Chapter-5

FUNDAMENTAL UNIT OF LIFE

SUB TOPIC: Discovery of cell and cell theory

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. The term 'Cell' was given by -
   a. (a)Leeuwenhoek (b) Robert Hooke
   b. (c) Flemming (d) Robert Brown
2. Who proposed the cell theory? -
   (a) Schleiden and Schwann (b) Watson and Crick
   (c) Darwin and Wallace (d) Mendel and Morgan
3. The number of lenses in compound light microscope is
   (a) 2 (b)3 (c) 4 (d)1
4. The history of the cell began in 1665 with the publication of Micrographia in London by -
   a. Robert Hooke (b) Robert Brown
   (c) Strasburger (d)Dujardin
5. Which of the following can be made into crystal?
   a. A Bacterium
   b. An Amoeba
   c. A Virus
   d. A Sperm
6. Cell arises from pre-existing cell was stated by
   a. Haeckel
   b. Virchow
   c. Hooke
   d. Schleiden
7. Cell theory was given by
   a. Schleiden and Schwann
   b. Virchow

c. Hooke

d. Haeckel

8. 1 µm is

a) 10^{-6} m (b) 10^{-9} m (c) 10^{-10} m (d) 10^{-3}m

9. Living cells were discovered by

a. Robert Hooke

b. Purkinje

c. Leeuwenhoek

d. Robert Brown

10. Which of the following statement marks as a difference between plant cell and animal cell?

(a) Plant cells have cell wall which animal cells do not.
(b) Plant cells do not have vacuole while animal cells do have.
(c) Plant cells have only cell membrane while animal cells have both cell wall as well as cell membrane.
(d) Plant cells have more plastids while animal cells have few plastids.

VERY SHORT QUESTIONS: (1 MARK)

1. Define Cell
2. What will happen to a cell if its nucleus is removed?
3. Who proposed the Cell Theory?
4. Who expanded cell theory by suggesting that all cells arise from pre-existing cells?
5. In which year electron microscope was invented?
6. Name the book in which Robert Hooke published his observations about cork cells.
7. Who discovered nucleus in the cell?
8. Name the two postulates of the cell theory
9. Name the largest cell?
10. Name the world's smallest cell.
11. Name the smallest cell in human body.
12. Give an example of anucleate cell i.e. cell without nucleus.
13. Give an example of cells containing two nuclei (Binucleate).

14. Give examples of cells which are muti-nucleate (i.e. having many nuclei).
15. What are the different types of cells on the basis of nuclear material found inside?
16. Which of the substance does Robert Hooke sees the resemblance of slice of the cork from a tree.
17. Name the book written by Robert Hooke on his discovery of cell.

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. Describe the microscopic structure of the cell.
2. How can you calculate the magnification of a microscope?
3. Differentiate between unicellular and multicellular organisms.(any 3 points)
4. Why is virus an exception to cell theory? Explain
5. Write a short note on cell theory.

SUB TOPIC: Shape, Size and types of cell

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Organisms lacking nucleus and membrane bound organelle are -

(a) Diploids (b) Prokaryotes

(c) Haploids (d) Eukaryotes

VERY SHORT QUESTIONS: (1 MARK)

2. Name a cell which changes its shape.

3. Name the biggest cell in human body.

4. Name the longest cell in human body.

5. Name the cell in human body which cannot reproduce.

6. What are eukaryotic cells?

7. What are prokaryotic cells?

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. How is a bacterial cell different from an onion peel cell?
2. Draw a plant cell and label the parts which
   (a) determines the function and development of the cell
   (b) packages materials coming from the endoplasmic reticulum
   (c) provides resistance to microbes to withstand hypotonic external media without bursting
   (d) is site for many biochemical reactions necessary to sustain life.
   (e) is a fluid contained inside the nucleus
3. Do you agree "A cell is a building unit of an organism".If yes, explain why

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

SUB TOPIC: Structural organization of cell - Plasma membrane- structure, composition and functions

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. The barrier between the protoplasm and the outer environment in an animal cells -

(a) Cell wall (b) Nuclear membrane

(c) Tonoplast (d) Plasma membrane

8. Animal cell is limited by –

(a) Plasma membrane (b) Shell membrane

(c) Cell wall (d) Basement membrane

9. The network of Endoplasmic Reticulum is present in the -

(a) Nucleus (b) Nucleolus

(c) Cytoplasm (d) Chromosomes

10. Amoeba acquires its food through a process, termed

(a) Exocytosis
(b) Endocytosis
(c) Plasmolysis
(d) Exocytosis and endocytosis both

VERY SHORT QUESTIONS: (1 MARK)

1. State the primary functions of plasma membrane.

2. Bacteria do not have chloroplast but some bacteria are photoautotrophic in nature and perform photosynthesis. Which part of the bacterial cell performs this?

3. If the plasma membrane of a cell is ruptured what will happen to the cell?

SHORT ANSWER TYPE QUESTIONS: (3 MARKS)

1. What is a semi permeable membrane? What are the differences between semi permeable membrane and selectively permeable membrane?

2. What is active transport? Differentiate between active and passive transport.

(a) Mention the difference between cell wall and plasma membrane?
(b) Is plasma membrane living or dead? Which component in plasma membrane makes it flexible.
Give a brief account of structure of plasma membrane.
What do you mean by selectively permeable membrane?
Which of the two cell wall or plasma membrane have this feature?
State the function of plasma membrane (any 3)

SUB TOPIC: Transport across cell membrane- Diffusion and Osmosis

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Plasmolysis occurs due to -

(a) Absorption (b) Endosmosis

(c)Osmosis (d)Exosmosis

2. A plant cell becomes turgid due to -

(a) Plasmolysis (b) Exosmosis

(c) Endosmosis (d) Electrolysis

3. Solute concentration is higher in the external solution -

(a) Hypotonic (b) Isotonic

(c) Hypertonic (d) None of the above

4. A cell placed in hypertonic solution will

(a) Shrink (b) Show Plasmolysis

(c) Swell up (d) No change in shape or size

5. Root hair absorbs water from soil through -

(a) Osmosis (b) Active transport

(c) Diffusion (d) Endocytosis

6. A cell will swell up if

(a) The concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium

(b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell

(c) The concentration of water molecules is same in the cell and in the surrounding medium

(d) Concentration of water molecules does not matter

7. Following are a few definitions of osmosis. Read carefully and select the correct definition

(a) Movement of water molecules from a region of higher concentration to a region of lower concentration through a semi permeable membrane

(b) Movement of solvent molecules from its higher concentration to lower concentration

(c) Movement of solvent molecules from higher concentration to lower concentration of solution through a permeable membrane

(d) Movement of solute molecules from lower concentration to a higher concentration of solution through a semi permeable membrane.

8. Plasmolysis in a plant cell is defined as

(a) break down (lysis) of plasma membrane in hypotonic medium

(b) shrinkage of cytoplasm in hypertonic medium

(c) shrinkage of nucleoplasm

(d) none of them

VERY SHORT QUESTIONS: (1 MARK)

1. A cell placed in a solution swells up. What kind of solution is it? Why does it happen?
2. What would happen if an animal cell is kept in distilled water for 24 hours.
3. Why does the skin of your finger shrink when you wash clothes for a long time?
4. We eat food composed of all the nutrients like carbohydrates, proteins, fats, vitamins, minerals and water. After digestion, these are absorbed in the form of glucose, amino acids, fatty acids, glycerol etc. What mechanisms are involved in the absorption of digested food and water?
5. Differentiate between diffusion and osmosis.
6. What is plasmolysis?
7. How do the different substances like CO2 and water move in and out of the cells?

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. A person takes concentrated solution of salt, after sometime, he starts vomiting. What is the phenomenon responsible for such situation? Explain.
2. If you are provided with some vegetables to cook, you generally add salt to the vegetables during the cooking process. After adding salt, vegetables release water. What mechanism is responsible for this? Elaborate the process.
3. If cells of onion peel and RBC are separately kept in hypotonic solution, what among the following will take place? Explain the reason for your answer.
   (a) Both the cells will swell.
   (b) RBC will burst easily while cells of onion peel will resist the bursting to some extent.
   (c) a and b both are correct.
   (d) RBC and onion peel cells will behave similarly.
4. Put dried raisins in plain water and leave them for some time. Then place them in concentrated solution of sugar or salt. What do you observe in both cases? Give reason for your answer.
5. Give reasons. (a) Skin of our finger shrinks when we wash clothes for a long time.
   a. Person taking concentrated solution of salt vomits after some time.
   (c) After adding salt to the vegetables during cooking vegetable releases water.
6. Define endosmosis and exosmosis?
7. What are the different type of endocytosis
8. What happens to the raisins when they are placed?

(a) In water?

(b) In salt water?

9. Elaborate hypotonic, isotonic and hypertonic solutions?
10. What happens to the cell when it is placed in hypotonic, hypertonic and isotonic solutions?

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

1. In brief state what happens when
   (a) dry apricots are left for sometime in pure water and later transferred to sugar solution?
   (b) a Red Blood Cell is kept in concentrated saline solution?
   (c) the Plasma membrane of a cell breaks down?
   (d) rheo leaves are boiled in water first and then a drop of sugar syrup is put on it?
   (e) golgi apparatus is removed from the cell?

SUB TOPIC: Cell Wall-structure, composition and functions

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Cell inclusions are -

(a) Non-living materials present in the cytoplasm

(b) Another name of cell organelle

(c) Cytoskeletal framework of cell

(d) Combined name for cell wall and plasma membrane

2. Cell wall of which one of these is not made up of cellulose?
(a) Bacteria
(b) Hydrilla
(c) Mango tree
(d) Cactus

VERY SHORT QUESTIONS: (1 MARK)

1. Name a cell that lacks cell wall
2. Name the main constituent substance present in plant cell wall.

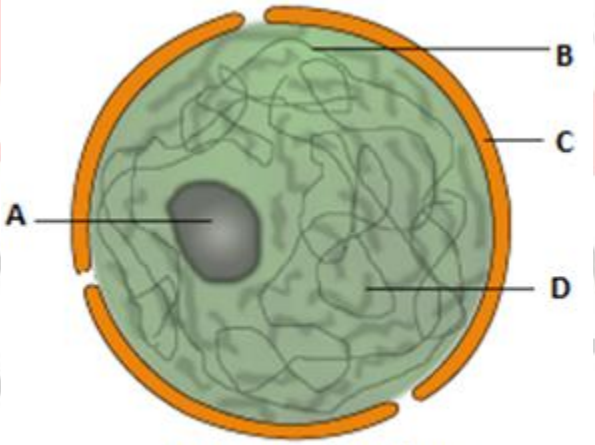
SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. What are the functional differences between a plasma membrane and cell wall?

SUB TOPIC: Nucleus – structure, composition and functions

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. The undefined nuclear region of prokaryotes are also known as
   (a) nucleus
   (b) nucleolus
   (c) nucleic acid
   (d) nucleoid
2. The nucleus controls all the activities of the cell and acts as a site of DNA material and protein synthesis. It is composed of some components which all together give the nucleus its functionality. Here is shown a figure of nucleus with some of its components labeled as A, B, C and D. can you name these components correctly?



Structure of Nucleus

(a) A – Nucleons; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm
(b) A – Nucleus; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm
(c) A – Nucleolus; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm

(d) A – Nucleolus; B – Chromatin; C – Nuclear membrane; D – Nuclear wall

VERY SHORT QUESTIONS: (1 MARK)

1. Identifiy and name the following cell structures:
    a) The undefined nuclear region of Prokaryotic cell.
    b) Site of energy release inside the cell
2. Name the two components of chromosomes.
3. When does the chromatin network separate out to form chromosomes?
4. Which cellular content is named as factory of ribosome and why?
5. What is nucleosome
6. Name a structure responsible for transmission of hereditary information which becomes visible only at the time of cell division.
7. What are chromosomes
8. In humans, what is the number of chromosome present in each body cell

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. What are the functions of nuclear membrane?
2. Write the characteristics of nucleolus

LONG ANSWER TYPE QUESTIONS (5 MARKS)

1. Draw a well-labeled diagram of a eukaryotic nucleus. How is it different from nucleoid?

SUB TOPIC: Cytoplasm, Cell Organelles-Endoplasmic Reticulum- structure, composition and function

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Which of these is not related to endoplasmic reticulum?
   (a) It behaves as a transport channel for proteins between nucleus and cytoplasm
   (b) It transports materials between various regions in cytoplasm
   (c) It can be the site of energy generation
   (d) It can be the site for some biochemical activities of the cell
2. Find out the false sentences
   (a) Golgi apparatus is involved with the formation of lysosomes
   (b) Nucleus, mitochondria and plastid have DNA; hence they are able to make their own structural proteins
   (c) Mitochondria is said to be the powerhouse of the cell as ATP is generated in them.
   (d) Cytoplasm is called as protoplasm
3. Find out the correct sentence
   (a) Enzymes packed in lysosomes are made through RER (rough endoplasmic reticulum)
   (b) Rough endoplasmic reticulum and smooth endoplasmic reticulum produce lipid and protein respectively
   (c) Endoplasmic reticulum is related to the destruction of plasma membrane
   (d) Nucleoid is present inside the nucleoplasm of eukaryotic nucleus
4. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
   (a) Golgi apparatus
   (b) Lysosomes
   (c) Smooth endoplasmic reticulum
   (d) Vacuoles
5. The proteins and lipids, essential for building the cell membrane, are manufactured by
   (a) rough endoplasmic reticulum
   (b) Golgi apparatus
   (c) plasma membrane
   (d) mitochondria

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Name the cell organelle that detoxifies poisons and drugs.
2. Name the cell organelle that is associated with protein synthesis
3. Name the functional unit of DNA that carries genetic informations.
4. Expand the word DNA.

5. Name the Reticulum which has ribosome's attached to it.

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. Differentiate between SER and RER (any 3 differences)
2. Explain membrane Biogenesis?
3. Name the organelles which show the analogy written as under
   (a) Transporting channels of the cell——
   (b) Power house of the cell——
   (c) Packaging and dispatching unit of the cell——
   (d) Digestive bag of the cell——
   (e) Storage sacs of the cell——
   (f) Kitchen of the cell——
   (g) Control room of the cell——
4. What is membrane biogenesis? How is plasma membrane formed during this process? Endoplasmic reticulum has a big number of functions to perform within a cell. Justify.

LONG ANSWER TYPE QUESTION (5 MARKS)

1. Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?
2. Describe the structure and function of endoplasmic reticulum

SUB TOPIC: Cell Organelles-Golgi Apparatus, Lysozome

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Which is called 'Suicidal Bag'?

   (a) Centrosome (b) Lysosome

   (c) Mesosome (d) Chromosome

2. Ribosomes are the center for -

   (a) Respiration (b) Photosynthesis

   (c) Protein synthesis (d) Fat synthesis

3. Double membrane is absent in -

   (a) Mitochondrion (b) Chloroplast

   (c) Nucleus (d) Lysosome

4. Lysosome are reservoirs of -

(a) Fat (b) RNA

(c) Secretary Glycoprotein (d) Hydrolytic Enzymes

5. Cell secretion is done by -

(a) Plastids (b) ER

(c) Golgi apparatus (d) Nucleolus

6. The cell organelle involved in forming complex sugars from simple sugars are
(a) endoplasmic reticulum
(b) Ribosomes
(c) plastids
(d) Golgi apparatus

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Why are lysosomes known as "suicidal bags"?
2. Why is the nucleus so significant in a cell?
3. Which cell organelle is rich in acid hydrolyses?

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. Write a note on Golgi apparatus and the functions it performs.

LONG ANSWER TYPE QUESTION (5 MARKS)

SUB TOPIC: Cell Organelles- Mitochondria, Ribosome

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. The power house of a cell is -

(a) Chloroplast (b) Mitochondrion

(c) Golgi apparatus (d) Nucleolus

2. Within a cell the site of respiration (oxidation) is the -

(a) Ribosome (b) Golgi apparatus

(c) Mitochondrion (d) Endoplasmic Reticulum

3. Cristae and Oxysomes are associated with -

(a) Mitochondria (b) Plastids

(c) Golgi apparatus (d) Plasma membrane

4. Which of these options are not a function of Ribosomes?

(i) It helps in manufacture of protein molecules

(ii) It helps in manufacture of enzymes

(iii) It helps in manufacture of hormones

(iv) It helps in manufacture of starch molecules

(a) (i) and (ii)

(b) (ii) and (iii)

(c) (iii) and (iv)

(d) (iv) and (i)

5. Organelle other than nucleus, containing DNA is

(a) endoplasmic reticulum

(b) Golgi apparatus

(c) mitochondria

(d) lysosome

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Where ATP is synthesized in mitochondria?

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. Write a short note on organelle of cells which is responsible for production of energy in the form of ATP.
2. Mitochondria are called the power house of the cell. Justify
3. ATP is the energy currency of the cell. Justify the statement.
4. Name the organelles which are named :

(a) Control room of the cell

(b) Packaging and dispatching unit of the cell.

(c) Storage sac of the cell

5. Plants have large vacuoles. Why?

LONG ANSWER TYPE QUESTION (5 MARKS)

1. Draw a labeled diagram of mitochondria. Write the functions of mitochondria.

SUB TOPIC: Cell Organelles- Plastids, Vacuoles and Centrosomes

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Centrosome is found in -

(a) Cytoplasm (b) Nucleus

(c) Chromosomes (d) Nucleolus

2. Cell organelle found only in Plant is -

(a) Golgi apparatus (b) Mitochondria

(c) Plastids (d) Ribosomes

3. The membrane surrounding the vacuole of a plant cell is called -

(a) Tonoplast (b) Plasma membrane

(c) Nuclear membrane (d) Cell wall

4. Centrioles are associated with -

(a) DNA synthesis (b) Reproduction

(c) Spindle formation (d) Respiration

5. Which out of the following is not a function of vacuole?

(a) Storage

(b) Providing turgidity and rigidity to the cell

(c) Waste excretion

(d) Locomotion

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. What are plastids? Write their functions?

2. Name two semi- autonomous organelles?

3. What provides different colours to spinach, papaya, etc

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. Write the name of different plant parts in which chromoplast, chloroplast and leucoplast are present. Also mention each of their function.
2. Explain the structure of chloroplast?
3. Name the different types of plastids, also discuss the functions of plastids.
4. Write a short note on centrosome.

LONG ANSWER TYPE QUESTION (5 MARKS)

1. What is the structure, types and functions of vacuole.

SUB TOPIC -Comparison between plant cell and animal cell, Cell cycle- mitosis and meiosis

MULTIPLE CHOICE QUESTIONS: (1 MARK)

1. Name the non-membrane bound organelle exclusively found only in animal cell

(a) Sphaerosome

(b) Glyoxisome

(c) Centriole

(d) Peroxisome

2. Component of plant cell absent in animal cell is

(a) Cytoplasm

(b) Cell membrane

(c) Cell wall

(d) Nucleus

VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)

1. Which cell organelles are present only in plant cell and absent in animals cell?

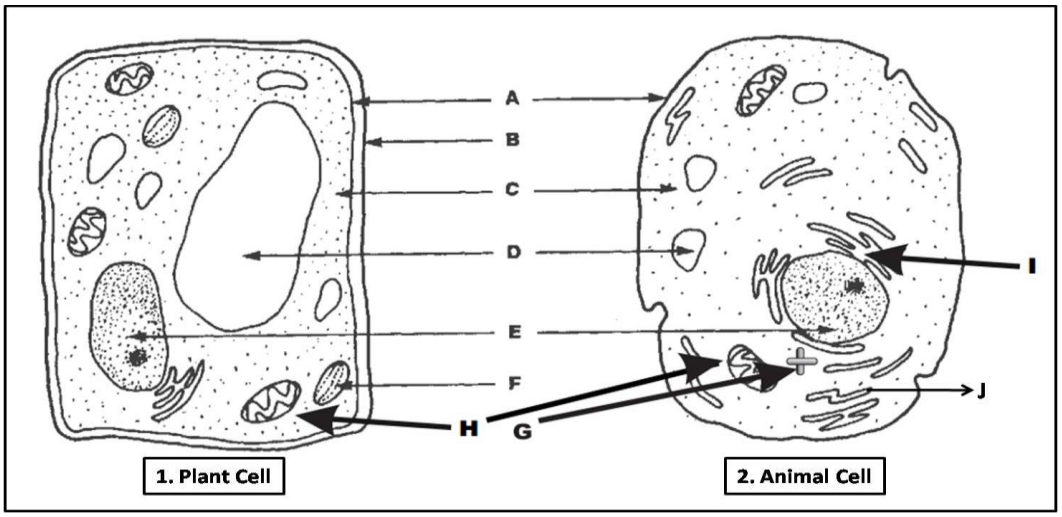
SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. What is cell division? Give the types of cell division.
2. Give 3 points of difference between mitosis and meiosis

3. What is the function of vacuoles in a plant cell
4. Describe with a diagram plant and animal cell with their similar and dissimilar organelles.
5. How do plant cells and animal cells differ with respect to their shape
6. Distinguish between the plant and animal cell.
7. Write some similarities of plant cell animal cell.
8. Why are plant cells generally larger in size compared to the animal cells?

LONG ANSWER TYPE QUESTION (5 MARKS)

1. Draw a neat labeled diagram of an animal cell.
2. Draw a plant cell and label the parts which
   (a) determines the function and development of the cell
   (b) packages materials coming from the endoplasmic reticulum
   (c) provides resistance to microbes to withstand hypotonic external media without bursting
   (d) is site for many biochemical reactions necessary to sustain life.
   (e) is a fluid contained inside the nucleus
3. Illustrate only a plant cell as seen under an electron microscope. How is it different from an animal cell?
4. a)List out the difference between mitosis and meiosis
   a. b) State a few similarities between mitosis and meiosis.

5. 

i) Which of the following is the justification for considering diagram 1 as plant cell

a) Presence of mitochondria

b) Presence of vacuole

c) Presence of cell wall

d) Presence of plasma membrane

ii) The structure labeled A is present in both prokaryotic and eukaryotic cells.

The structure is

a) Cell wall

b) Ribosome

c) Cell membrane

d) Endoplasmic reticulum

iii) This is the physical basis of life where all organelles are present

a) Nucleus

b) Mitochondria

c) Cytoplasm

d) Lysosome

iv) G give rise to spindle fibres and exclusively seen in animal cell. The structure is called

a) Lysosome

b) Peroxisome

c) Endoplasmic reticulum

d) Centriole

v) It is the site for synthesis of secretory proteins. The organelle labeled I is

a) smooth ER

b) Rough ER

c) Ribosome

d) Golgi apparatus

HOTS (HIGH ORDER THINKING SKILLS) QUESTIONS

1. What are the colors absorbed by plants? The green light of the sunlight is blocked. How will the photosynthesis be affected?
2. Where will you find more number of ribosomes-in cancer cells or in fat cells?
3. A solution of 3% glucose and a solution of 8% glucose are kept in a trough separated by a semi permeable membrane. What will you observe after 1 hour?
4. What are the colours absorbed by plants? The green light of the sunlight is blocked. How will the photosynthesis be affected?
5. Why does the skin of your finger shrink when you wash clothes for a long time?
6. Place a de-shelled egg in water for five minutes. What do you observe?

   (Note: De-shelled egg means, the shell of an egg is removed by dissolving it in dilute hydrochloric acid. The shell is mostly calcium carbonate. A thin outer skin now encloses the egg.)

   What will happen if a de-shelled egg in a concentrated salt solution for 5 minutes? Explain