

8. Cell Structure and Functions

Very Short Answer Type Questions

1. Question

Which instrument was essential for the study of cells ?

Answer

Microscope was essential for the study of cells.

2. Question

What is the basic similarity among all the living organism (plants and animals) ?

Answer

The basic similarity among all the living organisms is that they all are made up of cells.

3. Question

Name the scientist who observed a thin slice of cork through a microscope and coined the term 'cell'.

Answer

Robert Hooke in 1665 observed a thin slice of cork through a microscope and coined the term 'cell'

4. Question

Name the outermost layer of an animal cell.

Answer

Plasma membrane is the outermost layer of an animal cell.

5. Question

Which part of the cell contains organelles?

Answer

Cell organelles are present in the cytoplasm.

6. Question

Name any two organelles present in a cell.

Answer

Mitochondria and Endoplasmic reticulum.

7. Question

Which part of a cell carries out respiration?

Answer

Mitochondria is the site of respiration.

8. Question

What are the units of inheritance in living organisms?

Answer

Gene is a unit of inheritance in living organisms.

9. Question

Which is the largest floating body generally in the center of a cell?

Answer

Nucleus is the largest floating body generally in the center of a cell.

10. Question

What is the function of nucleus in a cell?

Answer

Nucleus controls all activities of the cell, hence it is also called Master or Director of the cell.

11. Question

What do the chloroplasts contain?

Answer

They possess photosynthetic pigment called chlorophyll.

12. Question

What kind of cells are surrounded by a cell wall?

Answer

Plant cells are surrounded by a cell wall.

13. Question

What sort of cells do not have a cell wall around them ?

Answer

Animal cells do not have a cell wall around them.

14. Question

Name the layer which is outside the cell membrane of a plant cell.

Answer

Cell wall

15. Question

How is the outside of a plant cell different from that of an animal cell ?

Answer

Plant cells differ from animal cells in having an additional layer around the cell membrane termed cell wall.

16. Question

Name the organelle of a plant cell where photosynthesis takes place.

Answer

Chloroplast is the organelle of a plant cell where photosynthesis takes place.

17. Question

Which part of a plant cell protects outside of the cell ?

Answer

Cell wall protects outside to the plant cell.

18. Question

Which part of plant cell releases energy from food?

Answer

Mitochondria releases energy from food in the plant cell.

19. Question

What causes the red colour in tomatoes?

Answer

Coloured plastid (Chromoplasts) gives the red colour in tomatoes.

20. Question

Which part of the two has a large vacuole: a plant cell or an animal cell ?

Answer

A plant cell has a large vacuole.

21. Question

Name any two parts which are present in a plant cell but not in an animal cell.

Answer

Cell wall and plastids are present only in a plant cell.

22. Question

Which cells transmit message between the brain and other parts of the body?

Answer

Nerve cell transmit message between the brain and other parts of the body.

23. Question

Which cells in the human body can contract (and relax) ?

Answer

Muscle cells in the human body can contract and relax.

24. Question

Name the spindle-shaped cells present in the human body.

Answer

The spindle-shaped cells present in the human body are muscle cells.

25. Question

State an important characteristic of muscles cells.

Answer

A muscle cell is pointed at both ends and has a spindle shape.

26. Question

Name a single cell (other than *Ameoba cell*) which can change its shape.

Answer

White blood cells present in human blood is a single cell (other than *Ameoba cell*) which can change its shape.

27. Question

Name one 'single cell' which behaves like a complete organism.

Answer

Amoeba is a single cell which behaves like a complete organism.

28. Question

Name one cell which can be seen easily with naked eye and one cell which can be seen only through a microscope.

Answer

The bird's egg are very large cell which can be seen easily with naked eye while bacterial cells are extremely small which can be seen only through a microscope.

29. Question

State whether the following statements are true or false :

- (a) Unicellular organism have one- celled body.
- (b) Muscle cells are branched.
- (c) *Amoeba* has irregular shape.
- (d) All the cells in our body are alike.
- (e) A hen's egg is a group of cells.
- (f) The basic living unit of an organism is organ.

Answer

- (a) True, unicellular organisms (single celled organisms) are made up of only one cell.
- (b) False, muscle cell are not branched.
- (c) True, Amoeba have changing shape.
- (d) False, All the cells in our body exhibit variety of shapes and sizes so that they can perform different functions.

(e) False, A hen's egg is not a group of cells. It is a single cell.

(f) False, the basic living unit of an organism is cell.

30. Question

Name the smallest unit of life.

Answer

Cell is the smallest unit of life.

31. Question

What is a 'cell' in biology ?

Answer

Cell is structural and functional unit of all living beings.

32 A. Question

What are the basic parts of all the cells ?

Answer

The basic parts of all the cells are- cell membrane, cytoplasm and nucleus.

32 B. Question

What parts are present only in plant cells ?

Answer

The parts which are present only in plant cells are- Cell wall, chloroplasts and large vacuole.

33. Question

What controls the flow of substance in and out of a cell ?

Answer

Plasma membrane controls the flow of substance in and out of a cell.

34. Question

Which part of a cell controls all the activities of the cell ?

Answer

Nucleus controls all the activities of the cell.

35. Question

Name the animal cell which is long and has thread-like branches.

Answer

Nerve cell is a long and has thread like branches.

36. Question

What is the function of chloroplasts in a plant cell ?

Answer

Chloroplasts help in the synthesis of food by the process of photosynthesis.

37. Question

Name an organism which has no definite shape, and it keeps on changing its shape.

Answer

Amoeba has no definite shape, and it keeps on changing its shape.

38. Question

Name one cell in human body which is spherical in shape.

Answer

Red blood cell is spherical in shape.

39. Question

Which organism has the smallest cell?

Answer

Bacteria mycoplasma is the smallest cell measuring 0.1 micrometer.

40. Question

Name the biggest cell ?

Answer

The largest cell measuring 170 mm × 130 mm, is the egg of an ostrich.

41. Question

Name two animal organs and two plant organs.

Answer

There are different animal organs. Some of the names are Heart, Stomach, brain and lungs. Stem, Leaf, Roots etc are plant organs.

42. Question

Name two plant organ which is responsible for :

- (a) making of food.
- (b) absorption if water and minerals.

Answer

- (a) Leaves are responsible for synthesis of food.
- (b) Plant roots help in the absorption water and minerals.

43. Question

Which of the two does not have a true nucleus: prokaryotic cell or eukaryotic cell?

Answer

Prokaryotic cell does not have a true nucleus.

44. Question

Name one prokaryotic cell and one eukaryotic cell.

Answer

Prokaryotic cell – Blue green algae

Eukaryotic cell – Onion peel cell

45. Question

Fill in the blanks with suitable words :

- (a) Cells were first observed in cork by in 1665.
- (b) What is brick to a house is To an organism.
- (c) The cytoplasm and nucleus make up the
- (d) The shape and size of a cell is related to its
- (e) The bacteria cells are tomicrometer in length.
- (f) The smallest unit of life is a
- (g) Tissues make up

- (h) Organ systems make up an
- (i) Cells make up
- (j) Organs make up

Answer

- (a) Robert Hooke
- (b) Cell
- (c) protoplasm
- (d) function
- (e) 0.1; 0.5
- (f) cell
- (g) organs
- (h) organism
- (i) tissue
- (j) organ system

Short Answer Type Questions

46. Question

Why are plant and animal specimens usually stained with dyes before observing them through a microscope ? Name one stain (or dye) used for this purpose.

Answer

The various parts of the cell are colorless and hence, difficult to distinguish. So, various stains are used to colour the parts of the cell to study the detailed structure through a microscope.

The dyes (stains) which are used in the study of cell structure are methylene blue, dilute iodine solution, etc.

47. Question

What is a tissue? Give two examples of tissues.

Answer

A tissue is a group of similar cells performing a specific function.

Examples – Epithelial tissue, muscle tissue.

48. Question

What is an organ? Give two examples of organs.

Answer

An organ is a group of different tissues which work together to perform a specific function in the body of an organism.

Examples – Organs in the animal body - Brain and kidney

Organs in the plant body - Root and leaves.

49. Question

What is an organ system ?

(a) Give two examples of organ systems in animals.

(b) Name the two main organ systems in plants .

Answer

Organ system – A group of closely related organs that work together to perform a specific function for the organism is called organ system.

(a) Muscular system and digestive system are examples of organ systems in animals.

(b) Root system and shoot system are main organ systems in plants .

50. Question

Which of the following are plant organs and which are animal organs ?

Brain, Leaf, Lungs, Roots, Stem, Kidneys, Flower, Heart

Answer

Plant organs	Animal organs
Leaf	Brain
Roots	Lungs
Stem	Kidneys
Flower	Heart

51. Question

What are the functions of the following organs ?

- (a) Heart (b) Brain
(c) Roots (d) Leaves

Answer

- (a) Heart – It pumps blood throughout the body.
(b) Brain – It controls the activities of other parts of the body.
(c) Roots – These help in absorption of water and minerals.
(d) Leaves – These are responsible for synthesis of food.

52. Question

What is the shape of red blood cells in human blood? What function do red blood cells perform ?

Answer

Red blood cells (RBCs) are usually spherical in shape. The main function of red blood cells is to carry oxygen from the lungs to the tissues around the

body.

53 A. Question

State the difference between prokaryotes and eukaryotes.

Answer

Prokaryotes have nuclear material without nuclear membrane whereas eukaryotes have well organized nucleus with a nuclear membrane.

53 B. Question

Name two prokaryotes and two eukaryotes.

Answer

Prokaryotes – Blue green algae and bacteria

Eukaryotes - Onion cells and cheek cells

54 A. Question

Why are nerve cells long and have branches ?

Answer

Nerve cells (neurons) are long, branched and have thread-like projections so that they can connect other nerves cells and transmit messages over long distance

54 B. Question

What is the other name of a nerve cell ?

Answer

The other name of a nerve cell is neuron.

55 A. Question

Why could cells not be observed and studied for thousands of years ?

Answer

Most of cells are extremely small and cannot seen with naked eye, hence cells could not be observed and studied for thousands of years.

55 B. Question

State the cell theory of organisms.

Answer

Two biologists, Schleiden (1839) and Schwann (1839) presented the cell theory. This stated that all the plants and animals are composed of cells and the cell is the basic unit of life.

56. Question

Explain the function of mitochondria in a cell.

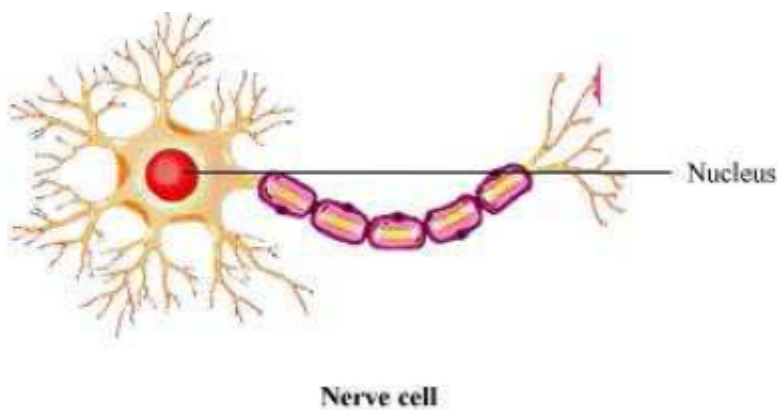
Answer

Mitochondria is the site of cellular respiration or oxidation of food in a cell. It uses glucose and oxygen to produce energy. Hence, it is known as "Powerhouse of the cell".

57. Question

Make a sketch of human nerve cell. What function do nerve cells perform ?

Answer



The function of nerve cell: The nerve cell receives and transfers messages, thereby helping to control and coordinate the working of different parts of the body.

58. Question

Make a sketch of the human muscle cell. What are the functions do muscles cell perform ?

Answer



Muscle cell

The muscle cells are responsible for movement in our body by contracting and relaxing.

59. Question

What are pseudopodia in *Ameoba*? What are the functions of pseudopodia?

Answer

The finger-like projection of varying lengths protruding out of the body of *Amoeba*, is called pseudopodia. These projections appear and disappear as Amoeba moves or feeds.

Thus, the function of pseudopodia is to facilitates movement and help in capturing food.

60. Question

Where are chromosomes found in a cell ? State their function.

Answer

Chromosomes are thread-like structures usually present in the nucleus that become visible only during cell divisions.

The function of chromosomes is to transfer the characters from parents to the offsprings through the genes located on them.

61. Question

What are genes ? Where are genes located ?

Answer

Gene is a unit of inheritance in living organisms. It controls the transfer of a hereditary characteristic from parents to offspring. Genes are located on chromosomes.

62. Question

What is a plastid ? What is the name of green plastids present in plant cells ?

Answer

Plastids are major organelles found only in plant cells. The green coloured plastids present in plant cells, are called chloroplast. It contains photosynthetic pigment called chlorophyll which helps in the synthesis of food.

63. Question

What is the size of an ostrich egg ? Is it a single cell or a group of cells ?

Answer

The size of an ostrich egg is 170mm x 130 mm. It is the largest cell. It is a single cell called “fertilized egg cell” or “zygote”.

64. Question

What is the function of cell wall in a plant cell ?

Answer

Cell wall provides shape and rigidity to the plant cell. It also provides protection the cell.

65. Question

Name two cells which are found in animals and two which are found in plants.

Answer

The cells which are found in animals are – Red blood cells (RBCs) and Muscle cells

The cells which are found in plants are – Xylem cells and phloem cells

Long Answer Type Questions**66 A. Question**

What is cytoplasm? What is its function?

Answer

Cytoplasm is a jelly-like substance present between the cell membrane and the nucleus. Cytoplasm contains many specialised cell organelles. Each of these organelles performs a specific function for the cell. Cytoplasm contains a number of minute living structure known as cell organelles. Each of these organelles performs a specific function for the cell.

Most of the chemical reactions which are necessary to keep cell alive take place in the cytoplasm.

66 B. Question

What is protoplasm ? Name the elements which make up major part of protoplasm.

Answer

Cell without its cell membrane is called Protoplasm. The Cytoplasm and Nucleus taken together make up the protoplasm.

67 A. Question

What are unicellular organisms ? Name two unicellular organisms.

Answer

The organisms made up of single cell are called unicellular organisms. Examples- Amoeba, Paramecium.

67 B. Question

What are multicellular organisms ? Name two multicellular organisms.

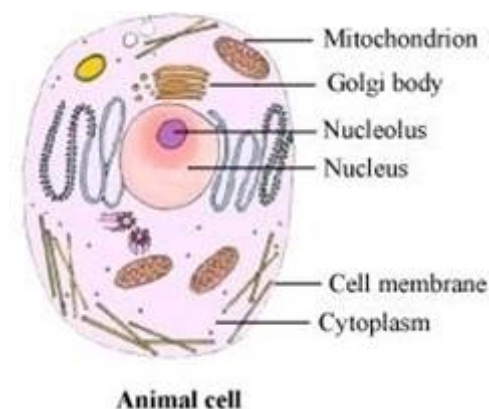
Answer

The organisms made up of many cells are called multicellular organisms. Examples- Animal and plant.

68 A. Question

Draw the general diagram of an animal cell and label it.

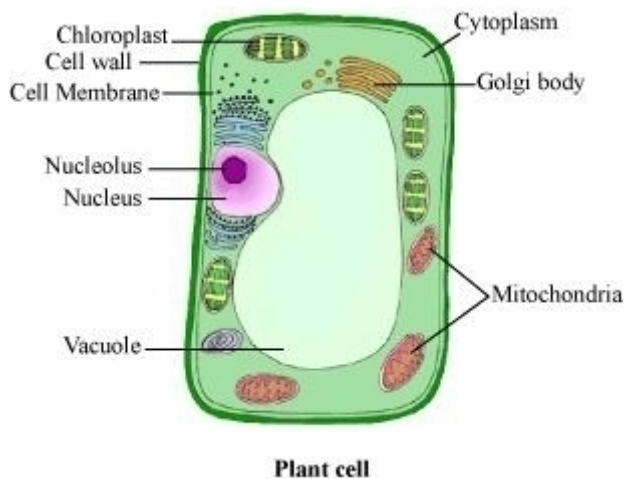
Answer



68 B. Question

Draw the general diagram of a plant cell and label it.

Answer



68 C. Question

Explain why, chloroplasts are found only in plant cells.

Answer

Chloroplasts are the green coloured plastids present in the cytoplasm of plant cells. They possess photosynthetic pigment called chlorophyll. Chlorophyll absorbs energy from the sunlight during the process of photosynthesis. In the process of photosynthesis, green plants make their own food in the presence of sunlight and chlorophyll with the help of inorganic substances like carbon dioxide and water. Thus, chloroplast help in the synthesis of food by green plants.

69 A. Question

An *Amoeba* cell can change its shape and a white blood cell in human blood can also changing its shapes. What is the difference between an *Amoeba* cell and a white blood cell?

Answer

An *Amoeba* cell can change its shape and a white blood cell in human blood can also changing its shapes. The difference between an *Amoeba* cell and a white blood cell is that the *Amoeba* cell is a full-fledged organism which is capable of independent existence. While white blood cell is only a cell of human blood which is not a full-fledged organism and hence cannot exist independently. White blood cells can exist only inside the blood.

69 B. Question

Out of *Amoeba* cell and white blood cell, which one is

- (i) eukaryotic cell, and
- (ii) prokaryotic cell ?

Answer

Amoeba cell and White Blood Cell both are eukaryotic cell because they have well defined nucleus with a nuclear membrane.

70 A. Question

State three difference between a plant cell and animal cell ?

Answer

Differences between a plant cell and animal cell:

Plant cell	Animal cell
A plant cell has a cell wall around its cell membrane. Blue-green algae cell	An animal cell does not have a cell wall around it.
Plastids are present.	Plastids are absent.
A single large vacuole is present.	Vacuoles either are absent or if present, they are smaller in size.

70 B. Question

Which of the following are prokaryotic cells and which are eukaryotic cells ?

Amoeba cell, Bacterium cell, Human cheek cell, Blue-green algae cell, onion peel cell.

Answer

Prokaryotic cells	Eukaryotic cells
Bacterium cell	<i>Amoeba</i> cell
Blue-green algae cell	Human cheek cell
	onion peel cell

Multiple Choice Questions (MCQs)

71. Question

The organelles which provide energy for all activities of a cell are :

- A. chloroplasts
- B. mitochondria
- C. golgi bodies
- D. ribosomes

Answer

Mitochondria is the site of cellular respiration or oxidation of food in a cell. It uses glucose and oxygen to produce energy. Hence, it is known as "Powerhouse of the cell".

72. Question

In a living cell, chromatin is present in :

- A. cytoplasm
- B. chloroplasts
- C. nucleus
- D. vacuole

Answer

Chromatin material is a tangled fibrous mass. The chromatin material condenses to form chromosomes during cell division.

73. Question

The cell wall in onion peel cell is made of :

- A. starch
- B. gelatin
- C. cellulose
- D. cell sap

Answer

The cell wall in onion peel cell is made of cellulose.

74. Question

The group of similar cell which work together to perform a particular functions is called :

- A. organ
- B. organelle
- C. organisms
- D. tissue

Answer

The group of similar cells which work together to perform a particular function is called tissue.

75. Question

A long and branched animal cell is :

- A. muscle cell
- B. epithelial cell
- C. nerve cell
- D. cartilage cell

Answer

Nerve cells (neurons) are long, branched and have thread-like projections so that they can connect other nerves cells and transmit messages over long distance

76. Question

Which of the following is not a unicellular organism ?

- A. Amoeba
- B. Yak
- C. Yeast
- D. Rhizobium

Answer

Amoeba, yeast and rhizobium are examples of unicellular organisms while Yak is an example of multicellular organisms.

77. Question

Which of the following organelle is not found in the root cells of a plant ?

- A. nucleus
- B. vacuole
- C. mitochondria
- D. chloroplasts

Answer

Chloroplasts are found only in those plant cells which carry out photosynthesis like the cells in green leaves. So, chloroplasts are not found in the root cells of a plant.

78. Question

The part of a cell which plays a role in inheritance is :

- A. nucleus
- B. cytoplasm
- C. plasma membrane
- D. mitochondria

Answer

The correct answer is option (b) Nucleus.*Explanation: Nucleus contains thread-like structures called chromosomes. These carry genes and help in inheritance or transfer of characters from the parents to the offspring.*

79. Question

The basic similarity among all the living organisms is that they are made up of :

- A. tissue
- B. organs
- C. cells
- D. organ systems

Answer

The basic similarity among all the living organisms is that they are made up of cells. Cell is the structural and functional unit of life.

80. Question

The structural and functional unit of life called cell was discovered by :

- A. Robert Boyle
- B. Charles Darwin
- C. Robert Koch
- D. Robert Hooke

Answer

The structural and functional unit of life called cell was discovered by Robert Hooke.

81. Question

Which of the following cell does not have a nucleus ?

- A. white blood cell
- B. red blood cell
- C. nerve cell
- D. muscle cell

Answer

Red blood cell does not have a nucleus.

82. Question

The parts which are not present in an animal cell are :

- A) Cell membrane
 - B) Chloroplast
 - C) Cell wall
 - D) Mitochondria
- A. A and B
- B. B and C
- C. A and D
- D. B and D

Answer

The correct option is B.

Explanation: The parts which are not present in an animal cell are cell wall and chloroplast. Plant cells have chloroplasts because they make their own food. Animal cells do not make their food, so there is no chloroplast. And, cell wall provides the stability and shape to the cell. Animal cells do not have cell walls because they don't need them.

83. Question

All the living matter in a cell is called :

- A. endoplasm
- B. protoplasm
- C. cytoplasm
- D. cell sap

Answer

The entire content of a living cell is known as protoplasm. It includes the cytoplasm and the nucleus. Protoplasm is called the living substance of the cell.

84. Question

Which of the following is a plant cell ?

- A. cartilage cell
- B. neuron
- C. epidermal cell
- D. epithelial cell

Answer

Epidermal cell is a plant cell while cartilage cell, neuron and epithelial cell are animal cells.

85. Question

The egg cell measuring about 17 cm X 13 cm is most likely that of :

- A. hummingbird
- B. hen
- C. elephant
- D. ostrich

Answer

The largest cell measuring 170 mm ×130 mm, is the egg of an ostrich.

86. Question

Which of the following have cell walls ?

- A) Epidermal cell
- B) Epithelial cell
- C) Mesophyll cell
- D) Liver cell

- A. A and B
- B. B and C
- C. A and C
- D. B and D

Answer

Cell wall is a characteristics of plant cell only and absent in animal cell. It is an outer, rigid, protective and supportive covering of plant cells. The cell wall

lies outside of the plasma membrane. Epidermal cell and mesophyll cell are examples of plant cells. Thus, they have cell wall.

87. Question

Which of the following are prokaryotes ?

- A. Protozoa
- B. Blue – green algae
- C. Fungi
- D. Bacteria

Answer

Organisms which do not have true nucleus are called prokaryotes. Bacteria and blue green algae are examples of prokaryotes.

88. Question

Which of the following human system includes oesophagus ?

- A. respiratory system
- B. circulatory system
- C. digestive system
- D. reproductive system

Answer

Oesophagus is a part of human digestive system. It is a muscular tube which connects the pharynx to the stomach. It is also known as food pipe.

89. Question

Which of the following cells can change their shape ?

- A) White blood cell
- B) Amoeba cell
- C) Red blood cell
- D) Euglena cell

- A. A and B
- B. B and C
- C. A and D

D. B and D

Answer

An amoeba cell and white blood cell present in human blood can change their shape.

90. Question

The non-living part of a tomato cell is its :

A. cell membrane

B. nucleus

C. chloroplasts

D. cell wall

Answer

The non-living part of a tomato cell is its cell wall. Cell wall is the outer most covering of a plant cell. It is a non-living and rigid.

Questions Based on High Order Thinking Skills (HOTS)

91. Question

The part of P and Q are present only in plant cells, and they are not present in animal cells. The part P contains a green pigment called R whereas part Q is made of a tough material S. The part P takes part in the food making process whereas part Q gives shape and support to the plant cell.

(a) What is (i) P, and (ii) Q?

(b) What is (i) R, and (ii) S?

Answer

(a) (i) The part P is Chloroplasts

Chloroplasts are the food producers in plant cells and they are not present in animal cells because animal cells do not make their own food.

(ii) The part Q is Cell wall

The cell wall is absent in the animal cells because they don't need cell walls. The main purpose of a cell wall is to provide stability and stiffness to the cell. And it is made up of cellulose.

(b) (i) The part R is Chlorophyll

Chlorophyll is the green pigment present in the leaves.

(ii) The part S is Cellulose

Cellulose is a fiber and wood, cotton, etc. all contain cellulose.

92. Question

A, B, C and D are the basic part of all the cells. The part A contains thread-like structures called E which transfer the characteristic from parents to their offsprings. The part B uses glucose and oxygen to produce energy whereas part C controls the movement of substance into the cell. The part D is a transparent, jelly-like material. What could A, B, C, D and E be ?

Answer

A is nucleus ; B is mitochondria; C is cell membrane ; D is cytoplasm; and E is chromosomes.

93. Question

X and Y are the two types of cells. The cells X have a well organized nucleus which is separated from the cytoplasm by the nuclear membrane On the other hand, cells Y do not have a real nucleus, their nuclear material is in direct contact with the cytoplasm.

(a) what type of cells are

(i) X, and (ii) Y ?

(b) Give one example each of cells like

(i) X, and (ii) Y ?

Answer

(a) (i) Eukaryotic cell (ii) Prokaryotic cell

(b) (i) Amoeba cell (ii) Bacterium cell

94. Question

The cytoplasm of the cells of a tomato plant contains organelles X having different pigments which impart different colours to the leaves of tomato plants and its fruits.

(a) What is the general name of the organelles X ?

(b) What is the (i) name (ii) colour, and (iii) function, of organelles X present in the leaves of Tomato plant?

(c) What is the colour of organells X which are present in the ripe fruits of tomato plant ?

Answer

(a) The general name of the organelles X is plastids.

(b) (i) Chloroplasts (ii) green (iii) Chloroplasts (X) help in the synthesis of food by the process of photosynthesis.

(c) The colour of organelles X which are present in the ripe fruits of tomato plant is red.

95. Question

Cells make up A; A makes up B; B makes up C, and finally C makes up an organism. What are A, B, and C ?

Answer

A is tissue; B is organ; and C is organ system.