CBSE

FUNDAMENTAL UNIT OF LIFE WS 2

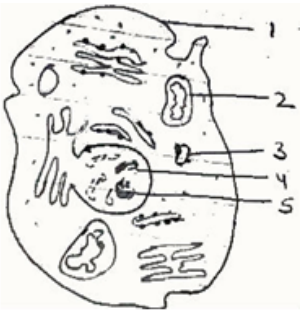
Class 09 - Science

Section A

1. Differentiate between diffusion and osmosis. What is its importance? **[3]**
2. Differentiate between RER and SER **[3]**
3. What is prokaryotic cell? Differentiate between prokaryotic cell & eukaryotic cell? **[3]**
4. There would be no plant life if chloroplasts did not exist. Justify. **[3]**
5. Differentiate between active and passive transport. **[3]**
6. Write main differences between plant cell and animal cell. **[3]**
7. Distinguish between Plant cell and Animal cells. **[3]**
8. Fill in the gaps in the following table illustrating differences between prokaryotic and eukaryotic cells. **[3]**

Prokaryotic Cell	Eukaryotic Cell
1. Size. Generally small (1 – 10 μm).	1. Size. Generally large (5 – 100 μm).
2. Nuclear Region _____ and known as _____	2. Nuclear Region. Well defined and surrounded by a nuclear membrane.
3. Chromosomes. Single	3. More than one Chromosome
4. Membrane Bound Cell Organelles. Absent.	4. _____

9. Differentiate between plant cell and animal cell. **[3]**
10. Differentiate between chromatin and chromosome. **[3]**
11. In brief, state what happens when dry apricots are left for some time in pure water and later transferred to sugar solution? **[3]**
12. What is the functional difference between a plasma membrane and cell wall? **[3]**
13. Observe the diagram of the cell below - answer the following questions. **[3]**



i. Label the parts of the cell
ii. what function does part 1 perform?
iii. If the organelle 2 is removed from the cell, what effect is it going to make on the functions of the cell?
iv. Identify, whether it is plant cell or animal cell
v. Which structure is called 'Powerhouse of the cells'?

14. How is a prokaryotic cell different from a eukaryotic cell? **[3]**

15. **[3]**

a. Label X and Y

b. What is the function of X?

c. What is the composition of Y?

d. Identify the above diagram and what is its common name?

16. What is nucleoid? How it is different from the nucleus of eukaryotic cell? **[3]**

17. What are the differences between cell wall and cell membrane? **[3]**

18. Differentiate between hypertonic and hypotonic solution. **[3]**

19. What is the difference between plasma membrane and cell wall ? Give the functions of each one. **[3]**

20. How are the following related to each other? **[3]**

i. Chromatin network and chromosomes

ii. Chloroplast and chlorophyll

iii. Genes and DNA

Section B

21. **Read the passage and answer any four questions:** **[4]**

Lysosomes are membrane-bound sacs filled with digestive enzymes. These enzymes are made by RER. Lysosomes are a kind of waste disposal system of the cell. Foreign materials entering the cell, such as bacteria or food, as well as old organelles end up in the lysosomes, which break complex substances into simpler substances. Mitochondria have two membrane coverings. The outer membrane is porous while the inner membrane is deeply folded. Mitochondria are strange organelles in the sense that they have their own DNA and ribosomes. Plastids are present only in plant cells. There are two types of plastids – chromoplasts and leucoplasts. Vacuoles are storage sacs for solid or liquid contents. Vacuoles are small-sized in animal cells while plant cells have very large vacuoles.

i. Which of the following statement marks a difference between a plant cell and an animal cell?

I. Plant cells have a cell wall which animal cells do not.

II. Plant cells do not have vacuoles while animal cells do have.

III. Plant cells have only cell membranes while animal cells have both cell walls as well as cell membranes.

IV. Plant cells have more plastids while animal cells have few plastids.

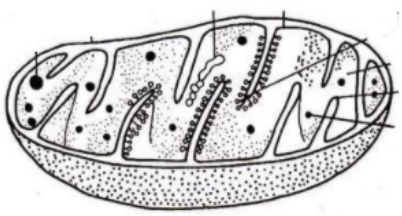
a. (I) and (II)

b. (II) and (III)

c. (III) and (IV)

d. Only (I)

ii. Mitochondria folds that are shown in the below diagram increases surface area for:



a. ATP generating chemical reactions

b. for synthesis of a protein

c. for absorption

d. none of these

iii. Organelle other than nucleus, containing DNA is:

a. endoplasmic reticulum

b. Golgi apparatus

c. mitochondria

d. lysosomes

iv. 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

v. Chromoplasts that contain _____ are called chloroplasts.

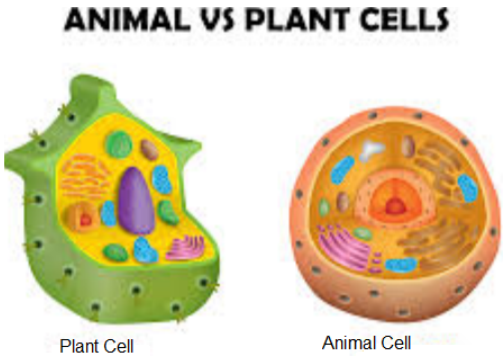
a. green colour pigment

b. yellow colour pigment

c. starch

d. none of these

22. **Read the passage and answer any four questions:** **[4]**



The plasma membrane is the outermost covering of the cell that separates the contents of the cell from its external environment. The plasma membrane allows or permits the entry and exit of some materials in and out of the cell through osmosis and diffusion. Osmosis is the passage of water from a region of high water concentration through a selectively permeable membrane to a region of low water concentration till equilibrium is reached. If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Osmosis is a special case of diffusion through a selectively permeable membrane. Diffusion is important in the exchange of gases and water in the life of a cell. In addition to this, the cell also obtains nutrition from its environment.

i. In diffusion, there is a spontaneous movement of a substance from a region of _____ concentration to a region where its concentration is _____.

a. high, low

b. low, high

c. high, high

d. low, low

ii. The plasma membrane is flexible and is made up of

I. protein

II. lipids

III. fat

IV. carbohydrates

Choose the correct option

a. (I) and (II)

b. (II) and (III)

c. (III) and (IV)

d. (IV) and (I)

iii. Unicellular freshwater organisms and most plant cells tend to gain water through

a. osmosis

b. diffusion

c. absorption

d. none of these

iv. The cell will shrink in which of the following solution?

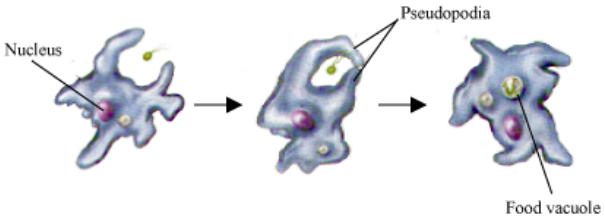
a. Hypotonic solution

b. Hypertonic solution

c. isotonic solution

d. none of these

v. Amoeba acquire its food through the process of



a. endocytosis

b. exocytosis

c. both (a) and (b)

d. none of these

23. **Read the passage and answer any four questions:** **[4]**

Plant cells, in addition to the plasma membrane, have another rigid outer covering called the cell wall. The cell wall lies outside the plasma membrane. The plant cell wall is mainly composed of cellulose. The nucleus has a double-layered covering called a nuclear membrane. The nuclear membrane has pores that allow the transfer of material from inside the nucleus to its outside, that is, to the cytoplasm. The nucleus contains chromosomes, which are visible as rod-shaped structures only when the cell is about to divide. Chromosomes contain information for the inheritance of characters from parents to the next generation in the form of DNA. The nucleus plays a central role in cellular reproduction, the process by which a single cell divides and forms two new cells.

i. Cellulose is a complex substance which provides:

a. mechanical support

b. structural strength to plants

c. both (a) and (b)

d. none of these

ii. Chromosomes are made up of:

a. DNA

b. Protein

c. DNA and protein

d. RNA

iii. Plasmolysis in a plant cell is defined as:

I. breakdown (lysis) of the plasma membrane in hypotonic medium

II. shrinkage of cytoplasm in hypertonic medium

III. shrinkage of nucleoplasm

IV. swelling of cytoplasm

Choose the correct statement

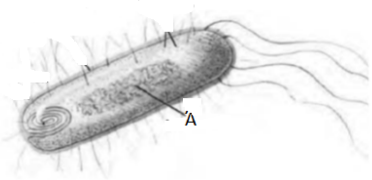
a. (I) and (II)

b. (II) and (III)

c. Only (II)

d. (IV) and (I)

iv. Identify (A) in the given diagram



a. nucleus

b. nucleolus

c. nucleic acid

d. nucleoid

v. Select the odd one out.

a. The movement of water across a semi-permeable membrane is affected by the number of substances dissolved in it.

b. Membranes are made of organic molecules like proteins and lipids.

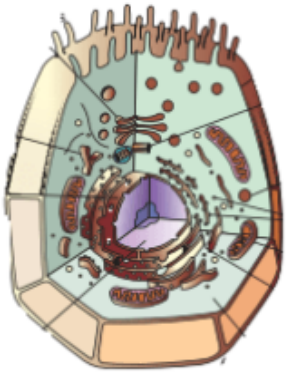
c. Molecules soluble in organic solvents can easily pass through the membrane.

d. Plasma membranes contain chitin sugar in plants.

24. **Read the passage and answer any four questions:** **[4]**

Cell organelles are enclosed by membranes. Cell organelles are the endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria and plastids. The endoplasmic reticulum (ER) is a large network of membrane-bound tubes and sheets. It looks like long tubules or round or oblong bags. There are two types of ER rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER). RER looks rough under a microscope because it has particles called ribosomes attached to its surface. The ribosomes, which are present in all active cells, are the sites of protein manufacture. The Golgi apparatus, first described by Camillo Golgi, consists of a

system of membrane-bound vesicles arranged approximately parallel to each other in stacks called cisterns.



i. Which of the following are covered by a single membrane?

a. Mitochondria

b. Vacuole

c. Lysosome

d. Plastid

ii. 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

iii. The cell organelle involved in forming complex sugars from simple sugars are:

a. endoplasmic reticulum

b. ribosomes

c. plastids

d. golgi apparatus

iv. Find out the correct sentence about the Endoplasmic reticulum.

I. Enzymes packed in lysosomes are made through RER.

II. Rough endoplasmic reticulum and smooth endoplasmic reticulum produce lipid and protein respectively.

III. The endoplasmic reticulum is related to the destruction of the plasma membrane.

IV. The SER helps in the manufacture of fat molecules or lipids.

choose a suitable answer from the following:

a. (I) and (II)

b. (II) and (III)

c. (III) and (IV)

d. (IV) and (I)

v. Which of these is not related to the endoplasmic reticulum?

a. It behaves as a transport channel for proteins between the nucleus and cytoplasm.

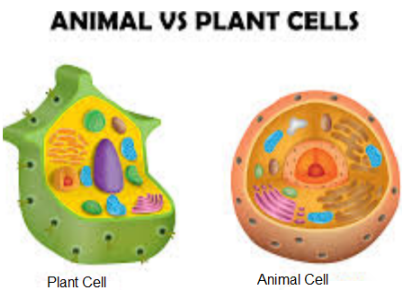
b. It transports materials between various regions in the cytoplasm.

c. It can be the site of energy generation.

d. It can be the site for some biochemical activities of the cell.

Section C

Question No. 25 to 29 are based on the given text. Read the text carefully and answer the questions: [5]



The plasma membrane is the outermost covering of the cell that separates the contents of the cell from its external environment. The plasma membrane allows or permits the entry and exit of some materials in and out of the cell through osmosis and diffusion. Osmosis is the passage of water from a region of high water concentration through a selectively permeable membrane to a region of low water concentration till equilibrium is reached. If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Osmosis is a special case of diffusion through a selectively permeable membrane. Diffusion is important in the exchange of gases and water in the life of a cell. In addition to this, the cell also obtains nutrition from its environment.

25. In diffusion, there is a spontaneous movement of a substance from a region of _____ concentration to a region where its concentration is _____.

a) low, low
b) high, low
c) low, high
d) high, high

26. The plasma membrane is flexible and is made up of

I. protein
II. lipids
III. fat
IV. carbohydrates

a) (IV) and (I)
b) (II) and (III)
c) (I) and (II)
d) (III) and (IV)

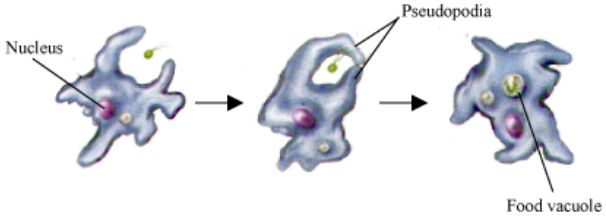
27. Unicellular freshwater organisms and most plant cells tend to gain water through

a) osmosis
b) absorption
c) Reverse osmosis
d) diffusion

28. The cell will shrink in which of the following solution?

a) Supersaturated solution
b) Hypertonic solution
c) isotonic solution
d) Hypotonic solution

29. Amoeba acquire its food through the process of



a) endocytosis
b) both endocytosis and exocytosis
c) Transcytosis
d) exocytosis

Question No. 30 to 34 are based on the given text. Read the text carefully and answer the questions: **[5]**

It is a green coloured organelle present in cells exposed to sunlight as those of leaves. A cell may have several of them. Inside the green coloured organelle is present a matrix in which are embedded membrane bounded flattened sacs. At places the flattened sacs are aggregated like stacks of coins.

30. The green coloured organelle is

a) Amyloplast
b) Chromoplast
c) Leucoplast
d) Chloroplast

31. Flattened sacs present in the green coloured organelle are

a) Cisternae
b) Thylakoids
c) Cristae
d) Dictyosomes

32. At places the flattened sacs of green coloured organelle are aggregated to form stacks called

a) Lamellae
b) Grana
c) Microvilli
d) Cisternae

33. What is the function of flattened sacs and the matrix contained in the green coloured cell organelle

i. Matrix traps solar energy while flattened sacs perform carbon assimilation
ii. Matrix produces reducing power of NADPH and ATP which is used by membranes of flattened sacs to reduce carbon dioxide
iii. Reduction of carbon dioxide occurs in the matrix while flattened sacs produce NADPH and ATP
iv. Matrix is the seat of breaking of water into hydrogen and oxygen while membranes of flattened sacs form ATP

a) Option (ii)
b) Option (i)
c) Option (iv)
d) Option (iii)

34. Which of the following is correct regarding plant cells?

a) Vacuoles are small and temporary.
b) A rigid cell wall encapsulates the plasma membrane.
c) Do contain centrosomes and centrioles.
d) Do not contain plastids.

Question No. 35 to 39 are based on the given text. Read the text carefully and answer the questions: **[5]**

A student prepared three types of salt solutions A, B and C. A deshelled egg was placed in each solution. After an hour he observed that the egg in solution A has swelled up. There was no change in solution B while the deshelled egg kept in solution C decreased in size.

35. The phenomenon bringing about changes in the size of egg is

a) Diffusion
b) Inhibition
c) Circulation
d) Osmosis

36. Eggs are deshelled because the shells are

a) Semipermeable
b) Permeable
c) Impermeable
d) Made of calcium carbonate

37. Deshelling of eggs is carried out by dipping the eggs in

a) Alcohol
b) Sodium hydroxide solution
c) Dilute hydrochloric acid
d) Lime water

38. Name the types of solutions A, B and C

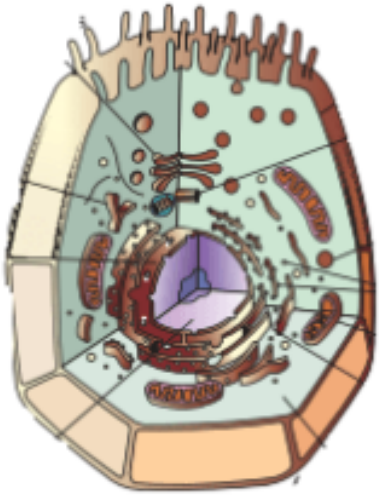
a) Hypertonic, isotonic, hypotonic
b) Hypotonic, hypertonic, iosotonic
c) Hypotonic, isotonic and hypertonic
d) Isotonic, hypotonic and hypertonic

39. In which solution concentration of solutes and pH as the surrounding bodily fluid is the same?

a) Hypertonic
b) Hypotonic
c) Homogenous
d) Isotonic

Question No. 40 to 44 are based on the given text. Read the text carefully and answer the questions: **[5]**

Cell organelles are enclosed by membranes. Cell organelles are the endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria and plastids. The endoplasmic reticulum (ER) is a large network of membrane-bound tubes and sheets. It looks like long tubules or round or oblong bags. There are two types of ER rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER). RER looks rough under a microscope because it has particles called ribosomes attached to its surface. The ribosomes, which are present in all active cells, are the sites of protein manufacture. The Golgi apparatus, first described by Camillo Golgi, consists of a system of membrane-bound vesicles arranged approximately parallel to each other in stacks called cisterns.



40. Which of the given are covered by a single membrane?

a) Plastid
b) Lysosome
c) Vacuole
d) Mitochondria

41. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?

a) Vacuoles
b) Golgi apparatus
c) Lysosomes
d) Smooth endoplasmic reticulum

42. The cell organelle involved in forming complex sugars from simple sugars are:

a) golgi apparatus
b) ribosomes
c) endoplasmic reticulum
d) plastids

43. Find out the correct sentence about the Endoplasmic reticulum.

I. Enzymes packed in lysosomes are made through RER.
II. Rough endoplasmic reticulum and smooth endoplasmic reticulum produce lipid and protein respectively.
III. The endoplasmic reticulum is related to the destruction of the plasma membrane.
IV. The SER helps in the manufacture of fat molecules or lipids.

a) (I) and (II)
b) (IV) and (I)
c) (III) and (IV)
d) (II) and (III)

44. Which of these is not related to the endoplasmic reticulum?

a) It behaves as a transport channel for proteins between the nucleus and cytoplasm
b) It can be the site of energy generation.
c) It transports materials between various regions in the cytoplasm.
d) It can be the site for some biochemical activities of the cell.

Question No. 45 to 49 are based on the given text. Read the text carefully and answer the questions: **[5]**

Prior to division, chromosomes replicate. Every chromosome becomes double. In common type of cell division, the two replicas of each chromosome separate and pass to different daughter cells. This maintains the chromosome number in the daughter cells similar to mother cell. The division makes all cells of the body similar to one another in genetic composition.

45. When do chromosomes replicate?

a) Before cell division
b) During cell division
c) During sexual reproduction only
d) After cell division

46. All cells of the body of an organism contains the same number of chromosomes. How is it possible?

a) Formation of chromosome replicas after each cell division inside the newly formed cells
b) Each chromosome multiplies twice and separates twice during every cell division
c) Replication and separation of chromosome replicas during every cell division
d) A multicellular organism develops due to repeated cell division

47. What is the name of this mode of division?

a) Amitosis
b) Meiosis
c) Mitosis
d) Brachymeiosis

48. In which type of function does it participate?

a) Vegetative reproduction
b) Growth of multicellular organism
c) Asexual reproduction
d) All of these

49. Chromosomes are made up of _____.

a) DNA and proteins
b) Proteins
c) DNA
d) Carbohydrate

Question No. 50 to 54 are based on the given text. Read the text carefully and answer the questions: **[5]**

Lysosomes are membrane-bound sacs filled with digestive enzymes. These enzymes are made by RER. Lysosomes are a kind of waste disposal system of the cell. Foreign materials entering the cell, such as bacteria or food, as well as old organelles end up in the lysosomes, which break complex substances into simpler substances. Mitochondria have two membrane coverings. The outer membrane is porous while the inner membrane is deeply folded. Mitochondria are strange organelles in the sense that they have their own DNA and ribosomes. Plastids are present only in plant cells. There are two types of plastids – chromoplasts and leucoplasts. Vacuoles are storage sacs for solid or liquid contents. Vacuoles are small-sized in animal cells while plant cells have very large vacuoles.

50. Which of the following statement marks a difference between a plant cell and an animal cell?

I. Plant cells have a cell wall which animal cells do not.

II. Plant cells do not have vacuoles while animal cells do have.

III. Plant cells have only cell membranes while animal cells have both cell walls as well as cell membranes.

IV. Plant cells have more plastids while animal cells have few plastids.

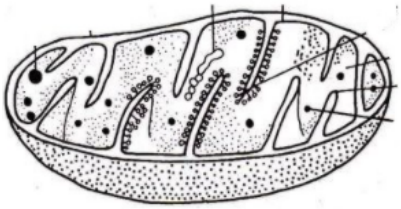
a) (II) and (III)

b) (III) and (IV)

c) Only (I)

d) (I) and (II)

51. Mitochondria folds that are shown in the below diagram increases surface area for:



a) for synthesis of a carbohydrates

b) for absorption

c) ATP generating chemical reactions

d) for synthesis of a protein

52. Organelle other than nucleus, containing DNA is:

a) mitochondria

b) Golgi apparatus

c) lysosomes

d) endoplasmic reticulum

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

a) Locomotion

b) Providing turgidity and rigidity to the cell

c) Storage

d) Waste excretion

54. Chromoplasts that contain _____ are called chloroplasts.

a) green colour pigment

b) White colour pigment

c) yellow colour pigment

d) starch

Question No. 55 to 59 are based on the given text. Read the text carefully and answer the questions: **[5]**

Plant cells, in addition to the plasma membrane, have another rigid outer covering called the cell wall. The cell wall lies outside the plasma membrane. The plant cell wall is mainly composed of cellulose. The nucleus has a double-layered covering called a nuclear membrane. The nuclear membrane has pores that allow the transfer of material from inside the nucleus to its outside, that is, to the cytoplasm. The nucleus contains chromosomes, which are visible as rod-shaped structures only when the cell is about to divide. Chromosomes contain information for the inheritance of characters from parents to the next generation in the form of DNA. The nucleus plays a central role in cellular reproduction, the process by which a single cell divides and forms two new cells.

55. Cellulose is a complex substance which provides:

a) both mechanical support and structural strength to plants

b) mechanical support

c) structural strength to plants

d) Nutritional strength to plants

56. Chromosomes are made up of:

a) Protein

b) RNA

c) DNA

d) DNA and protein

57. Plasmolysis in a plant cell is defined as:

I. breakdown (lysis) of the plasma membrane in hypotonic medium

II. shrinkage of cytoplasm in hypertonic medium

III. shrinkage of nucleoplasm

IV. swelling of cytoplasm

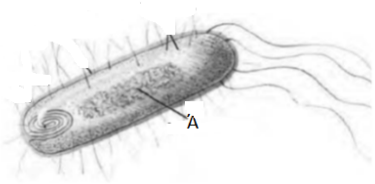
a) (IV) and (I)

b) (II) and (III)

c) (I) and (II)

d) Only (II)

58. Identify (A) in the given diagram



a) nucleic acid

b) nucleus

c) nucleolus

d) nucleoid

59. Select the odd one out.

a) Membranes are made of organic molecules like proteins and lipids.

b) Molecules soluble in organic solvents can easily pass through the membrane.

c) Plasma membranes contain chitin sugar in plants.

d) The movement of water across a semi-permeable membrane is affected by the number of substances dissolved in it.

60. Write the main functions of atleast ten cell components. **[5]**

61. Write the main function of each of the following. **[5]**

(a) Plasma membrane

(b) cell wall

(c) Ribosome

(d) Lysosome

(e) Nucleolus

(f) Endoplasmic reticulum

62. Write a note on Golgi apparatus and the functions it performs. **[5]**

63. Differentiate between **[5]**

i. Cell wall and cell membrane.

ii. Nuclear region of a bacterial cell and nuclear region of an animal cell.

iii. Prokaryotic cell & eukaryotic cell.

64. Draw a plant cell and label the parts which **[5]**

i. determines the function and development of the cell

ii. packages materials coming from the endoplasmic reticulum

iii. provides resistance to microbes to withstand hypotonic external media without bursting

iv. is site for many biochemical reactions necessary to sustain life.

v. is a fluid contained inside the nucleus

65. Make a comparison and write down ways in which plant cells are different from animal cells. **[5]**

66. i. Describe the role played by the lysosomes. Why are they termed as suicidal bags? How do they perform their function? **[5]**

ii. What happens to the dry raisins, when placed in plain water for some time? State the reason for whatever is observed. What would happen if these raisins are then placed in concentrated salt solution?

67. What is membrane biogenesis? How is plasma membrane formed during this process? **[5]**

68. Explain main functional regions of a cell with the help of a diagram. **[5]**

69. Draw a neat labelled diagram of an animal cell. **[5]**

70. What are cell organelles? Write the names of different cell organelles. **[5]**

71. Grass looks green, papaya appears yellow. Which cell organelle is responsible for this? **[5]**

72. Why are mitochondria called powerhouse of the cell? Give three similarities and one difference between mitochondria and plastid. **[5]**

73. i. State what will happen when human red blood cells are placed in a hypotonic salt/sugar solution. **[5]**

ii. Why plant cell shrinks when kept in a hypertonic solution.

iii. Why lysosomes are known as suicidal bags?

74. Draw a well-labeled diagram of a eukaryotic nucleus. How is it different from the nucleoid? **[5]**