bacteria produce toxins that are used in the eradication of many insects

c. The role of bacteria in biotechnology
   - Bacteria is used in the production of antibiotics

Q6: differentiate between

a. **Bacteria and Archaea**: bacteria contain Peptidoglycan in the cell wall but Archaea do not contain Peptidoglycan in the cell wall

b. Gram positive and gram negative bacteria?

- **Gram positive bacteria**: are bacteria that retain the color of the crystal violet (purple) stain in the gram stain.
- **Gram negative bacteria**: are those acquiring the color of the safranin (pink) stain.

Chapter 7: Question and answer

1. **Explain animal like protists?**

Animal like protists: they exist as free or as parasites and posses some of characteristics of animals so they are called protozoan's which means 'first animals'

2. **Why phylum ciliphora also called ciliate?**

Because they have cilia

3. **How paramecium can reproduce?**

Paramecium reproduces asexually by binary fission or sexually by conjugation

4. **Define cilia?**

Cilia are short hair like projections that produce movement in the water and helps in food capturing

5. **State the meaning and function of pseudopods?**

Pseudopods: means false feet. The function of pseudopods aid in engulfing food particles

6. **Why phylum mastigophora also called flagellates?**

Because they have flagella

7. **Explain trypanosomes?**

Trypanosomes are parasites live in the blood of fish, amphibians, reptiles, birds and mammals and are carried from host to host by bloodsucking insect called tsetse fly which lives in Africa

8. **Describe leishmania?**

Leishmania is a parasite that causes a disease called leishmaniasis which is characterized by skin scores, swollen glands, fiver and swollen spleen and liver

9. **Explain phylum Soporozoa?**

Phylum Soporozoa: The members of phylum Soporozoa are non-motile, which means that they do not move

10. **Explain plant like protists?**

Plant like protists: also called algae, are large and diverse group of unicellular or multicellular organisms that have a threadlike shape

11. **Explain phylum Chlorophyta?**

Chlorophyta are commonly known as green algae found in aquatic environment

12. **Explain phylum euglenophyta?**

Euglenophyta is of the smallest phylum of the kingdom protists, it is a unicellular aquatic algae

Euglenophyta live in freshwater

13. **Explain phylum Chrysophyta?**

Members of the phylum Chrysophyta are of the three general kinds; yellow-green algae, golden-brown algae and diatoms

14. **Define diatoms?**

Diatoms are photosynthetic and are among the most abundant species in the oceans

15. **Explain phylum Rhodophyta?**

Rhodophyta contain reddish pigment called phycobilin, almost all red algae are marines, most live in tropical water and also are common along rocky coasts in colder water

16. **Explain phylum Phoephyta?**

Phylum Phoephyta: contain a brown pigment called fucoxanthin most brown algae are marine; they are common in coastal areas.

17. **Describe Slime molds?**

Slime molds: are typically found on moist, decaying matter, they appears as glistening white, yellow or red masses of slime

18. **Describe water molds?**

Water molds: is a fungus like protist composed of branching filaments of cells

CHAPTER EXERCISE

Q1: CIRCLE THE LETTER OF THE BEST SUITABLE ANSWER

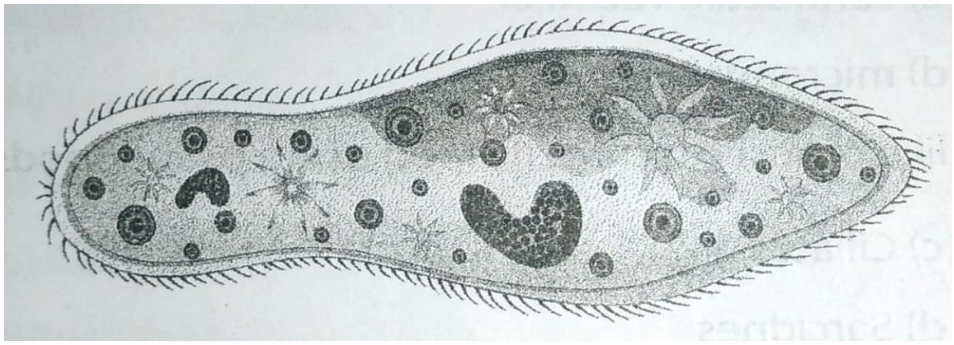
1. All protists are
   a. Solitary
   b. Colonial
   c. Motile
   d. Eukaryotic
2. Which organism causes malaria
   a. Paramecium
   b. Trypanosome
   c. Plasmodium
   d. Euglena
3. Short hair like projections that produce movement in certain protists are
   a. Cilia
   b. Pseudopods
   c. Flagella
   d. Microtubules
4. Diatoms belong to the phylum
   a. Ciliophora
   b. Chrysophyta
   c. Pyrrophyta
   d. Myxomycota
5. Which of the following organisms are not placed in the phylum sacrodina?
   a. Amebas
   b. Radiolarians
   c. Heliozoans

d. Flagellates

6. A euglena moves by means of
   a. Pseudopods
   b. Cilia
   c. Spores
   d. Flagella
7. Which organism is not associated with a disease in humans?
   a. Trichonympha
   b. Entamoeba
   c. Trypanosome
   d. Plasmodium
8. A paramecium excretes excess water through the
   a. Gullet
   b. Trichocytsts
   c. Contractile vacuole
   d. Micronucleus
9. Which group of animals like protist captures its food using pseudopods
   a. Zoofalagets
   b. Sporozoans
   c. Ciliates
   d. Sarcidnes
10. Unlike algae, Euglen
    a. Can be heterotrophic under certain conditions
    b. Do not have pigments
    c. Can make their own food
    d. Can move from place to place
11. A type of unicellular plant like protist with beautiful glass like cell walls is a
    a. Green algae
    b. Diatoms
    c. Water mold
    d. Cillate
12. The contractile vacuole is used to
    a. Maintenance water balance
    b. Contract into ball shaped
    c. Control reproduction
    d. Form a cyst under unfavorable condition
13. Which term best describes this protist?
    a. A cellular
    b. Multicellular
    c. Eukaryotic
    d. Prokaryotic
14. Which organism has silica walls?
    a. Brown algae
    b. Dinolf agellate
    c. Diatom

d. Eugenio

15. Which structure does this organism use for movement? Use the diagram below to answer the question



a. Cilia
b. Contractile vacuole
c. Flagella
d. Pseudopodia

Q1: are the categories animals like, plant like or fungus like useful in classifying protists? Explain your answer.

Yes, protists have characteristics similar to plants, animals and fungi

Q2: make a table contains the following information about euglena, amoeba, diatom and plasmodium:

Name of the phylum; animal like or plant like; means of locomotion; relationships with other organisms

	Phylum	Animallike or plantlike	Means of locomotion	Relationships with other organisms
Euglena	Euglenozoa	Both plant and animal characteristics.	Flagella	They are autotro phic
Amoeba	Amoebozoa	Animal-like protists	Pseudopoda	Lives in water
Diatom	Heterokont	Plant-like protists.	Flagella	Autrotrophic
plasmodium	Apicomplexa	multicellular animals	Do not move	Cause diseases

Q3: describe the general characteristics of kingdom protists?

- Protist are eukaryotic organisms with varied body forms, some are unicellular while others are colonial
- They have many organelles including mitochondria
- Most of them are anaerobes but some aerobes

Q4: classify protists according to their mode of nutrition?

- Animal-like protists (protozoan's)
- Plant-like protists (algae)
- Fungus-like protists

Q5: identify the diseases caused by some varieties of protists

- Malaria
- Trypanosome
- Leishmaniasis

Q6: state the importance of protists?

- Plant-like protists produce the oxygen on the planet through photosynthesis
- Protists decompose and recycle nutrients that human need to live
- Many protists are also commonly used in medical research

Q7: differentiate between freshwater algae and marine algae?

The difference between freshwater algae is that seaweed is multi-cellular and it lives in the marine biome, algae can be both unicellular and multicellular.