Chapter 1

Cell : The Unit of Life

Solutions

SECTION - A

Objective Type Questions

(What is a Cell)

1. Robert Hooke discovered the_____ of a cell

(1) Cell membrane (2) Nucleus (3) Cell wall (4) Cytoplasm

Sol. Answer (3)

Nucleus → Robert Brown

Cell membrane → Schwann (1838)

Cytoplasm → Strasburger (1882)

(Cell Theory)

2. The statement *Omnis cellula e cellula*, which means all cells arise from pre-existing cells was given by

(1) Rudolf Virchow

(2) Schleiden

(3) Robert Brown

(4) Anton Von Leeuwenhoek

Sol. Answer (1)

Cell Lineage theory → Rudolf virchow.

(An overview of Cell)

3. The smallest cell of 0.3 μm in length is

(1) Ostrich egg (2) Cyanobacteria (3) Bacteria (4) *Mycoplasma*

Sol. Answer (4)

Bacteria = 3 to 5 μm

Ostrich → Largest isolated single cell.

(Prokaryotic Cells)

4. Which of the following cell organelles is non-membrane bound and found in both prokaryotes and eukaryotes?

(1) Lysosomes (2) Ribosomes (3) Centrioles (4) Mitochondria

Sol. Answer (2)

Ribosomes are cell organelles which are non membrane bound and found in both prokaryotes and eukaryotes. Rest all are membrane bound cell organelles.

5. Which of the following structure is present only in prokaryotic cell?

(1) Plasmid (2) Nucleus (3) Mitochondria (4) Ribosomes

Sol. Answer (1)

Plasmid is present only in prokaryotic cell. Yeast is the only eukaryote having plasmid.

6. The genomic DNA of a bacterium is

(1) Circular (2) Linear (3) Segmented (4) Rod shaped

Sol. Answer (1)

Circular *i.e.*, close ends

7. Which of the following component provides sticky character to the bacterial cell?

(1) Cell wall (2) Nuclear membrane (3) Plasma membrane (4) Glycocalyx

Sol. Answer (4)

Glycocalyx → Outermost coating of mucous.

→ Or polysaccharides

8. The subunits of ribosomes of a prokaryotic cell are

(1) 60S and 40S (2) 20S and 90S (3) 50S and 30S (4) 30S and 60S

Sol. Answer (3)

Prokaryotic ribosomes 70S → 50S + 30S

9. The genetic material of a prokaryotic cell is known as

(1) Nucleus (2) Centrosome (3) Nucleoid (4) Mesosome

Sol. Answer (3)

Nucleoid as it diffused and not enclosed within nuclear envelope.

10. Which of the following cell organelle is known as protein factory?

(1) Lysosome (2) Mitochondria (3) Nucleolus (4) Ribosome

Sol. Answer (4)

Ribosomes → Protein factory (Site for protein synthesis)

Lysosome → Suicidal bags as they contain hydrolytic enzymes

Nucleolus → Site for rRNA synthesis.

Mitochondria → Power house of cell. So, it is site for ATP synthesis.

11. Which type of vacuoles provide buoyancy to bacteria?

(1) Sap vacuoles (2) Contractile vacuoles (3) Gas vacuoles (4) Food vacuoles

Sol. Answer (3)

Gas vacuoles → Provide buoyancy to bacteria and help in floating.

Sap vacuoles → Found in plants

Contractile vacuoles → Osmoregulation

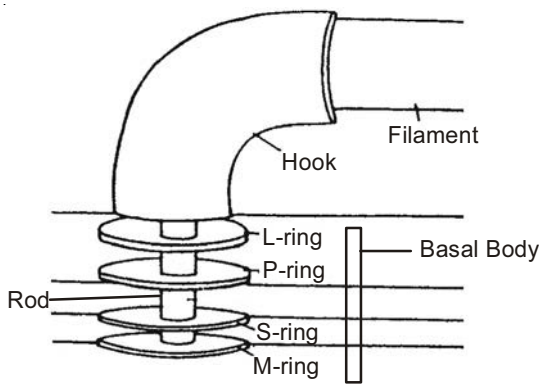
Food vacuoles → Digestion

12. Which of the following is not a structure of prokaryotic flagella?

(1) Filament (2) Centriole (3) Hook (4) Basal body

Sol. Answer (2)

Centriole is not present in a prokaryotic flagella.



A prokaryotic flagella
(sectional view)

13. The _____ are small bristle like fibres sprouting out of the bacterial cell.

(1) Pili (2) Mesosomes (3) Cilia (4) Fimbriae

Sol. Answer (4)

Pili – Elongated tubular structures (of protein pilin)

Cillia – Fine hair-like outgrowth of membrane

Mesosome – Invagination of plasma membrane into cell

14. Gas vacuoles are found in

(1) Blue green algae (2) Green and purple bacteria

(3) *Bacillus* (4) More than one option is correct

Sol. Answer (4)

Gas vacuoles or pseudovacuoles are present in BGA, green and purple bacteria.

(Eukaryotic Cells)

15. The animal cell is different from a plant cell in having

(1) Ribosomes (2) Nucleus (3) Golgi apparatus (4) Centrosomes

Sol. Answer (4)

Centrosome or centrioles are present in only animal cells.

16. The model given by Singer and Nicolson in_____ was_____ for plasma membrane.

(1) 1982, fluid mosaic model (2) 1992, bilayer model

(3) 1972, fluid mosaic model (4) 1952, bilayer model

Sol. Answer (3)

Fluid mosaic model proposed by Singer and Nicolson.

17. The main chemical component of fungal cell wall is

(1) Peptidoglycan (2) Chitin (3) Hemicellulose (4) Pectin

Sol. Answer (2)

Peptidoglycan $\rightarrow$ Found in cell wall of bacteria

Hemicellulose + Pectin $\rightarrow$ Plant cell wall

18. Which of the following statement is incorrect?
(1) Middle lamella is chiefly made up of calcium and magnesium pectate
(2) Secondary cell wall is found in harder woody parts of a plant
(3) Plasmodesmata are cytoplasmic bridges that connect the neighbouring plant cells
(4) Secondary wall is formed on the outer side of the cell

Sol. Answer (4)

Secondary wall formed on inner side of cell or primary wall of cell.

19. Which of the following cell organelles is not considered as a part of an endomembrane system?
(1) Mitochondria (2) ER (3) Golgi complex (4) Lysosomes

Sol. Answer (1)

Mitochondria is not a part of endomembrane system because endomembrane system includes → Endoplasmic reticulum, Golgi bodies, Lysosomes and Vacuoles.

20. A cell organelle 'X' is divided into two types on the basis of a cell organelle 'Y', that helps in the protein synthesis. Identify 'X' and 'Y' respectively
(1) Golgi complex and ribosome (2) ER and mitochondria
(3) ER and ribosome (4) Lysosome and ER

Sol. Answer (3)

ER is divided into two types on the basis of ribosomes (helps in protein synthesis)

ER having ribosomes – Rough ER

ER without ribosomes – Smooth ER

21. The surface of RER has
(1) Lysosomes (2) Ribosomes (3) Golgi complex (4) Plastids

Sol. Answer (2)

22. Which of the following cell organelle is responsible for the synthesis of steroids and lipids?
(1) SER (2) RER (3) Mitochondrion (4) Ribosome

Sol. Answer (1)

RER → Protein synthesis facilitation

Mitochondrion → ATP synthesis site

Ribosome → Protein synthesising machinary

23. Large number of RER are found in the cells actively involved in
(1) Lipid synthesis (2) Steroidogenesis (3) Protein synthesis (4) Starch synthesis

Sol. Answer (3)

RER – Protein synthesis

24. Which of the following statement is incorrect w.r.t. Golgi apparatus?
(1) It is non-membrane bound organelle
(2) It is composed of flattened sacs called cisternae
(3) Cisternae resemble with SER
(4) Golgi apparatus has two faces – *cis* and *trans*

Sol. Answer (1)

Golgi apparatus is unit membrane bound organelle.

25. Which of the following is common to both ER and Golgi complex?
(1) Both are double membrane bound (2) Both have cisternae
(3) Both contain their own DNA (4) Both are semi-autonomous organelles

Sol. Answer (2)

Both ER and Golgi complex have cisternae

26. A number of proteins synthesised by ribosomes present on the ER are transferred to
(1) Vacuoles (2) Lysosomes (3) Plastids (4) Golgi apparatus

Sol. Answer (4)

Proteins synthesised by ribosomes are transferred to Golgi appratus for modification and packaging

27. Which of the following statement is incorrect w.r.t. lysosomes?
(1) Lysosomes are simple tiny spherical sac-like structures
(2) They are distributed in the cytoplasm of the cell
(3) The enzymes of lysosomes work in basic condition
(4) The enzymes of lysosomes are synthesised by RER

Sol. Answer (3)

Enzymes of lysosome work in acidic pH.

28. Which of the following cell organelle is involved in the synthesis of the cell organelle that contains hydrolytic enzymes?
(1) Mitochondrion (2) Golgi apparatus (3) Plastids (4) Nucleus

Sol. Answer (2)

Golgi appratus is involved in the synthesis of lysosomes that contain hydrolytic enzymes.

29. Which of the following vacuoles help in osmoregulation in *Amoeba*?
(1) Gas vacuoles (2) Food vacuoles (3) Contractile vacuoles (4) Sap vacuoles

Sol. Answer (3)

Contractile vacuoles – help in osmoregulation in *Amoeba*.

30. The vacuoles which help in the digestion of food particles engulfed by protists are
(1) Contractile vacuoles (2) Gas vacuoles (3) Sap vacuoles (4) Food vacuoles

Sol. Answer (4)

Food vacuoles help in the digestion of food particles engulfed by protists.

31. Which of the following stain is used to observe mitochondria?
(1) Methylene blue (2) Safranin (3) Janus green (4) Gram stain

Sol. Answer (3)

Stain used to observe mitochondria is Janus green.

32. Which of the following cell organelle is known as powerhouse of the cell?
(1) Golgi apparatus (2) ER (3) Lysosome (4) Mitochondrion

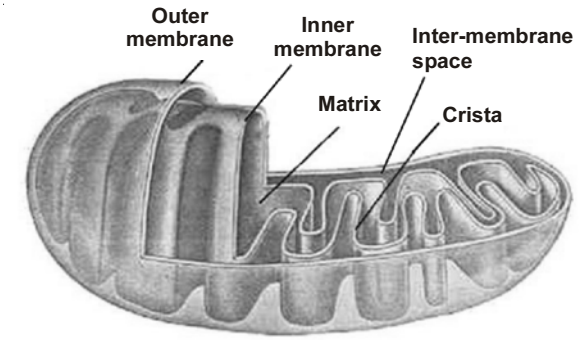
Sol. Answer (4)

Cell organelle known as power house of the cell is Mitochondrion.

33. The inner membrane of mitochondria forms a number of infoldings called

(1) Cisternae (2) Cristae (3) Microtubules (4) Mesosomes

Sol. Answer (2)



The inner membrane of mitochondrion forms a number of infoldings called cristae.

While Cisternae → Long, flattened, parallel sac-like interconnected structures.

Microtubules → Cytoskeleton

Mesosomes → Invagination of plasma membrane of bacterial cell.

34. The type of ribosomes found inside the mitochondria is

(1) 90S (2) 60S (3) 80S (4) 70S

Sol. Answer (4)

Mitochondrial ribosomes (70S) are smaller in size than cytosotic ribosomes.

35. The plastids which store proteins are

(1) Aleuroplasts (2) Elaioplasts (3) Amyloplasts (4) Chromoplasts

Sol. Answer (1)

Elaioplasts → Plastids which store oil and fats.

Amyloplasts → Plastids which store starch.

36. Which of the following plastid is coloured and contains carotenoids?

(1) Aleuroplast (2) Elaioplast (3) Amyloplast (4) Chromoplast

Sol. Answer (4)

Chromoplast - coloured plastids

37. Which type of plastid contains chlorophyll and responsible for photosynthesis?

(1) Chloroplast (2) Chromoplast (3) Aleuroplast (4) Elaioplast

Sol. Answer (1)

38. The orange colour of carrot root is due to the presence of

(1) Aleuroplast (2) Elaioplast (3) Chromoplast (4) Amyloplast

Sol. Answer (3)

Chromoplast contains carotenoids and are coloured.

39. Thylakoids are present in

(1) Mitochondria (2) Vacuoles (3) Chloroplast (4) Ribosomes

Sol. Answer (3)

Thylakoid are sac-like structures containing pigments for photosynthesis.

40. Which of the following statement is **incorrect** w.r.t. ribosomes?

(1) The type of ribosomes of prokaryotes is 70S
(2) Ribosomes were discovered by George Palade
(3) They are made up of RNA only
(4) Ribosomes are also known as protein factories

Sol. Answer (3)

They are made up of rRNA and ribosomal proteins.

41. Centrosome is an organelle containing two cylindrical structures called

(1) Cristae (2) Cisternae (3) Centrioles (4) Thylakoids

Sol. Answer (3)

Centrioles are arranged perpendicularly to each other.

42. The nucleus was discovered by _____ in _____.

(1) Robert Hooke, 1931
(2) Anton van Leeuwenhoek, 1906
(3) Robert Brown, 1831
(4) Schleiden, 1981

Sol. Answer (3)

Robert Brown discovered nucleus in 1831.

43. What is common in mitochondria, chloroplast and nucleus?

(1) They are double membrane bound organelles
(2) They are single membrane bound organelles
(3) They are included in endomembrane system
(4) They have 80S ribosomes.

Sol. Answer (1)

Double membrane bound cell organelles.

44. The structure present inside the nucleus responsible for ribosomal unit formation is

(1) Mesosomes (2) Nucleoplasm (3) Nucleolus (4) DNA

Sol. Answer (3)

Mesosomes → DNA replication, respiration, cell division etc.

Nucleoplasm → Matrix of nucleus

DNA → Genetic material

45. Chromatin found in nucleus was discovered by

(1) Flemming (2) Schleiden (3) Schwann (4) Robert Brown

Sol. Answer (1)

Schleiden and Schwann → Cell theory

Robert Brown → Nucleus

46. Chromatin is essentially composed of

(1) DNA only (2) DNA and histones (3) RNA only (4) RNA and ribosomes

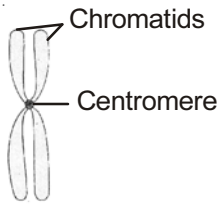
Sol. Answer (2)

Interphase nucleus has chromatin.

47. The chromatids of a chromosome are held together at a point called

(1) Centrosome (2) Centriole (3) Satellite (4) Centromere

Sol. Answer (4)



Centriole → Non-membranous cell organelle present in animal cells.

Satellite → Portion of chromosome beyond secondary constriction

48. An elaborate network of filamentous proteinaceous structure present in the cytoplasm which helps in the maintenance of cell shape is called

(1) Thylakoid (2) Endoplasmic reticulum (3) Plasmalemma (4) Cytoskeleton

Sol. Answer (4)

Thylakoid → sac-like structure present inside chloroplast.

ER → Responsible for helping protein synthesis

Plasmalemma → Plasma membrane

49. Select the **incorrect** statement w.r.t. mitochondria

(1) They divide by fission (2) The matrix possesses single circular DNA

(3) The cristae decrease the surface area (4) They produce cellular energy in the form of ATP

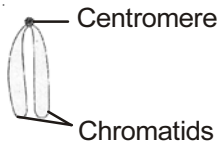
Sol. Answer (3)

Cristae increase surface area for enzymatic activities.

50. The chromosomes having centromere at terminal end are called

(1) Sub-metacentric (2) Metacentric (3) Telocentric (4) Acrocentric

Sol. Answer (3)

Telocentric → 

Sub-metacentric → Centromere shifted a little towards one end. 

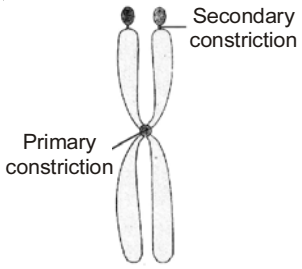
Metacentric → Centromere in the middle 

Acrocentric → Centromere near one end 

51. Satellite chromosomes have

(1) Primary constriction only
(2) Secondary constriction only
(3) Tertiary constriction only
(4) Both primary and secondary constriction

Sol. Answer (4)



52. Microbodies are

(1) Membrane bound minute vesicles
(2) Non-membrane bound organelles
(3) Present only in animals
(4) Present only in plants

Sol. Answer (1)

Microbodies are present in both animals and plants.

53. Match the column I with column II

	Column I		**Column II**
a.	Glyoxysome	(i)	Plant lysosomes
b.	Sphaerosome	(ii)	Glyoxylate cycle
c.	Mitochondria	(iii)	Photorespiration
d.	Peroxisome	(iv)	Succinate dehydrogenase

(1) a(ii), b(i), c(iv), d(iii) (2) a(ii), b(i), c(iii), d(iv) (3) a(iii), b(i), c(iv), d(ii) (4) a(i), b(ii), c(iv), d(iii)

Sol. Answer (1)

Mitochondria – site of aerobic respiration.

Glyoxysome, Sphaerosome and peroxisome – Microbodies.

54. Which of the following organelles show polymorphism?

(1) Golgi apparatus (2) Lysosome (3) Mitochondria (4) Chloroplast

Sol. Answer (2)

Lysosomes show polymorphism *i.e.*, change their shape.

55. Which structure is/are considered as semi-autonomous organelle?

(1) Ribosome
(2) Golgi body
(3) Mitochondria and chloroplast
(4) Mitochondria only

Sol. Answer (3)

Mitochondria and chloroplast are semi-autonomous organelle as they have circular DNA and 70S ribosome.

56. Animals cannot carry out gluconeogenesis as they do not possess
(1) Glycolysis enzyme (2) Glycolate enzyme (3) Glyoxylate enzyme (4) Lysosome

Sol. Answer (3)

Glyoxylate enzyme is required for glyoxylate cycle.

57. Diagrammatic representation of karyotype of a species is called
(1) Cladogram (2) Dendogram
(3) Idiogram (4) More than one option is correct

Sol. Answer (3)

Photograph or diagrammatic representation of karyotype of a species is called ***Idiogram***.

58. **Incorrect** statement in relation to nucleolus is
(1) It is a spherical structure
(2) It is separated from nucleoplasm by nuclear envelope
(3) It is the site of rRNA synthesis
(4) They are larger and more numerous in cells actively engaged in protein synthesis

Sol. Answer (2)

It is not membrane bound.

59. Microfilaments perform all the following functions**, except**
(1) Provide support to plasma membrane (2) Involved in cyclosis
(3) Help in cell plate method during cell division (4) Help in pseudopodia formation

Sol. Answer (3)

It is done by a small fragment of Golgi body or ER which is known as phragmoplasts.

60. Mark the **mis-matched** pair
(1) Peroxisomal – Catalase (2) Ribosomes – Palade particles
(3) Glyoxylate enzymes – Plants and animals (4) Massule - MTG

Sol. Answer (3)

SECTION - B

Objective Type Questions

(What is a Cell)

1. Cell is the fundamental, structural and functional unit of all living organisms because
(1) Unicellular organisms are incapable of independent existance
(2) The cell is the basic unit of life
(3) Anything less than a complete structure of a cell does ensure independent living
(4) Essential life functions can be performed in only multicellular organisms

Sol. Answer (2)

The cell is the basic unit of life because anything less than a complete structure of cell does not ensure independent living.

(Prokaryotic Cells)

2. Gas vacuole, Single envelope system, Cytoskeleton, Non cellulosic wall, Microfilaments, Cytoplasmic streaming, Lack any cell organelles

How many of the above features are associated with prokaryotic cell?

(1) One (2) Four (3) Two (4) Three

Sol. Answer (4)

Prokaryotic cell has gas vacuole, single envelope system and non-cellulosic cell wall.

3. The function of polysome in bacterial cell is to

(1) Translate the mRNA into protein (2) Store reserve food materials

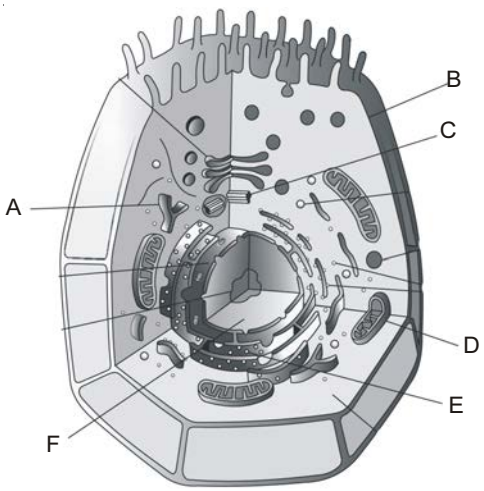
(3) Synthesize pigments (4) Help in buoyancy

Sol. Answer (1)

Four to six ribosomes attached to single mRNA is called polysome.

(Eukaryotic Cells)

4. Identify the **correct** statements w.r.t. the given cell



A. Concerned with lipid and steroidal hormone synthesis

B. Outer non-living rigid structure which gives shape to the cell and protects from mechanical damage and infection.

C. Both lie perpendicular to each other and each has an organisation like the cart wheel.

D. Responsible for trapping light energy for the synthesis of sugar.

E. Present in cells actively involved in protein synthesis and secretion.

F. Spherical structures, rich in hydrolytic enzymes.

(1) A, D & E (2) B, C & D (3) A, C & E (4) A, B, C & F

Sol. Answer (3)

A – Smooth endoplasmic reticulum

B – Plasma membrane

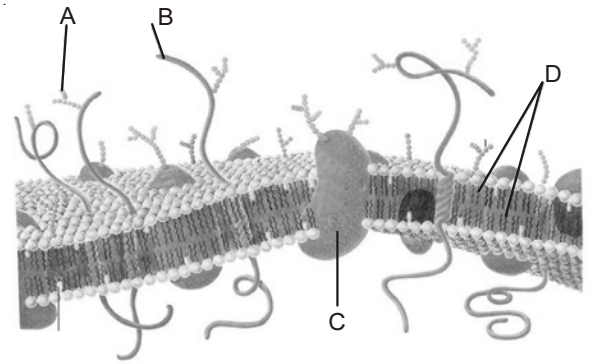
C – Centriole

D – Mitochondria

E – Rough endoplasmic reticulum

F – Nucleus

5. Identify the structures marked as A, B, C and D w.r.t fluid mosaic model of plasma membrane



	A	B	C	D
(1)	Protein	Sugar	Integral protein	Lipid monolayer
(2)	Sugar	Protein	Peripheral protein	Lipid bilayer
(3)	Protein	Sugar	Peripheral protein	Lipid bilayer
(4)	Sugar	Protein	Integral protein	Lipid bilayer

Sol. Answer (4)

Plasma membrane : Most accepted model of plasma membrane is fluid mosaic model.

6. Plasma membrane is

(1) Semipermeable and symmetric
(2) Selectively permeable, elastic and asymmetric
(3) Permeable and asymmetric
(4) Selective permeable with monolayer phospholipids

Sol. Answer (2)

Plasma membrane selects whether to allow and what to allow asymmetric as its composition differs in different cell.

7. Select the **correct** combination of the statements regarding the characteristics of middle lamella

a. It holds the different neighbouring cells together.

b. It is composed of Mg pectate only.

c. It gets dissolved during ripening of fruits.

Correct statements is/are

(1) a & c (2) b & c (3) Only a (4) a, b & c

Sol. Answer (1)

Middle lamella is composed of Mg pectate and Ca pectate.

8. Which of the following is associated with detoxification of drugs and muscle contraction by the release and uptake of Ca^{2+} ions?

(1) Golgi complex (2) RER (3) SER (4) Free ribosomes

Sol. Answer (3)

Golgi complex – Modification and packaging of fats and proteins.

RER – Facililates protein synthesis.

Ribosomes – Machinary for protein synthesis.

9. Study the organelle given below and identify its function

(1) It is a site for formation of glycoproteins and glycolipids

(2) Site for synthesis of steroidal hormone

(3) These have enzymes that are capable of digesting carbohydrates, proteins, lipids and nucleic acids

(4) It divides intracellular space into two distinct compartments, *i.e.,* luminal and extra luminal cytoplasm

Sol. Answer (1)

The organelle in picture is Golgi complex.

10. Which of the following statement is **incorrect** about golgi apparatus?

(1) It helps in recycling of the plasma membrane, pinched off by pinocytosis and phagocytosis

(2) Secretion is the main function of the golgi complex

(3) It helps in glycosidation and glycosylation of lipids and proteins

(4) Golgi body helps in animal cytokinesis

Sol. Answer (4)

Golgi apparatus helps in plant cytokinesis by initiating cell plate formation and it is known as phragmoplast.

11. Certain golgian vesicles, which are budded out from the trans-face contains acid hydrolases. Such vesicles are better termed as

(1) Heterophagosomes (2) Microsomes (3) Phragmosomes (4) Primary lysosomes

Sol. Answer (4)

As they contain hydrolytic enzymes but they are inactive.

12. In plants, the tonoplast facilitates the transport of a number of ions and other materials

(1) Against concentration gradient into vacuole

(2) Along concentration gradient into vacuole

(3) Along concentration gradient into gas vacuoles

(4) Against concentration gradient in contractile vacuole

Sol. Answer (1)

Plant cells do not contain gas and contractile vacuole and movement of molecules across tonoplast is always against concentration gradient and require energy.

13. Mitochondria and chloroplasts are semi-autonomous as they possess

(1) DNA (2) DNA + RNA

(3) DNA + RNA + ribosomes (4) Proteins

Sol. Answer (3)

Mitochondria and chloroplasts are semi autonomous body as they possess DNA + RNA + ribosomes.

But still they require nuclear genome for their functioning.

14. The endosymbiont hypothesis suggests that there are similarities between prokaryotes, mitochondria and chloroplasts like

(1) Presence of circular DNA associated with histones and 70 S ribosomes

(2) Presence of circular DNA not associated with histones and 70 S ribosomes

(3) 50 S ribosomes and DNA

(4) 30 S ribosomes and DNA

Sol. Answer (2)

Mitochondria and chloroplast are double membranous like some prokaryotes.

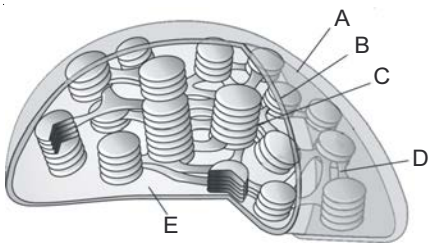
15. How many organelles of a eukaryotic cell are considered to have an independent existence during early events of evolution?

(1) 1 (2) 2 (3) 3 (4) 4

Sol. Answer (2)

Mitochondria and Chloroplast

16. Consider the following five statements (A to E) w.r.t. chloroplast shown below. Select the **correct** option stating which ones are **True** (T) and which ones are **False** (F).



A. It is impermeable and lacks porins.

B. It is selectively permeable, having carrier proteins for transport.

C. Stacked thylakoids one over other which is the site of production of assimilatory power.

D. Present between two grana and contains enzymes of dark reaction.

E. It contains enzymes for the synthesis of sugar and proteins.

	A	B	C	D	E
(1)	F	T	T	T	T
(2)	F	T	T	F	T
(3)	T	F	T	T	T
(4)	T	F	F	T	T

Sol. Answer (2)

A – False (It is selectively permeable)

B – True

C – True

D – False (Present between two grana, connects them and contain PSI and ATP synthase)

E – True

17. Find the correct set of structures/organelles not surrounded by membrane.

(1) Ribosome, centrosome, lysosome
(2) Peroxisome, nucleolus, ribosome
(3) Ribosome, nucleolus, centriole
(4) Nucleolus, spherosome, ribosome

Sol. Answer (3)

These are non-membranous cell structure.

18. The larger sub-unit of a ribosome is found to contain 28S, 5.8S and 5S types of RNA. This ribosome is found in

(1) Bacterium (2) Mitochondrion (3) Animal cell (4) Chloroplast

Sol. Answer (3)

Because they are rRNA of 80S $\rightarrow$ 60S (Larger subunit)

19. Organelle lacking DNA, but capable of duplication is

(1) Ribosome (2) Centriole (3) Chloroplast (4) Nucleus

Sol. Answer (2)

Centriole duplicates itself in cytoplasm during S phase.

20. Each centriole has a cart wheel organisation having a whorl of tubulin fibrils at periphery. These peripheral fibrils are composed of how many microtubules?

(1) 11 (2) 18 (3) 9 (4) 27

Sol. Answer (4)

There are nine evenly spaced fibrils of tubulin and each fibril is made up three sub fibres.

$\therefore$ 9 × 3 = 27

21. Find out all the proteins that make eukaryotic flagellum.

(1) Nexin, tubulin and flagellin
(2) Tubulin, nexin, dynein and flagellin
(3) Actin, myosin, dynein, nexin and tubulin
(4) Dynein, tubulin and nexin

Sol. Answer (4)

Flagellin } Prokaryotic flagella.

Dynein, Tubulin and Nexin } Eukaryotic flagella.

22. Consider the following statements and choose the **incorrect** option

a. Large and more numerous nucleoli are present in cells actively carrying out protein synthesis.
b. Nuclear pores allow bidirectional movement of molecules.
c. Cytoskeleton is a glycolipid structure for mechanical support, motility and maintenance of the shape of the cell.
d. Steroidal hormones are synthesized by Golgi complex.

(1) a and b (2) b and c (3) c and d (4) a and d

Sol. Answer (3)

Correction : c $\rightarrow$ Cytoskeleton is a proteinaceous structure for maintenance motility and shape.

d $\rightarrow$ Steroidal hormones are synthesised by Smooth Endoplasmic Reticulum (SER).

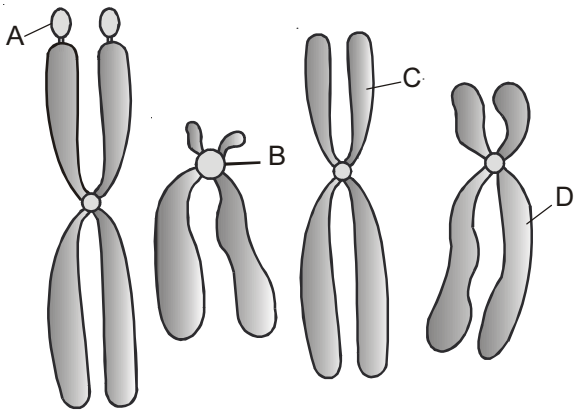
23. Eukaryotic cells have a well organised nucleus and
    a. Both 70S and 80S types of ribosomes
    b. Flagella associated with 9 + 2 organisation
    c. Shows cytoplasmic streaming
    d. Their DNA is complexed with histones to constitute the chromatin
    (1) All are correct
    (2) Only a is incorrect
    (3) Only c and d are correct
    (4) Both b and c are incorrect

Sol. Answer (1)
All statements are correct for eukaryotic cells. 70S ribosomes are present in organelles.

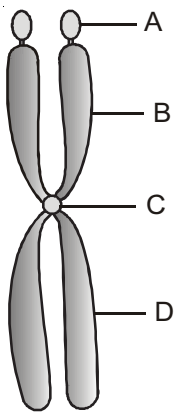
24. 9+2 organisation is present in
    (1) Flagella of bacteria
    (2) Flagella and cilia of eukaryotic cell
    (3) Basal body
    (4) Centriole and basal body

Sol. Answer (2)
Flagella and cilia $\rightarrow$ 9 + 2 organisation.
Centriole $\rightarrow$ 9 + 0 organisation

25. Find out the **correct** option on the basis of following diagrams
    (1) A – Satellite, B – Secondary constriction
        C – Short arm, D – Long arm
    (2) A – Satellite, B - Centromere
        C – Short arm, D – Long arm
    (3) A – Secondary constriction, B – Satellite,
        C – Long arm, D – Short arm
    (4) A – NOR, B – Secondary constriction
        C – Short arm, D – Long arm



Sol. Answer (2)



26. Nucleolus is formed by

(1) Primary constriction
(2) Nucleolar organiser
(3) Endoplasmic reticulum
(4) Ribosomes

Sol. Answer (2)

NOR of chromosome give rise to Nucleolus.

27. All the following statements are correct, **except**

(1) Peroxisomes are quite common in the photosynthetic cells. Their number can be 70 – 100 per mesophyll cell, wherein they interact with mitochondria and chloroplasts to take part in photorespiration
(2) Glyoxysomes are numerous in the endosperm of wheat
(3) The ER- bound ribosomes synthesise secretory membrane and lysosomal protein
(4) Ribosomes when associated with ER are attached with their 60S sub-unit

Sol. Answer (2)

Glyoxysomes are numerous in the endosperm of castor, peanuts etc.

28. Triglyceride metabolism to convert fats into carbohydrates is helped by glyoxylate cycle. The organelle responsible for this is found in

(1) Rice seeds
(2) Castor seeds
(3) Wheat seeds
(4) More than one option is correct

Sol. Answer (2)

Glyoxylate cycle is present in glyoxisomes.

29. Catalase and urate oxidase enzymes are associated with the organelle which is also involved in

(1) Gluconeogenesis
(2) Photorespiration
(3) Glycolate oxidation
(4) More than one option is correct

Sol. Answer (4)

Catalase and urate oxidase enzymes are associated with the organelle which is also involved in photorespiration and glycolate oxidation.

30. In fluid mosaic model of plasma membrane

(1) Upper layer is non-polar and hydrophilic
(2) Upper layer is polar and hydrophobic
(3) Phospholipids form a bimolecular layer in middle part
(4) Proteins form a middle layer

Sol. Answer (3)

Plasma membrane consist of lipid bilayer.

SECTION - C

Previous Year Questions

1. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP? **[NEET - 2017]**

(1) Lysosome (2) Ribosome (3) Chloroplast (4) Mitochondrion

Sol. Answer (4)

Mitochondria are the site of aerobic oxidation of carbohydrates to generate ATP.

2. Which of the following components provides sticky character to the bacterial cell? **[NEET - 2017]**

(1) Cell wall (2) Nuclear membrane (3) Plasma membrane (4) Glycocalyx

Sol. Answer (4)

Sticky character of the bacterial wall is due to glycocalyx or slime layer. This layer is rich in glycoproteins.

3. Select the **mismatch** **[NEET (Phase-2) 2016]**

(1) Gas vacuoles – Green bacteria

(2) Large central vacuoles – Animal cells

(3) Protists – Eukaryotes

(4) Methanogens – Prokaryotes

Sol. Answer (2)

Large central vacuole is present in plant cells.

4. A cell organelle containing hydrolytic enzymes is **[NEET (Phase-2) 2016]**

(1) Lysosome (2) Microsome (3) Ribosome (4) Mesosome

Sol. Answer (1)

The isolated lysosomal vesicles have been found to be very rich in almost all types of hydrolytic enzymes.

5. Water soluble pigments found in plant cell vacuoles are **[NEET - 2016]**

(1) Anthocyanins (2) Xanthophylls

(3) Chlorophylls (4) Carotenoids

Sol. Answer (1)

Anthocyanin are water soluble vacuolar pigments that may appear red, purple or blue depending on pH.

6. Mitochondria and chloroplast are **[NEET - 2016]**

(a) semi-autonomous organelles

(b) formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery

Which one of the following options is **correct**?

(1) Both (a) and (b) are false (2) Both (a) and (b) are correct

(3) (b) is true but (a) is false (4) (a) is true but (b) is false

Sol. Answer (4)

Mitochondria and chloroplast are semi-autonomous organelles which contains DNA, RNA, ribosomes (705) etc.

7. Microtubules are the constituents of **[NEET - 2016]**

(1) Centrosome, Nucleosome and Centrioles (2) Cilia, Flagella and Peroxisomes

(3) Spindle fibres, Centrioles and Cilia (4) Centrioles, Spindle fibres and Chromatin

Sol. Answer (3)

Microtubules are structures present in cilia, flagella, centrioles and spindle fibres.

8. Which one of the following cell organelles is enclosed by a single membrane? **[NEET - 2016]**

(1) Nuclei (2) Mitochondria (3) Chloroplasts (4) Lysosomes

Sol. Answer (4)

Nuclei, mitochondria and chloroplasts are double membrane bound organelles. Lysosomes are single membrane bound organelle.

9. Which of the following structures is not found in a prokaryotic cell? **[Re-AIPMT-2015]**

(1) Plasma membrane (2) Nuclear envelope (3) Ribosome (4) Mesosome

Sol. Answer (2)

True nucleus is absent in prokaryotic cell.

10. Which of the following are not membrane-bound? **[Re-AIPMT-2015]**

(1) Mesosomes (2) Vacuoles (3) Ribosomes (4) Lysosomes

Sol. Answer (3)

Ribosomes are made up of r-RNA and proteins.

11. Cellular organelles with membranes are **[Re-AIPMT-2015]**

(1) Lysosomes, Golgi apparatus and mitochondria

(2) Nuclei, ribosomes and mitochondria

(3) Chromosomes, ribosomes and endoplasmic reticulum

(4) Endoplasmic reticulum, ribosomes and nuclei

Sol. Answer (1)

Lysosomes, Golgi apparatus and mitochondria are membrane bound organelles.

12. Cell wall is absent in **[Re-AIPMT-2015]**

(1) *Nostoc* (2) *Aspergillus* (3) *Funaria* (4) Mycoplasma

Sol. Answer (4)

Mycoplasma is wall-less smallest living organism.

13. A protoplast is a cell **[Re-AIPMT-2015]**

(1) Without cell wall (2) Without plasma membrane

(3) Without nucleus (4) Undergoing division

Sol. Answer (1)

Plant cell — Cell wall = Protoplast

14. Chromatophores take part in : **[Re-AIPMT-2015]**

(1) Respiration (2) Photosynthesis (3) Growth (4) Movement

Sol. Answer (2)

Chromatophores are photosynthetic apparatus in prokaryotes.

15. The structures that help some bacteria to attach to rocks and /or host tissues are : **[Re-AIPMT-2015]**

(1) Holdfast (2) Rhizoids (3) Fimbriae (4) Mesosomes

Sol. Answer (3)

Fimbriae - Hollow tubular surface appendages, present in bacterial cell, which help in attachment to rocks and/or host tissues.

16. Match the columns and identify the correct option **[Re-AIPMT-2015]**

Column I	Column II
(a) Thylakoids	(i) Disc-shaped sacs in Golgi apparatus
(b) Cristae	(ii) Condensed structure of DNA
(c) Cisternae	(iii) Flatmembranous sacs in stroma
(d) Chromatin	(iv) Infoldings in mitochondria

(1) a(iii), b(iv), c(ii), d(i) (2) a(iv), b(iii), c(i), d(ii) (3) a(iii), b(iv), c(i), d(ii) (4) a(iii), b(i), c(iv), d(ii)

Sol. Answer (3)

Thylakoids – Flat membranous sacs in stroma of chloroplast.

Cristae – Infoldings in mitochondria

Cisternae – Disc-shaped sacs in golgi-apparatus

Chromatin – Condensed structure of DNA.

17. Balbiani rings are sites of **[Re-AIPMT-2015]**

(1) RNA and protein synthesis (2) Lipid synthesis

(3) Nucleotide synthesis (4) Polysaccharide synthesis

Sol. Answer (1)

Balbiani rings are the large chromosome puff of polytene chromosomes. These are the sites of RNA and protein synthesis.

18. In photosynthesis, the light-independent reactions take place at **[Re-AIPMT-2015]**

(1) Stromal matrix (2) Thylakoid lumen (3) Photosystem I (4) Photosystem II

Sol. Answer (1)

Light-independent reactions or Dark reactions occur in stroma/ stromal matrix. During these reactions carbon dioxide is reduced to carbohydrates.

19. Nuclear envelope is a derivative of **[AIPMT-2015]**

(1) Rough endoplasmic reticulum (2) Smooth endoplasmic reticulum

(3) Membrane of Golgi complex (4) Microtubules

Sol. Answer (1)

20. True nucleus is absent in **[AIPMT-2015]**

(1) *Volvox* (2) *Anabaena* (3) *Mucor* (4) *Vaucheria*

Sol. Answer (2)

21. The structures that are formed by stacking of organized flattened membranous sacs in the chloroplasts are **[AIPMT-2015]**

(1) Stroma (2) Cristae (3) Grana (4) Stroma lamellae

Sol. Answer (3)

22. DNA is not present in **[AIPMT-2015]**

(1) Mitochondria (2) Chloroplast (3) Ribosomes (4) Nucleus

Sol. Answer (3)

23. Select the **correct** matching in the following pairs **[AIPMT-2015]**

(1) Rough ER – Oxidation of fatty acids

(2) Smooth ER – Oxidation of phospholipids

(3) Smooth ER – Synthesis of lipids

(4) Rough ER – Synthesis of glycogen

Sol. Answer (3)

24. Which one of the following is not an inclusion body found in prokaryotes? **[AIPMT-2015]**

(1) Polysome (2) Phosphate granule

(3) Cyanophycean granule (4) Glycogen granule

Sol. Answer (1)

25. The chromosomes in which centromere is situated close to one end are **[AIPMT-2015]**

(1) Sub-metacentric (2) Metacentric

(3) Acrocentric (4) Telocentric

Sol. Answer (3)

26. A somatic cell that has just completed the S phase of its cell cycle, as compared to gamete of the same species, has **[AIPMT-2015]**

(1) Four times the number of chromosomes and twice the amount of DNA

(2) Twice the number of chromosomes and twice the amount of DNA

(3) Same number of chromosomes but twice the amount of DNA

(4) Twice the number of chromosomes and four times the amount of DNA

Sol. Answer (4)

27. Which structures perform the function of mitochondria in bacteria? **[AIPMT-2014]**

(1) Nucleoid (2) Ribosomes (3) Cell wall (4) Mesosomes

Sol. Answer (4)

Mesosomes (Chondroid) contains respiratory enzyme.

28. The solid linear cytoskeletal elements having a diameter of 6nm and made up of a single type of monomer are known as **[AIPMT-2014]**

(1) Microtubules (2) Microfilaments

(3) Intermediate filaments (4) Lamins

Sol. Answer (2)

Microfilaments - Solid filaments made up of actin proteins.

29. The osmotic expansion of a cell kept in water is chiefly regulated by **[AIPMT-2014]**

(1) Mitochondria (2) Vacuoles (3) Plastids (4) Ribosomes

Sol. Answer (2)

Vacuoles - Large membrane bound space which cheifly contains water.

30. Match the following and select the **correct** answer **[AIPMT-2014]**

	Column I		**Column II**
a.	Centriole	(i)	Infoldings in mitochondria
b.	Chlorophyll	(ii)	Thylakoids
c.	Cristae	(iii)	Nucleic acids
d.	Ribozymes	(iv)	Basal body, cilia or flagella

(1) a(iv), b(ii), c(i), d(iii) (2) a(i), b(ii), c(iv), d(iii) (3) a(i), b(iii), c(ii), d(iv) (4) a(iv), b(iii), c(i), d(ii)

Sol. Answer (1)

RNA enzymes are known as *Ribozymes*.

31. Which one of the following organelle in the figure **correctly** matches with its function? **[NEET-2013]**

(1) Golgi apparatus, protein synthesis

(2) Golgi apparatus, formation of glycolipids

(3) Rough endoplasmic reticulum, protein synthesis

(4) Rough endoplasmic reticulum, formation of glycoproteins

Sol. Answer (3)

32. The Golgi complex plays a major role **[NEET-2013]**

(1) In digesting proteins and carbohydrates

(2) As energy transferring organelles

(3) In post translational modification of proteins and glycosidation of lipids

(4) In trapping the light and transforming it into chemical energy

Sol. Answer (3)

Lysosomes – In digesting proteins and carbohydrates.

Chloroplasts – In trapping the light and transforming it into chemical energy.

33. A major site for synthesis of lipids is **[NEET-2013]**

(1) SER (2) Symplast (3) Nucleoplasm (4) RER

Sol. Answer (1)

34. Nuclear membrane is absent in **[AIPMT (Prelims)-2012]**

(1) *Volvox* (2) *Nostoc* (3) *Penicillium* (4) *Agaricus*

Sol. Answer (2)

35. Which one of the following does **not** differ in *E.coli* and *Chlamydomonas*? **[AIPMT (Prelims)-2012]**

(1) Cell wall (2) Cell membrane

(3) Ribosomes (4) Chromosomal organization

Sol. Answer (2)

		***E.coli* (Prokaryotic)**	***Chlamydomonas* (Eukaryotic)**
Cell wall	→	Peptidoglycan	Cellulosic
Ribosomes	→	70S	80S
Chromosomal organization	→	DNA without histones	DNA with histones

36. Select the **correct** statement from the following regarding cell membrane **[AIPMT (Prelims)-2012]**

(1) Lipids are arranged in a bilayer with polar heads towards the inner part

(2) Fluid mosaic model of cell membrane was porposed by Singer and Nicolson

(3) Na^+ and K^+ ions move across cell membrane by passive transport

(4) Proteins make up 60 to 70% of the cell membrane

Sol. Answer (2)

Lipids are arranged in a bilayer with polar heads towards the outer part.

Na^+ and K^+ ions move across cell membrane by active transport.

Proteins make up $\simeq$ 50% of the cell membrane.

37. What is **true** about ribosomes ? **[AIPMT (Prelims)-2012]**

(1) These are found only in eukaryotic cells

(2) These are self-splicing introns of some RNAs

(3) The prokaryotic ribosomes are 80S, where "S" stands for sedimentation coefficient

(4) These are composed of ribonucleic acid and proteins

Sol. Answer (4)

These are found in both eukaryotes and prokaryotes.

Prokaryotic ribosomes are 70S where “S” stands for sedimentation co-efficient.

38. Ribosomal RNA is actively synthesized in : **[AIPMT (Prelims)-2012]**

(1) Nucleoplasm (2) Ribosomes (3) Lysosomes (4) Nucleolus

Sol. Answer (4)

Site of synthesis of ribosomes is nucleolus.

39. Which one of the following structures is an organelle within an organelle? **[AIPMT (Mains)-2012]**

(1) Ribosome (2) Peroxisome (3) ER (4) Mesosome

Sol. Answer (1)

Ribosome is present on ER and that ER is known as RER.

40. Which one of the following cellular parts is **correctly** described? **[AIPMT (Mains)-2012]**

(1) Thylakoids-flattened membranous sacs forming the grana of chloroplasts

(2) Centrioles - sites for active RNA synthesis

(3) Ribosomes-those on chloroplasts are larger (80S) while those in the cytoplasm are smaller (70S)

(4) Lysosomes-optimally active at a pH of about 8.5

Sol. Answer (1)

Thylakoids - flattened membranous sacs forming the grana of chloroplasts

Centrioles – Spindle appratus formation

Ribosomes – Those on chloroplasts are smallest (70S) while those in the cytoplasm are larger (80S)

Lysosomes – Optimally active of a pH of about less 7 *i.e.*, *acidic*

41. Important site for formation of glycoproteins and glycolipids is **[AIPMT (Prelims)-2011]**

(1) Lysosome (2) Vacuole (3) Golgi apparatus (4) Plastid

Sol. Answer (3)

Golgi apparatus is concerned with glycosylation (glycoprotein) and glycosidation (glycolipid)

42. Peptide synthesis inside a cell takes place in **[AIPMT (Prelims)-2011]**

(1) Ribosomes (2) Chloroplast (3) Mitochondria (4) Chromoplast

Sol. Answer (1)

43. In eubacteria, a cellular component that resembles eukaryotic cell is **[AIPMT (Prelims)-2011]**

(1) Cell wall (2) Plasma membrane (3) Nucleus (4) Ribosomes

Sol. Answer (2)

Plasma membrane is made up of lipid bilayer and also has proteins.

44. In mitochondria, protons accumulate in the **[AIPMT (Mains)-2011]**

(1) Intermembrane space (2) Matrix (3) Outer membrane (4) Inner membrane

Sol. Answer (1)

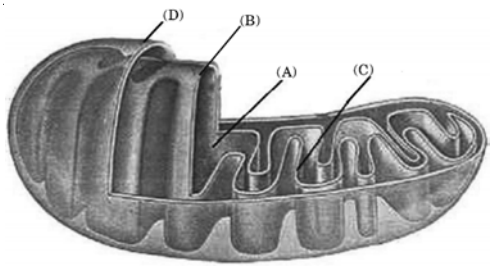
45. Which one of the following is **not** considered as a part of the endomembrane system? **[AIPMT (Mains)-2011]**

(1) Vacuole (2) Lysosome (3) Golgi complex (4) Peroxisome

Sol. Answer (4)

Endomembrane system includes Endoplasmic Reticulum, Golgi complex, Lysosomes and Vacuoles.

46. The figure below shows the structure of a mitochondrion with its four parts labelled (A), (B), (C) and (D). Select the part correctly matched with its function



[AIPMT (Mains)-2011]

(1) Part (C) : Cristae – possess single circular DNA molecule and ribosomes

(2) Part (A) : Matrix – major site for respiratory chain enzymes

(3) Part (D) : Outer membrane – gives rise toinner membrane by splitting

(4) Part (B) : Inner membrane – forms infoldings called cristae

Sol. Answer (4)

A – Matrix-site of krebs cycle.

B – Inner membrane-contains respiratory enzymes.

C – Cristae-contains ATPase

D – Outer membrane continuous layer.

47. The main arena of various types of activities of a cell is **[AIPMT (Prelims)-2010]**

(1) Nucleus (2) Plasma membrane (3) Mitochondria (4) Cytoplasm

Sol. Answer (4)

Matrix of cell where all cellular activities occur

Nucleus : Site DNA duplication and packaging transcription, rRNA formation.

Plasma membrane : Limiting membrane of cell, maintains the shape of cell, checks the transport in and out of cell.

Mitochondria : Power house of cell, site of formation of energy, currency of cell *i.e.*, ATP.

48. The plasma membrane consists mainly of **[AIPMT (Prelims)-2010]**

(1) Proteins embedded in a carbohydrate bilayer

(2) Phospholipids embedded in a protein bilayer

(3) Proteins embedded in a phospholipid bilayer

(4) Proteins embedded in a polymer of glucose molecules

Sol. Answer (3)

49. Which one of the following has its own DNA? **[AIPMT (Prelims)-2010]**

(1) Peroxisome (2) Mitochondria (3) Dictyosome (4) Lysosome

Sol. Answer (2)

Mitochondria – semi-autonomous organelle.

50. Which one of the following statements about the particular entity is **true**? **[AIPMT (Mains)-2010]**

(1) Centromere is found in animal cells, which produces aster during cell division

(2) The gene for producing insulin is present in every body cell

(3) Nucleosome is formed of nucleotides

(4) DNA consists of a core of eight histones

Sol. Answer (2)

(1) Centriole is found in animal cells, which help in the producing aster during cell division.

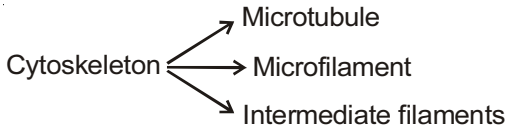
(3) Nucleosoe consists of core of eight histones.

(4) DNA is formed of nucleotides.

51. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called **[AIPMT (Mains)-2010]**

(1) Thylakoid (2) Endoplasmic reticulum (3) Plasmalemma (4) Cytoskeleton

Sol. Answer (4)



52. The plasma membrane consists mainly of **[AIPMT (Prelims)-2010]**

(1) Proteins embedded in a carbohydrate bilayer

(2) Phospholipids embedded in a protein bilayer

(3) Proteins embedded in a phospholipid bilayer

(4) Proteins embedded in a polymer of glucose molecules

Sol. Answer (3)

Proteins of plasma membrane can be intrinsic or extrinsic.

53. Identify the components labelled A, B, C and D in the diagram below from the list (i) to (viii) given along with

Components:

(i) Cristae of mitochondria

(ii) Inner membrane of mitochondria

(iii) Cytoplasm

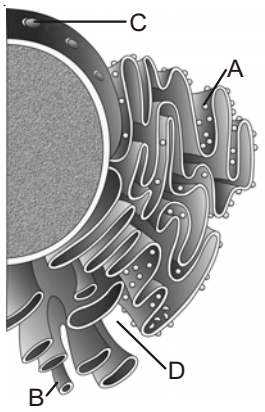
(iv) Smooth endoplasmic reticulum

(v) Rough endoplasmic reticulum

(vi) Mitochondrial matrix

(vii) Cell vacuole

(viii) Nucleus



The **correct** components are **[AIPMT (Mains)-2010]**

	A	B	C	D
(1)	(v)	(iv)	(viii)	(iii)
(2)	(i)	(iv)	(viii)	(vi)
(3)	(vi)	(v)	(iv)	(vii)
(4)	(v)	(i)	(iii)	(ii)

Sol. Answer (1)

A – RER

B – SER

C – Nucleus

D – Cytoplasm

54. Plasmodesmata are **[AIPMT (Prelims)-2009]**

(1) Locomotory structures

(2) Membranes connecting the nucleus with plasmalemma

(3) Connections between adjacent cells

(4) Lignified cemented layers between cells

Sol. Answer (3)

Lignified cemented layers between cell – Middle lamella

Locomotory structure – Cilia, Flagella

55. Middle lamella is composed mainly of **[AIPMT (Prelims)-2009]**

(1) Muramic acid (2) Calcium pectate (3) Phosphoglycerides (4) Hemicellulose

Sol. Answer (2)

Phosphoglycerides, Muramic acid } Component of bacterial cell wall

Hemicellulose – Plant cell wall

56. Cytoskeleton is made up of **[AIPMT (Prelims)-2009]**

(1) Callose deposits (2) Cellulosic microfibrils

(3) Proteinaceous filaments (4) Calcium carbonate granules

Sol. Answer (3)

Proteinacious filamentous structures present in cell is known as cytoskeleton.

57. Vacuole in a plant cell **[AIPMT (Prelims)-2008]**

(1) Lacks membrane and contains water and excretory substances

(2) Is membrane-bound and contains storage proteins and lipids

(3) Is membrane-bound and contains water and excretory substances

(4) Lacks membrane and contains air

Sol. Answer (3)

Its membrane is known as tonoplast.

58. Polysome is formed by **[AIPMT (Prelims)-2008]**

(1) Ribosomes attached to each other in a linear arrangement

(2) Several ribosomes attached to a single mRNA

(3) Many ribosomes attached to a strand of endoplasmic reticulum

(4) A ribosome with several subunits

Sol. Answer (2)

Polysomes are present in prokaryotes.

59. Keeping in view the 'fluid mosaic model' for the structure of cell membrane, which one of the following statements is **correct** w.r.t. the movement of lipids and proteins from one lipid monolayer to the other (described as flip-flop movement)? **[AIPMT (Prelims)-2008]**

(1) Neither lipids nor proteins can flip-flop (2) Both lipids and proteins can flip-flop

(3) While lipids can rarely flip-flop, proteins cannot (4) While proteins can flip-flop, lipids cannot

Sol. Answer (3)

Flip-flop movement is shown by lipids.

60. In germinating seeds fatty acids are degraded exclusively in the **[AIPMT (Prelims)-2008]**

(1) Mitochondria (2) Proplastids (3) Glyoxysomes (4) Peroxisomes

Sol. Answer (3)

As they contain enzymes related to glyoxylate cycle.

61. The two sub-units of ribosome remain united at a critical ion level of **[AIPMT (Prelims)-2008]**

(1) Calcium (2) Copper (3) Manganese (4) Magnesium

Sol. Answer (4)

Mangnesium ion concentration help in union of two subunits of ribosomes.

62. Which one of the following is **not** a constituent of cell membrane? **[AIPMT (Prelims)-2007]**

(1) Phospholipids (2) Cholesterol (3) Glycolipids (4) Proline

Sol. Answer (4)

63. Select the **wrong** statement from the following: **[AIPMT (Prelims)-2007]**

(1) The chloroplasts are generally much larger than mitochondria

(2) Both chloroplasts and mitochondria contain an inner and an outer membrane

(3) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane

(4) Both chloroplasts and mitochondria contain DNA.

Sol. Answer (3)

Only chloroplast have thylakoid

64. Which of the following statements regarding mitochondrial membrane is **not** correct? **[AIPMT (Prelims)-2006]**

(1) The outer membrane is permeable to all kinds of molecules

(2) The enzymes of the electron transfer chain are embedded in the outer membrane

(3) The inner membrane is highly convoluted forming a series of infoldings

(4) The outer membrane resembles a sieve

Sol. Answer (2)

They are embedded in inner membrane of mitochondria.

65. A major breakthrough in the studies of cells came with the development of electron microscope. This is because **[AIPMT (Prelims)-2006]**

(1) The resolution power of the electron microscope is much higher than that of the light microscope

(2) The resolving power of the electron microscope is 200 – 350 nm as compared to 0.1 – 0.2 nm for the light microscope

(3) Electron beam can pass through thick materials, whereas light microscopy requires thin sections

(4) The electron microscope is more powerful than the light microscope as it uses a beam of electrons which has wavelength much longer than that of photons

Sol. Answer (1)

66. Which of the following statements regarding cilia is **not** correct? **[AIPMT (Prelims)-2006]**

(1) The organized beating of cilia is controlled by fluxes of Ca^{2+} across the membrane

(2) Cilia are hair-like cellular appendages

(3) Microtubules of cilia are composed of tubulin

(4) Cilia contain an outer ring of nine doublet microtubules surrounding two single microtubules

Sol. Answer (1)

67. The main organelle involved in modification and routing of newly synthesized proteins to their destinations is **[AIPMT (Prelims)-2005]**

(1) Mitochondria (2) Endoplasmic reticulum (3) Lysosome (4) Chloroplast

Sol. Answer (2)

68. A student wishes to study the cell structure under a light microscope having 10X eyepiece and 45X objective. He should illuminate the object by which one of the following colours of light so as to get the best possible resolution? **[AIPMT (Prelims)-2005]**

(1) Yellow (2) Green (3) Blue (4) Red

Sol. Answer (3)

69. Chlorophyll in chloroplasts is located in **[AIPMT (Prelims)-2005]**

(1) Grana (2) Pyrenoid (3) Stroma (4) Both (1) & (3)

Sol. Answer (1)

Stacks of thylakoids (flattened sac-like structure) is known as grana.

70. Protein synthesis in an animal cell occurs **[AIPMT (Prelims)-2005]**

(1) Only on the ribosomes present in cytosol

(2) On ribosomes present in cytoplasm as well as in mitochondria

(3) Only on ribosomes attached to the nuclear envelope and endoplasmic reticulum

(4) On ribosomes present in the nucleolus as well as in cytoplasm

Sol. Answer (2)

71. According to widely accepted “fluid mosaic model” cell membranes are semi-fluid, where lipids and integral proteins can diffuse randomly. In recent years, this model has been modified in several respects. In this regard, which of the following statements is **incorrect**? **[AIPMT (Prelims)-2005]**

(1) Proteins in cell membranes can travel within the lipid bilayer

(2) Proteins can remain confined within certain domains of the membrane

(3) Proteins can also undergo flip-flop movements in the lipid bilayer

(4) Many proteins remain completely embedded within the lipid bilayer

Sol. Answer (3)

Proteins can also undergo flip-flop movements in the bilipid layer.

72. Genes for cytoplasmic male sterility in plants are generally located in **[AIPMT (Prelims)-2005]**

(1) Mitochondrial genome (2) Cytosol

(3) Chloroplast genome (4) Nuclear genome

Sol. Answer (1)

Mitochondria is also related to maternal / cytoplasmic inheritance.

73. The term 'glycocalyx' is used for

(1) A layer surrounding the cell wall of bacteria

(2) A layer present between cell wall and membrane of bacteria

(3) Cell wall of bacteria

(4) Bacterial cell genetically engineered to possess N-glycosylated proteins

Sol. Answer (1)

→ Outermost layer comprising a coating of mucous or polysaccharides macromolecules

→ It protects the cells and also helps in adhesion.

74. Why is a capsule advantageous to a bacterium?

(1) It allows the bacterium to attach to the surface

(2) It protects the bacterium from desiccation

(3) It provides means of locomotion

(4) It allows bacterium to hide from host's immune system

Sol. Answer (4)

Attachment → Fimbriae

Protection from dessication → Slime layer

Locomotion → Cilia / flagella

75. Which one of the following organisms is not an example of eukaryotic cells?

(1) *Amoeba proteus* (2) *Paramecium caudatum*

(3) *Escherichia coli* (4) *Euglena viridis*

Sol. Answer (3)

E.coli is a bacterium.

76. The prokaryotic flagella possess

(1) Helically arranged protein molecule (2) "9 + 2" membrane enclosed structure

(3) Unit membrane enclosed fibre (4) Protein membrane enclosed fibre

Sol. Answer (1)

Prokaryotic flagella

77. The site of respiration in bacteria is

(1) Ribosome (2) Microsome (3) Episome (4) Mesosome

Sol. Answer (4)

The invagination of cell membrane into the cell which increase the surface area.

78. In prokaryotes, the genetic material is

(1) Linear DNA without histones (2) Circular DNA without histones

(3) Linear DNA with histones (4) Circular DNA with histones

Sol. Answer (2)

Prokaryotes have double stranded and circular DNA.

79. Algae have cell wall made up of

(1) Cellulose, hemicellulose and pectins (2) Cellulose, galactans and mannans

(3) Hemicellulose, pectins and proteins (4) Pectins, cellulose and proteins

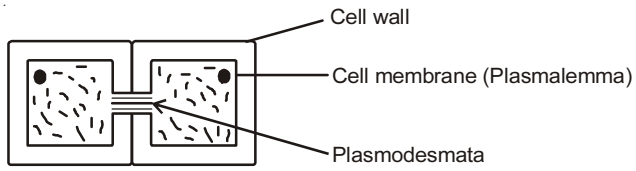
Sol. Answer (2)

Hemicellulose is absent in algal cell wall.

80. Which one of the following structures between two adjacent cells is an effective transport pathway?

(1) Plasmalemma (2) Plasmodesmata (3) Plastoquinones (4) Endoplasmic reticulum

Sol. Answer (2)



81. The rough endoplasmic reticulum (RER) in the cells are because of the presence of
(1) Mitochondria associated with ER
(2) Ribosomes on the surface of ER
(3) Volutin granules on the surface of ER
(4) Sulphur granules on the surface of ER

Sol. Answer (2)

These ribosomes impart rough apperance to ER.

82. Which one of the following statements about cytochrome P_{450} is wrong?
(1) It is a coloured cell
(2) It is an enzyme involved in oxidation reactions
(3) It has an important role in metabolism
(4) It contains iron

Sol. Answer (1)

It is not a cell.

83. Which cell organelle is concerned with glycosylation of protein?
(1) Ribosome
(2) Peroxisome
(3) Endoplasmic reticulum
(4) Mitochondria

Sol. Answer (3)

Protein + Sugar $\rightarrow$ Glycoprotein } Glycosylation

84. The Golgi apparatus
(1) Is found only in animals
(2) Is found in prokaryotes
(3) Is a site of rapid ATP production
(4) Modifies and packages proteins

Sol. Answer (4)

Golgi apparatus is responsible for modification, packaging and transport of cell proteins.

85. Which one of the following organelles is located near the nucleus and contains a collection of flattened membrane bound cisternae?
(1) Nucleolus
(2) Mitochondrion
(3) Centriole
(4) Golgi apparatus

Sol. Answer (4)

Golgi apparatus consist of cisternae, tubules, vesicles and golgian vacuoles.

86. Which of the following organelles contain enzymes that have digestive action?
(1) Ribosomes
(2) Polysomes
(3) Plastids
(4) Lysosomes

Sol. Answer (4)

Lysosomes contain hydrolytic actions.

87. Lysosomes are rich in

(1) Nucleic acids (2) Hydrolytic enzymes (3) Carbohydrates (4) Hormones

Sol. Answer (2)

Hydrolytic enzymes have digestive action.

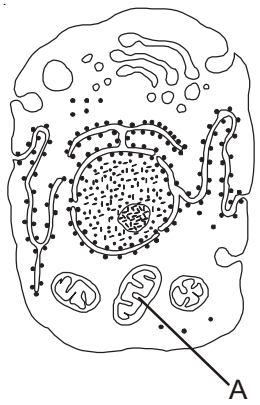
88. Heterophagosomes are

(1) Primary lysosomes (2) Secondary lysosomes (3) Autophagic vacuole (4) Tertiary lysosomes

Sol. Answer (2)

Secondary lysosomes formed by the fusion of food vacuoles and primary lysosomes.

89. Select the alternative giving **correct** identification and function of the organelle 'A' in the diagram



(1) Endoplasmic reticulum-synthesis of lipids

(2) Mitochondria-produce cellular energy in the form of ATP

(3) Golgi body-provides packaging material

(4) Lysosomes - secrete hydrolytic enzymes

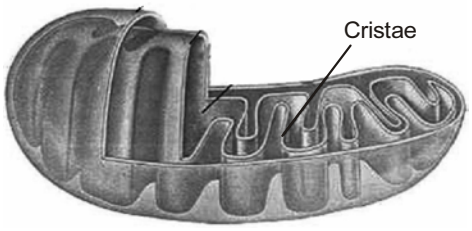
Sol. Answer (2)

Mitochondria – "Power house of cell"

90. The inner membrane of the mitochondria is usually, highly convoluted, forming a series of infoldings known as

(1) Thylakoids (2) Lamellae (3) Cristae (4) Grana

Sol. Answer (3)



Thylakoids, Lamellae and Grana are parts of chloroplasts.

91. In mitochondria, cristae act as sites for

(1) Protein synthesis (2) Phosphorylation of flavoproteins

(3) Breakdown of macromolecules (4) Oxidation-reduction reaction

Sol. Answer (4)

Cristae-site of ETS and oxidative phosphorylation

92. Which of the following type of plastids does not contain stored food material?
(1) Amyloplasts (2) Chromoplasts (3) Elaioplasts (4) Aleuroplasts

Sol. Answer (2)
Chromoplasts contain coloured pigment.
Amyloplasts → Store starch
Elaioplasts → Fats
Aleuroplasts → Proteins

93. Elaioplasts store
(1) Starch (2) Proteins (3) Fats (4) Essential amino acids

Sol. Answer (3)
It is a type of Leucoplast that stores fats.

94. Extranuclear DNA is found in
(1) Lysosome and chloroplast (2) Chloroplast and mitochondria
(3) Mitochondria and lysosome (4) Golgi and E.R

Sol. Answer (2)
Chloroplast and mitochondria are semi-autosomous cell organelles.

95. In chloroplasts, chlorophyll is present in the
(1) Outer membrane (2) Inner membrane (3) Thylakoids (4) Stroma

Sol. Answer (3)
Thylakoids are the membranous sac which contain pigments.

96. Stroma in the chloroplasts of higher plant contains
(1) Chlorophyll (2) Light-independent reaction enzymes
(3) Light-dependent reaction enzymes (4) Ribosomes

Sol. Answer (4)
Stroma contains enzymes, DNA, RNA, ribosomes, etc. Ribosomes are 70S in nature.

97. The proteins are synthesized at
(1) Centrosomes (2) Golgi bodies (3) Ribosomes (4) Mitochondria

Sol. Answer (3)
Ribosomes are also known protein synthesising machinery of cell.

98. Microtubule is involved in the
(1) Muscle contraction (2) Membrane architecture (3) Cell division (4) DNA recognition

Sol. Answer (3)
Microtubule is involved in cell division by helping in the formation of spindle apparatus.

99. Microtubules are absent in
(1) Mitochondria (2) Flagella
(3) Spindle fibres (4) Centrioles

Sol. Answer (1)
Microtubules are cytoskeletons.

100. Flagella of prokaryotic and eukaryotic cells differ in

(1) Type of movement and placement in cell

(2) Location in cell and mode of functioning

(3) Microtubular organization and type of movement

(4) Microtubular organization and function

Sol. Answer (3)

Prokaryotes → (4 + 4) arrangement and show movement in 360° → Flagellin protein

Eukaryotes → (9 + 2) and (9 + 0) arrangement of tubulin protein and movement is 180°.

101. Centromere is required for

(1) Replication of DNA

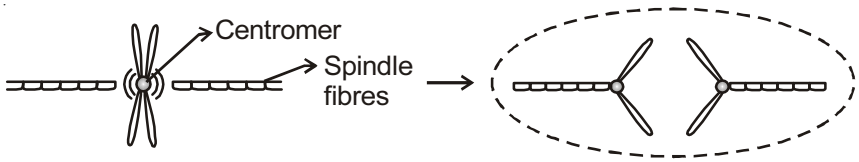
(2) Chromosome segregation

(3) Poleward movement of chromosome

(4) Cytoplasmic cleavage

Sol. Answer (3)

Centromere is required for poleward movement of chromosome because it contains a proteinaceous trilamellar structure that provides binding site of spindle fibres.



Centromere splites and chromatid moves towards opposite poles.

102. The point, at which polytene chromosome appear to be attached together, is called

(1) Centromere

(2) Chromomere

(3) Chromocentre

(4) Centriole

Sol. Answer (3)

Polytene chromosome giant chromosome present in salivary glands of insects.

103. The polytene chromosomes were discovered for the first time in

(1) *Drosophila*

(2) *Musca domestica*

(3) *Cheironomus*

(4) *Musca nebula*

Sol. Answer (3)

104. The maximum formation of *m*RNA occurs in

(1) Ribosome

(2) Nucleoplasm

(3) Cytoplasm

(4) Nucleolus

Sol. Answer (2)

Because transcription occurs inside nucleus *i.e.*, in matrix of nucleus or nucleoplasm.

105. Lampbrush chromosomes are seen in which typical stage?

(1) Mitotic metaphase

(2) Meiotic prophase

(3) Mitotic anaphase

(4) Mitotic prophase

Sol. Answer (2)

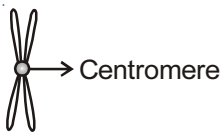
Because they are formed when cell exhibits extended diplotene stage which is a stage of prophase I of meiosis.

106. Centromere is a part of

(1) Chromosome
(2) Endoplasmic reticulum
(3) Ribosomes
(4) Mitochondria

Sol. Answer (1)

Centromere is a part of chromosome and is also known a primary constriction.



107. DNA is mainly found in

(1) Nucleolus
(2) Nucleus only
(3) Cytoplasm only
(4) None of these

Sol. Answer (2)

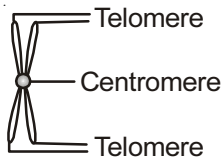
Nucleus contains DNA

108. Function of telomeres in nucleus is

(1) Poleward movement
(2) To initiate the RNA synthesis
(3) To seal the ends of chromosome
(4) To recognise the homologous chromosome

Sol. Answer (3)

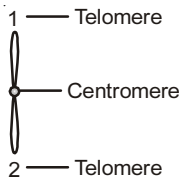
It maintains the structural identity of chromosome.



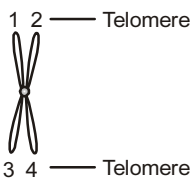
109. Which of the following occurs more than one and less than five in a chromosome?

(1) Chromatid
(2) Chromosome
(3) Centromere
(4) Telomere

Sol. Answer (4)



(More than one)



(Less than five)

110. Ribosomes are produced in

(1) Nucleolus
(2) Cytoplasm
(3) Mitochondria
(4) Golgi body

Sol. Answer (1)

Nucleolus is rich in rDNA therefore it is the site of synthesis of ribosomes.

111. The salivary gland chromosomes in the dipteran larvae, are useful in gene mapping because

(1) These are fused

(2) These are much longer in size

(3) These are easy to stain

(4) They have endoreduplicated chromosomes

Sol. Answer (3)

They are easily visible and thus useful mapping gene.

112. Genetically inactive and highly condensed region with tightly packed DNA is

(1) Euchromatin

(2) Heterochromatin

(3) Chromatin

(4) Chromosome

Sol. Answer (2)

Euchromatin → Genetically active, loosely packed.

Chromatin → The material of the nucleus stained by basic dyes.

Chromosome → Condensed form of chromatin.

113. Some of the enzymes, which are associated in converting fats into carbohydrates, are present in

(1) Microsomes

(2) Glyoxysomes

(3) Liposomes

(4) Golgi bodies

Sol. Answer (2)

Glyoxylate cycle converts fats into carbohydrates.

114. Which of the following organelle has single membrane?

(1) Mitochondria

(2) Sphaerosomes

(3) Nucleus

(4) Cell wall

Sol. Answer (2)

Rest all are double membrane bound.

115. The motile bacteria are able to move by

(1) Fimbriae

(2) Flagella

(3) Cilia

(4) Pili

Sol. Answer (2)

Motile bacteria show locomotion by flagella only.

SECTION - D

Assertion-Reason Type Questions

1. A : RBC membrane is highly flexible.

   R : Amount of external protein in cytoplasmic face of membrane is more.

Sol. Answer (1)

Extrinsic proteins are more towards cytoplasmic face of plasma membrane.

2. A : Lampbrush chromosomes show transcriptionally active loops.

   R : Informosomes can be used in future for embryo development.

Sol. Answer (2)

Packets of mRNA and proteins present in cytoplasm of oocytes are called informosomes.

3. A : Centriole does not form any compartment in a cell.

   R : Centriole is a non-membranous cell organelle.

Sol. Answer (1)

Membrane bound organelles are responsible for compartmentlisation of cell.

4. A : Janus green B is a vital stain for locating mitochondria.

   R : Janus green is oxidised by cytochrome oxidase present in mitochondria.

Sol. Answer (1)

The stain which import colour to living things is known as vital stain.

5. A : Lysosomes help in digestion of foreign particles in the animal cells.

   R : They have respiratory enzymes.

Sol. Answer (3)

Lysosomes have hydrolytic enzymes.

6. A : Chromoplast is coloured plastid in corolla and ripened fruits.

   R : It has water soluble chlorophyll and carotenoid pigments.

Sol. Answer (3)

Chlorophyll and carotenoids pigments are not water soluble.

7. A : The axoneme of eukaryotic flagellum possesses a number of microtubules running parallel to the long axis.

   R : It has a pair of peripheral doublet and a pair of centrally located microtubules.

Sol. Answer (3)

It has nine pairs of peripheral doublet.

8. A : Telocentric chromosome has two unequal arms.

   R : The centromere is situated close to its end forming one extremely short arm.

Sol. Answer (4)

A : Telocentric chromosome has only one arm.

R : The centromere is situated at its one end.

9. A : Chloroplast is a semi-autonomous organelle.
R : The ribosomes of the chloroplast are smaller than cytoplasmic ribosomes.

Sol. Answer (2)
It contains circular DNA and 70S ribosomes.

10. A : Lipids are arranged within the cell membrane with the hydrophobic tails towards the inner part.
R : This ensures that non-polar tail of saturated hydrocarbons is protected from the aqueous environment.

Sol. Answer (1)
This ensures that they do not come in contact with water (aqueous environment).

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