8.CELL THE UNIT OF LIFE

Biology Smart Booklet

Theory + NCERT MCQs + NEET PYQs

CELL

Rudolf Virchow gave the concept of omnis cellula-e-cellula

First live cell discovered by Anton Von Leeuwenhoek

Discovered by Robert Hooke in 1665 (in thin slice of cork)

Structural & functional unit of all living organisms

CELL ORGANELLES

Cell membrane Model given by Singer & Nicolson (Fluid mosaic model): cell membrane is selectively permeable.

Cell wall Gives shape to the cell. found in fungi & plants.

Middle lamella Hold neighboring cells together. made of calcium pectate

Endoplasmic Reticulum (ER)→Network of tiny tubular structures Scattered in cytoplasm : ER can be Smooth ER→without ribosomes & Rough ER with ribosomes. RER involved in protein synthesis. SER is major site for synthesis of lipids.

Golgi apparatus First observed by Camillo Golgi - consists of flat, disc shaped sacs or cisternae : cisternae arranged near the nucleus with distinct convex (cis) or forming face concave (trans) or maturing face.

Lysosomes - Membrane Bound vesides filled with hydrolytic enzymes (hydrolases, lipases).

Vacuoles - membrane Bound space filled with water, sap & excretory products.

Mitochondria is double membrane layered structure that are site of aerobic respiration. Produce cellular energy in the form of ATP. called power house of cell.

Plastids - Found in plant cells. bear specific pigments. 3 types: chloroplast, chromoplast & leucoplast.

Ribosomes - Granular structure composed of RNA & proteins. not surrounded by membrane. Eurkaryotic ribosomes 80S : Prokaryotic, ribosomes 70S. 80S divided into 60S & 40S. 70S divided into 50S & 30S.

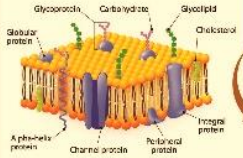
Cytoskeleton - Network of filaments in cytoplasm. helps in mechanical support & maintaining shape.

Cilia & Flagella all hair Like outgrowths. Cilia are smaller than flagella. help in cell movement.

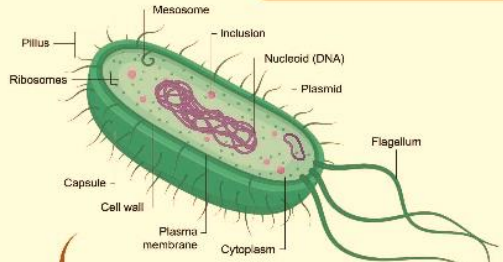
Centrosome - Organelle with 2 cylindrical structures centrioles. help in cell division (formation of Spindle fibres).

Nucleus - Discovered by Robert Brown. controls activities of cell & its organelles. major role in heredity.

Microbodies - Minute vesicles filled with enzymes.



PROKARYOTIC CELLS (Lack Nucleus)



- Cell wall determines the shape of cell
- Capsule (Gummy or Sticky) protects from host's immune system.
- Flagella helps in locomotion (thin filamentous structure) : has 3 parts filament, hook & basal body.
- Pili no role in motility: help in making process.
- Mesosomes extension of plasma membrane in cell : helps in cell wall formation. DNA replication.
- Nucleoid has irregular shape : consists of genetic material (Naked).
- Cell envelope 3 layered structure

On the basis of staining bacteria can be

- Gram positive → take up Gram stain
- Gram Negative → do not take gram stain

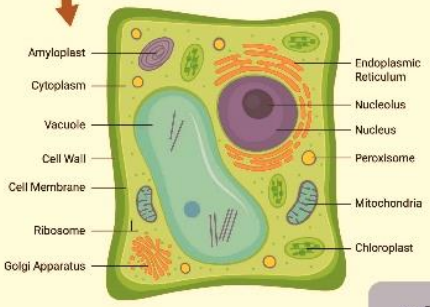
- Prokaryotic Cells lack membrane – bound cell organelles
- Genetic material – genomic DNA (circular DNA) + Small circular DNA outside the genomic DNA (plasmids)
- Ribosomes 70S (50S and 30S units) : help in protein synthesis.

EUKARYOTIC CELLS (Nucleus is Present)

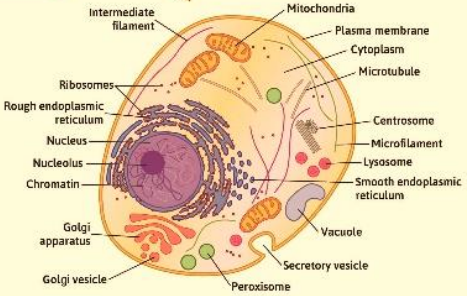
DIFFERENT SHAPES OF CELLS

- Red blood cells (Round & biconcave)
- White blood cells (Amoeboid)
- Columnar epithelial cells (long & narrow)
- Nerve cells (Branched & long)
- A tracheid (Elongated)
- Mesophyll cells (Round & oval)

PLANT CELL



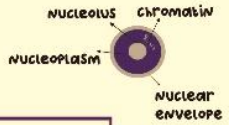
ANIMAL CELL



NUCLEUS

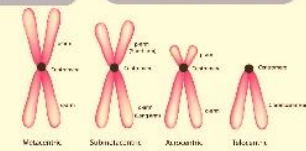
Controlling Unit of the cell

Main cell organelle



- **Nucleoli** (Spherical bodies) Site for ribosomal RNA synthesis
- **Chromatin** (Nucleoprotein fibers in interphase nucleus)
- **Nucleoplasm** (Nuclear matrix) contains nucleolus & chromatin.
- **Peri – Nuclear Space** Space between two parallel membranes of nuclear envelope

- Interphase nucleus has chromatin
- Chromatin has DNA & condenses to form chromosomes.
- Chromosomes has constriction in center called centromere.
- Centromere holds two chromatids together has disc – shaped structure kinetochores.



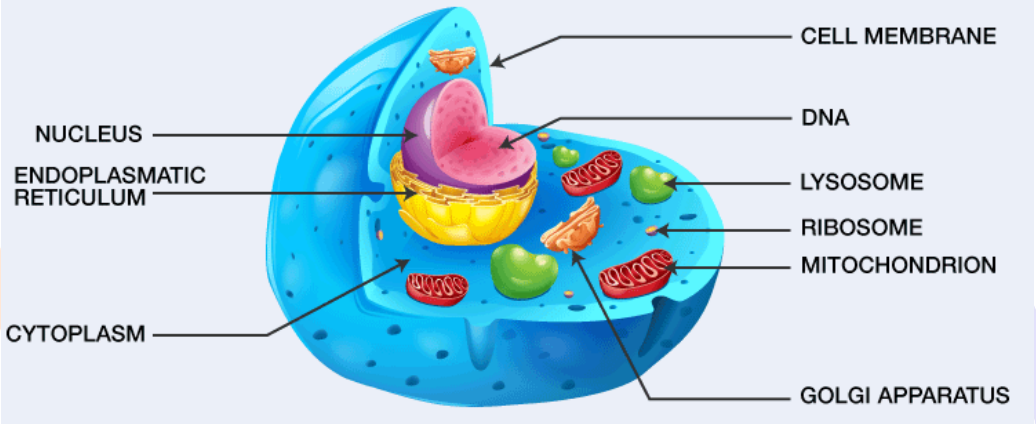
Chromosomes can be

- **Metacentric** — Centromere in middle
- **Sub-Metacentric** — Centromere slightly away from middle
- **acrocentric** — (Centromere close to end)
- **telocentric** — (Centromere at terminal)

CELL THE UNIT OF LIFE

Cell

A cell is defined as the most basic, structural and functional unit of all living organisms. Essentially, a cell is a structure that contains organelles which provide necessary functions to sustain itself. However, not all cells are the same.

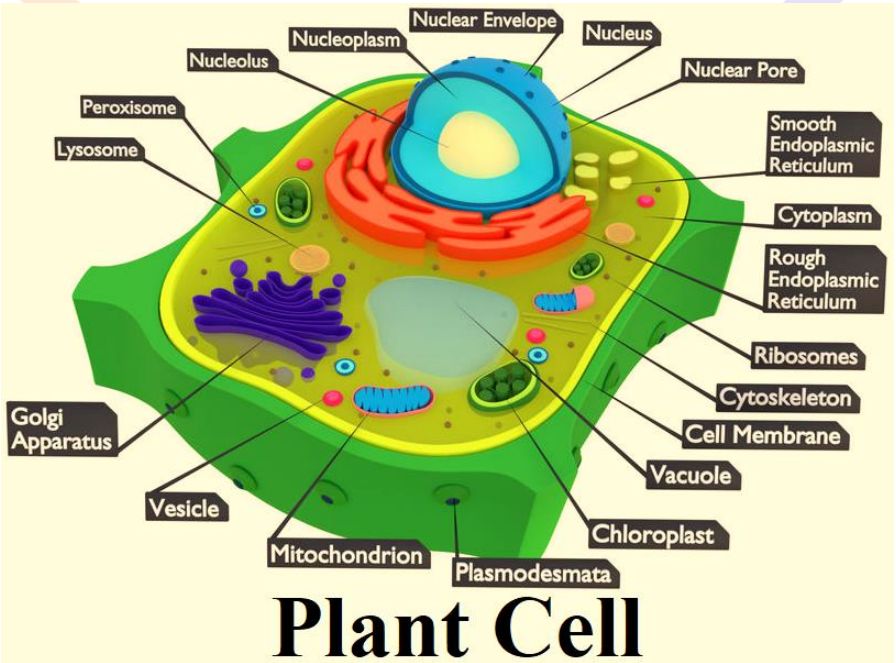


Prokaryotic cells

- Membrane-bound nucleus is absent.
- Cells are smaller in size.
- Single chromosome is present.
- Membrane-bound organelles are absent.

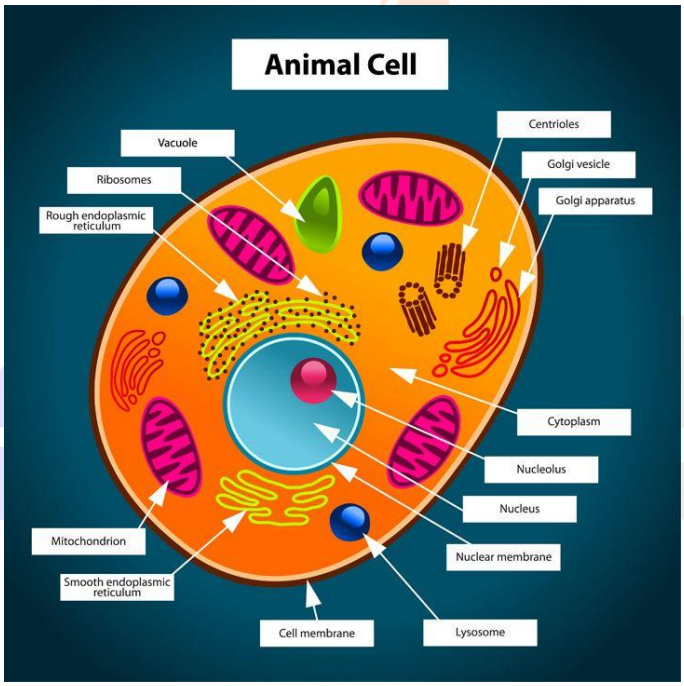
Eukaryotic cells

- Membrane-bound nucleus is present.
- Cells are larger in size.
- More than one chromosome is present.
- Membrane-bound organelles are present.



Animal cell

- Cell membrane is composed of lipids that are arranged in bilayer. The lipid component is mainly composed of phosphoglycerides. Later it was found that protein is also present in cell membrane. Ratio of protein and lipids varies in different cells.
- Membrane protein may be integral or peripheral. Integral protein remains buried in membrane but peripheral protein lies on the surface.
- Singer and Nicholson (1972) proposed fluid mosaic model. According to this model, the quasi-fluid nature of lipid enables lateral movement of protein within the bilayer of lipids.



Eukaryotic cells: Eukaryotic cells Possess an organized nucleus with nuclear envelope and have a variety of complex locomotory and cytoskeletal structures.

Active Transport

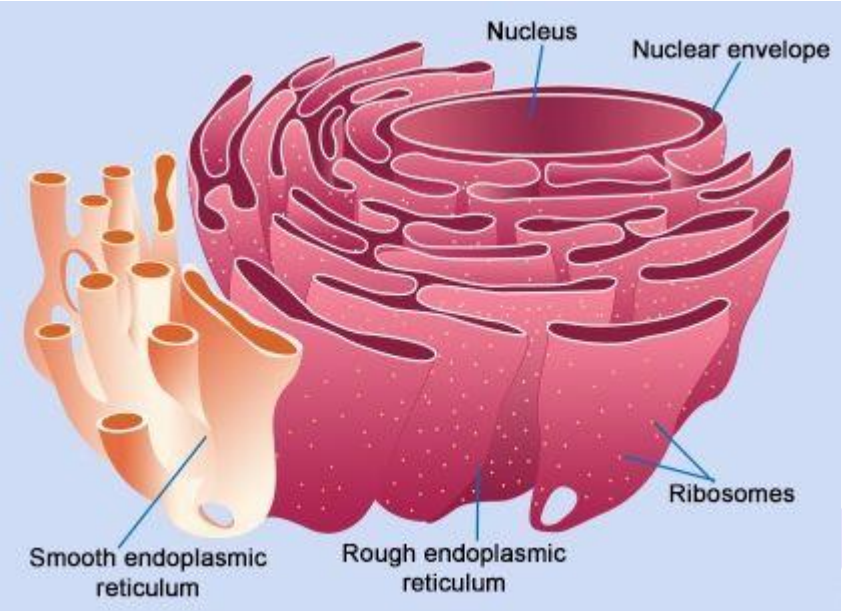
The transport involves an expenditure of energy by the cells, It occurs against the concentration gradient. It is a rapid process.

Passive Transport

The cells do not spend energy in passive transport, this transport is always along the concentration gradient. It is comparatively slow process.

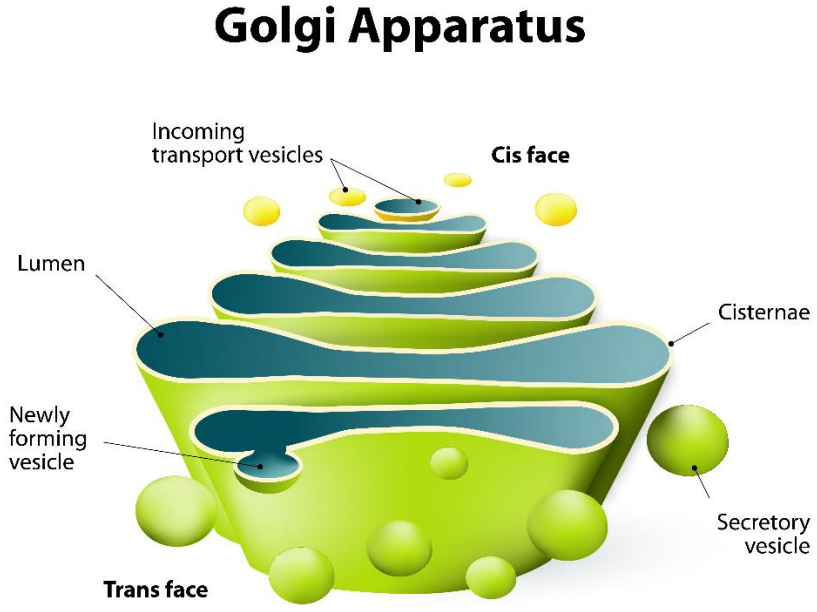
Endoplasmic Reticulum

Endoplasmic Reticulum are the tubular structure scattered in the cytoplasm. Rough endoplasmic reticulum bears ribosomes on its surface. RER is involved in protein synthesis and secretion. Smooth endoplasmic reticulum does not bear ribosomes on its surface. SER is involved in lipid synthesis and steroidal hormones.



Golgi apparatus

Golgi apparatus was first observed by Camillo Golgi in 1898 near nucleus. They consist of many flat, disc-shaped sacs or cisternae stacked parallel to each other. Golgi apparatus performs the function of packaging of materials and its transportation. A number of protein synthesized by ribosomes are modified in cisternae of Golgi apparatus. Golgi apparatus is the site for synthesis of Glycoproteins and glycolipids.



Lysosomes

Lysosomes are membrane-bound vesicular structures formed by the process of packaging in the Golgi apparatus. They are rich in hydrolytic enzymes- lipase, protease, carbohydrates active at acidic PH. These enzymes are capable of digesting carbohydrates, proteins, lipids, and nucleic acids.

Vacuoles

Vacuoles are membrane-bound space found in cytoplasm containing water, sap and excretory product. They are bound by single membrane. They form contractile vacuole and food vacuole in many organisms.

Mitochondria

Mitochondria is double membrane-bound structure with the outer membrane and inner membrane dividing its lumen in two compartments. The inner membrane forms a number of infoldings called cristae towards the matrix.

Plastids

Plastids are found in plant cells and in Euglenoids.

Plastids are three types:

Chloroplast (Contain chlorophyll and caratenoids).

Chromoplast (Contain carotene and xanthophyll).

Leucoplast (Colorless plastids).

- **Chloroplast:** Contains chlorophyll pigment and carotenoids and performs photosynthesis
- **Chromoplast:** Contains carotene and xanthophylls. They impart a specific color to flowers and fruits and help in pollination and dispersal of seeds
- **Leucoplast:** They are colorless and store various food products, e.g., amyloplasts- store starch, proteinoplasts or aleuroplasts- store proteins, elaioplasts- store fat.

NCERT LINE BY LINE QUESTIONS

Cell Structure and Function

1. In living organisms detailed description that brings out their knowledge of diversity is about **Pg-125, easy**

A) Their form B) Their appearance
C) Both D) None

2. What brought out the unit of diversity the cellular organisation of all life form: **Pg-125, easy**

A) Theory of evolution B) Species theory
C) Cell theory D) Darwinian theory

3. What is not true about physico-chemical approach:- **Pg-125, easy**

A) Established by analysis of living tissue for element and compounds.
B) Explains what type of organic compounds is present in living organism.
C) Explains the abnormal process that occur during any diseased condition.
D) This approach is known as forward biology.

Cell :- The Unit Of Life

4. Unicellular organism are capable of **Pg-125, easy**

A) Independent existence
B) Performing the essential functions of life.
C) Both
D) Does not ensure independent living

5. Living cell was firstly seen and described by:- **Pg-125, easy**

A) Robert Hooke B) Anton von Leeuwenhoek
C) Robert Koch D) Robert Brown

Paragraph – 8.2
Cell Theory

6. Cell theory was proposed by:- **Pg-126, easy**

A) Matthias Schleiden and Theodore Schwann
B) Schleiden; Schwann and Virchow.
C) Rudolf Virchow D) Sutton and Boveri

7. All the plants are composed of different kinds of cells which forms the tissue of the plant, this statement was given by:- **Pg-125, easy**

A) A German botanist ; Rudolf Virchow .
B) A British zoologist ; Matthias Schleiden
C) A British zoologist ; Theodore Schwann
D) A German botanist; Matthias Schleiden

8. Who studied the different types of animal cells to propose cell theory:- **Pg-126, easy**

A) A British zoologist; Matthias Schleiden
B) A German botanist; Theodore Schwann.
C) A physicist; Rudolf Virchow.
D) A British zoologist; Theodore Schwann.

9. A thin outer layer studied by Theodore Schwann nowadays known as:- **Pg-126, easy**

A) Plasma membrane B) Cell wall
C) Glycocalyx D) Middle lamella

10. Based on studies of Matthias Schleiden; what is the unique character of plant cell?

A) Cell wall B) Middle lamella
C) Glycocalyx D) None of these **Pg-126, easy**

11. The hypothesis that the bodies of animals and plant are composed of cells and their products was proposed by:- **Pg-126, easy**
A) Schleiden and Schwann B) Rudolf Virchow
C) Schwann only D) Virchow and Schleiden

12. Scientist who gave the final shape to cell theory? **Pg-126, easy**
A) Schleiden B) Schwann
C) Virchow D) Schleiden & Schwann

13. Which of the following is related to cell theory :- **Pg-126, medium**
i) All living organisms are composed of cells and product of cells.
ii) Proposed by Schleiden and Schwann.
iii) Modified by Rudolf Virchow
iv) All cells arise from pre – existing cell.
v) "Omnis cellula – e – cellula"
A) Only one of the above B) Only two of the above
C) Only four of the above D) All five

Paragraph – 8.3
An Overview of Cell

14. What is the delimiting boundary around a human cheek cell? **Pg-126, easy**
A) Cell membrane B) Protoplasm
C) Protoplast D) Cell wall

15. What is the Semi – fluid matrix inside the cell? **Pg-126, easy**
A) Cell membrane B) Protoplast
C) Cytoplasm D) Nucleus

16. How many of the following statements are not true:- **Pg-126, medium**
i) All cells have membrane bound nuclei and nucleolus.
ii) Nucleus contains the chromosome
iii) DNA is the Genetic material.
iv) Cytoplasm is the main arena of cellular activities in plant and animal cells.
A) Only (ii), (iii), & (iv) B) Only (ii) & (iv)
C) Only (i) & (iii) D) Only (i)

17. Besides the nucleus; the _____cell have other membrane bound distinct structures.
A) Eukaryotic B) Prokaryotic
C) Both (a) and (b) D) None of these **Pg-126, easy**

18. What is the non – membranous organelle present in both Eukaryotic as well as Prokaryotic cell **Pg-126, easy**
A) Endoplasmic reticulum B) Protein
C) Mitochondria D) Ribosomes of 80s' type

19. Animal cells have another non – membrane bound cellular organelle known as:- **Pg-126, easy**
A) Microbodies B) Nucleus
C) Lysosome D) Centrosome

20. Which of the following is not incorrect? **Pg-127, medium**
A) Mycoplasma is the smallest cell -> 0.3 µm in width.
B) Bacteria could be 3 µm to 5 µm in length
C) Human RBCs are about 7.0mm in diameter.
D) Cell's shape is independent of their work they perform.

Paragraph – 8.4
Prokaryotic Cell

21. The prokaryotic cells are represented by:- **Pg-127, easy**
A) Bacteria B) BGA
C) Mycoplasma & PPLO D) All of these

22. All prokaryotic cell have this cellular boundary surrounding the cell – membrane except in mycoplasma **Pg-127, easy**
A) Glycocalyx B) Protoplast
C) Cell wall D) Cytoplasm

23. Which of the following is related to prokaryotic cell:- **Pg-127, easy**
A) Have no well defined nucleus
B) Have basically naked genomic material.
C) An addition to genomic DNA; the extra – genomic DNA is also present known as plasmid.
D) All of the above

24. Which of the following confirms certain unique phenotypic characters to some bacteria **Pg-127, easy**
A) Chromosomal material
B) Extra chromosomal material
C) Mitochondrial DNA
D) Genetic material present in chloroplast

25. A special form of cell membrane ; which is the characteristic of prokaryotes is:- **Pg-128, easy**
A) Plasmid B) Cell wall
C) Cell membrane D) Mesosomes.

26. Which of the following is membrane less bodies other than Ribosomes. **Pg-128, easy**
A) Cell wall B) Inclusion
C) Mesosomes D) Chromatophores

27. Which of the following is the essential infolding's of cell membrane **Pg-128, easy**
A) Inclusion B) Mesosome C) Chromatophores D) Plasmid

Paragraph – 8.4.1
Cell Envelope and it's modification

28. What is the sequence of cell envelope in most of the prokaryotic cell (Outer to Inner) **Pg-128, easy**
A) Glycocalyx ->cell membrane -> cell wall.
B) Cell membrane -> cell wall -> Glycocalyx
C) Cell wall -> Glycocalyx -> cell membrane
D) Glycocalyx ->cell wall -> cell membrane.

29. The prokaryotic cell have a single protective unit made up of **Pg-128, easy**
A) Glycocalyx + cellulosic cell wall + cell membrane
B) Peptidoglycan cell wall + cell membrane + Glycocalyx
C) Chitinous cell wall + cell membrane + Glycocalyx
D) Silicous cell wall + Glycocalyx + cell membrane

30. How many of the following statements are correct:- **Pg-128, easy**
i) Glycocalyx is outermost layer.
ii) All three layer have same function.
iii) Bacteria can be classified on the basis of differences in the cell envelope.
iv) Bacteria can be classified on the basis of response to the staining procedure
A) Only one B) Only two C) Only three D) All four

31. The bacteria that take up gram stain are **Pg-128, easy**
A) Gram positive type. B) Gram negative type.

C) Both type
D) Neither gram positive nor gram negative.

32. The bacteria that do not take up gram stain are **Pg-128, easy**
A) Gram positive type. B) Gram negative type.
C) Either gram positive or gram negative
D) Neither gram positive nor gram negative

33. Which of the following in a bacterial envelope is a loose sheath of slimy layer **Pg-128, easy**
A) Glycocalyx B) Cell wall C) Cell membrane D) None of the above

34. Glycocalyx could be a thick and tough layer and known as:- **Pg-128, easy**
A) Slimy layer B) Cyst
C) Capsule D) None of the above

35. Which of the following determines the shape of a bacteria cell:- **Pg-128, easy**
A) Glycocalyx B) Capsule
C) Cell membrane D) Cell Wall

36. How many of the following in not incorrect regarding a cell membrane in prokaryotes **Pg-128, medium**
i) Selectively permeable in nature
ii) Structurally similar to eukaryotic cell membrane
iii) Interacts with outer world.
iv) Innermost layer of cell envelope
v) Living layer.
A) Only (ii), (iii) & (iv) B) Only (i), (ii), (iii), (iv) & (v)
C) Only (i), (iii), (iv) & (v) D) Only (i), (iv) & (v)

37. How many of the following is the membranous extensions into the cell of bacteria:- **Pg-128, easy**
Mesosomes, Tubules, Vesicles, Lamellae, Chromatophores, Inclusions
A) 6 B) 3 C) 5 D) 4

38. How many functions from the following, the mesosomes can perform **Pg-129, easy**
i) DNA replication ii) Respiration
iii) DNA distribution to daughter cells iv) Secretion
v) Increases surface area vi) Contains enzymatic content.
A) Only four B) Only Three
C) All six D) Only five

39. In cyanobacteria, there are some another membranous extensions except mesosomes are: **Pg-129, easy**
A) Inclusion B) Fat globules
C) Chromatophores D) All of the above

40. What are structures related to Bacterial flagellum:- **Pg-129, easy**
A) Basal body & filament B) Basal body, Hook & filament.
C) Hook & filament D) Filament only.

41. Longest portion of flagellum is:- **Pg-129, easy**
A) Basal body B) Hook
C) Filament D) None of the above

42. Which of the following structure helps in motility in bacterial cell:- **Pg-129, easy**
A) Cell membrane B) Pili
C) Fimbriae D) Flagella

43. Which of the following is not a surface structure :- **Pg-129, easy**
A) Fimbriae B) Pili C) Flagella D) Inclusion

44. Which of the following is small bristle like fibres sprouting out of the cell:- **Pg-129, easy**
A) Pili B) Cilia C) Flagella D) Fimbriae

45. Which of the following is elongated tubular proteinaecious structure:- **Pg-129, easy**
A) Pili B) Inclusion
C) Mesosome D) Fimbriae

46. Which of the following help the bacteria attach to rocks in streams:- **Pg-129, easy**
A) Inclusion B) Mesosome C) Fimbriae D) Pili

Paragraph – 8.4.2
Ribosomes and Inclusion Bodies

47. Ribosomes are associated with the structures in a bacterial cell:- **Pg-129, easy**
A) t – RNA strand B) Golgi body
C) Cell membrane D) E.R

48. Ribosomes in the bacterial cell are **Pg-129,**
A) 20nm to 30 nm in size.
B) Made up of two subunits(Larger 60s' & smaller 40s')
C) Made up of two subunits(Larger 50s' & smaller 30s')
D) Associated with E.R and cell membrane

49. A polysome is:- **Pg-129, easy**
A) Several mRNA bound to a single Ribosome.
B) Several subunits of ribosomes attached to each other.
C) Several ribosomes attached to a single strand of mRNA
D) Several mRNA attached to each other.

50. Which of the following structure translate the mRNA into proteins: in a bacterial cell:- **Pg-129, easy**
A) Inclusions of cytoplasm B) Ribosomes of E.R
C) Ribosomes of Polysome. D) Polysomes of Ribosome.

51. Inclusion bodies in a prokaryotic cell are:- **Pg-129, easy**
A) Reserve material containing structure
B) Cell membrane infoldings
C) Membrane bound structure
D) All of the above

52. What are example of inclusion bodies:- **Pg-129, easy**
i) Mesosome ii) Chromatophores
iii) Gas vacuole iv) Phosphate granules
v) Cyanophycean granules vi) Glycogen granules
A) Only (ii), (iii) & (iv) B) Only (iii), (iv) & (v)
C) Only (iii), (iv), (v) & (vi) D) Only (iv), (v) & (vi)

53. Inclusion bodies can be found in **Pg-129, easy**
A) All type of cells B) All eukaryotic cell
C) BGA & green photosynthetic bacteria D) Prokaryotic cell.

Paragraph – 8.5
Eukaryotic cell

54. All of the above except are eukaryotic except:- **Pg-129, easy**
A) Protista B) Plants C) Monera D) Animals

55. How many of the following statements are true regarding Eukaryotic cell. **Pg-129, easy**
i) Cytoplasm has extensive compartmentalization
ii) Presence of membrane bound organelle
iii) Organised nucleus
iv) A variety of complex locomotory and cytoskeletal structures.

v) Genetic material is organised into chromosomes

A) 2 B) 3 C) 4 D) 5

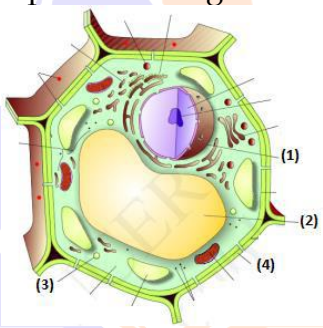
56. **Statement – I:-** Plant cells differs from animals cells.
Statement – ii:- The former one posses cell walls, plastids & a large vacuole which is absent in latter one. **Pg-129, easy**

A) Both statements are correct.
B) Both statement are incorrect.
C) Statement – I is correct but statement – II is incorrect.
D) Statement – I is incorrect but statement – II is correct.

57. Centrioles are present in **Pg-129, easy**

A) Animal cells B) Plant cells
C) Both animal and plant cells.
D) All other than plant cells.

58. Which of the following correctly explain the diagram. **Pg-130, medium**



A) 1 -> Nuclear membrane 2 -> vacuole 3 -> peroxisome 4 -> cell wall
B) 1 -> Microvilli 2 -> cell wall 3 -> cytoplasm 4 -> Plasma membrane
C) 1 -> Vacuole 2 -> cytoplasm 3 -> Microvilli 4 -> cell wall
D) None of the above

Paragraph – 8.5.1
Cell Membrane

59. The detailed structure of the membrane was studied:- **Pg-131, easy**

A) Only after the advent of the electron microscope in 1950s.
B) Enabled to deduce the possible structure of plasma membrane
C) Both D) None

60. Which of the following cell's study enabled the scientists to deduce the possible structure of Plasma membrane? **Pg-131, easy**

A) RBC B) Cork cell C) WBCs D) Bacterial Cell

61. Cell membrane is mainly composed of **Pg-131, easy**

A) Lipids and Proteins B) Proteins & Cholesterols
C) Lipids & Carbohydrates D) Carbohydrates & Proteins

62. What is the correct arrangement of Lipid molecules in the cell membrane **Pg-131, easy**

A) Polar head -> Outside, non – polar tails -> Inner side.
B) Non – polar head -> Outside Polar tail - > Inner side
C) Polar tail -> Outside non – polar head - > Inner side
D) Polar tail -> inner side non – polar head -> outer side

63. What ensures that the non – polar tail is protected from aqueous environment? **Pg-131, easy**

A) Polar head -> Outside non – polar tails -> Inner side.
B) Non – polar head -> Outside Polar tail - > Inner side
C) Polar tail -> Outside non – polar head - > Inner side
D) Polar tail -> inner side non – polar head -> outer side

64. The constituents of cell membrane are:- **Pg-131**

i) Phospholipid ii) Carbohydrate
iii) Proteins iv) Cholesterol
v) Phosphoproteins
A) Only (i), (ii) & (iv) B) Only (ii), (iv) & (v)
C) Only (ii), (iii), (iv) & (v) D) Only (i), (ii), (iii) & (iv)

65. Which of the following study revealed that cell membrane also contains proteins & carbohydrate:- **Pg-131, easy**
A) Electron microscopic study.
B) Phase – Contrast microscopic study.
C) Biochemical investigation study
D) Cobalt – chloride paper test study.

66. Which of the following statement is incorrect:- **Pg-131, easy**
A) The tail is hydrophobic of saturated hydrocarbons.
B) The tail is hydrophilic of saturated hydrocarbons.
C) The tail is hydrophobic of unsaturated hydrocarbons.
D) The tail is hydrophilic of unsaturated hydrocarbons

67. Which of the following statement is incorrect:- **Pg-131, easy**
A) The ratio of proteins and lipids varies considerably in different cells.
B) In erythrocytes; it has approximately 52% proteins and 40% lipids.
C) On the basis of ease of extraction membrane proteins are of extrinsic and intrinsic type.
D) None of the above

68. The improved model of the structure of cell membrane was proposed by:- **Pg-132, easy**
A) Messelson & Stahl B) Schleiden & Schwann
C) Anton von Leeuwenhoek D) Singer and Nichloson

69. The quasi–fluid nature of lipid enables:- **Pg-132, easy**
A) Flip–flop movement of proteins within the lipid bilayer.
B) Lateral movement of proteins within the lipid bilayer.
C) Flip–flop movement of lipid crossing the protein bilayer.
D) lateral movement of lipid crossing the protein bilayer.

70. One of the most important function of the plasma membrane is:- **Pg-132, easy**
A) Transport of molecules across it. B) Flip – flop movement.
C) Secretion D) Cell enlargement.

71. What ability explains the fluidity of cell membrane:- **Pg-132, easy**
A) Quasi – fluid nature of cell membrane.
B) Lateral movement of proteins.
C) Cell growth, formation of intercellular junctions; secretion; endocytosis; cell division
D) All of the above.

72. The plasma membrane is:- **Pg-132, easy**
A) Semi – permeable in nature B) Impervious in nature
C) Impermeable in nature D) Selectively permeable in nature.

73. How many of the following functions the cell membrane can perform:-
Active transport; Osmosis; Passive transport. **Pg-132, easy**
A) Only one B) Only two C) All D) None

74. Na+ - K+ pump transports molecules **Pg-132, easy**
A) By passive transport B) By active transport
C) By utilisation of ATP D) Both B & C

Paragraph – 8.5.2
Cell Wall

75. The outer covering of fungi and plants is:- **Pg-132, easy**

A) Glycocalyx B) Cell wall C) Cell membrane D) All

76. What is the function of cell wall:- **Pg-132, easy**
A) Gives shape to the cell B) Protects the cell
C) Cell – to – cell interaction D) All of the above

77. What are chemical composition of algal cell wall
Cellulose, Galactans, Mannans, Calcium carbonate, Chitin **Pg-132, easy**
A) Only two of them B) Only three of them
C) Only four of them D) All five of them

78. Cell wall of plants consists of:- **Pg-132, easy**
A) Cellulose & Pectin's only
B) Cellulose, hemicellulose & Pectin's only
C) Cellulose, hemicellulose, Pectin & Proteins.
D) Hemicellulose & Proteins only.

79. Which of the following is capable of growth **Pg-132, easy**
A) Primary cell wall B) Secondary cell wall
C) Tertiary cell wall D) All of them

80. Secondary cell wall is formed **Pg-132, easy**
A) Outside the primary cell wall. B) Inside the cell membrane
C) Inside the plasmodesmata. D) Inside the primary cell wall.

81. Which of the following in plant acts as glue between neighbouring plant cells:- **Pg-132, easy**
A) Ca – Pectate B) Mg – Pectate
C) Ca & Mg – Pectate D) None of the above

82. Which of the following is traversed by plasmodesmata:- **Pg-132, easy**
A) Cell wall & cell membrane
B) Cell membrane & Glycocalyx
C) Cell membrane, cell wall, Glycocalyx & Middle lamella.
D) Cell wall & middle lamella.

Paragraph – 8.5.3
Endomembrane System

83. What are the constituent of Endomembrane system:- **Pg-133, easy**
A) Endoplasmic reticulum B) Golgi body & E.R.
C) E.R; Golgi body; Lysosome & Vacuole. D) E.R, Golgi body & Lysosome.

84. Why Mitochondria, Chloroplast & Peroxisome are not the part of Endo – system:- **Pg-133, easy**
A) They are autonomous organelles.
B) They are semi – autonomous organelles.
C) They are not coordinated with Endomembrane system.
D) They have their own genetic material.

85. Which of the following is the network of tiny-tubular structure scattered in cytoplasm:- **Pg-133, easy**
A) E.R B) Golgi body C) Lysosome D) Vacuole

86. Which of the following structure divides the intercellular space into two compartments:- **Pg-133, easy**
A) E.R B) Golgi body C) Lysosome D) None of the above

87. The extra luminal & luminal compartment represents:- **Pg-133, easy**
A) Cytoplasm & inside ER B) Inside ER & cytoplasm
C) Outside ER & cytoplasm D) Cytoplasm & outside ER

88. The ER having Ribosomes attached to its outer surface is known as **Pg-133, easy**

A) RER B) SER C) Both D) None

89. RER is frequently observed in cells, actively involved in:- **Pg-133, easy**
A) Protein Synthesis B) Lipid synthesis
C) DNA synthesis D) Glucose synthesis

90. Which of the following is continuous with the outer membrane of nucleus:- **Pg-133, easy**
A) R.E.R B) S.E.R C) Golgi body D) Lysosome

91. Steroidal hormones are synthesised by:- **Pg-133, easy**
A) R.E.R B) Lysosome C) S.E.R D) Ribosome

92. Golgi body was firstly observed by **Pg-133, easy**
A) Camillo Golgi in 1898 B) Camillo Golgi in 1897
C) Camillo Golgi in 1895 D) Camillo Golgi in 1993.

93. Golgi body is **Pg-133, easy**
i) Reticular structure. ii) Densely stained structure
iii) Made up of cisternae, Tubule & Vesicle
iv) Concentric cisternae
A) Only (i) & (iii) B) Only (ii), (iii) & (iv)
C) All of the above D) Only (iii) & (iv)

94. What is the diameter of cisternae of Golgi body:- **Pg-133, easy**
A) 0.5µm to 1.0µm B) 0.1 µm to 2.0 µm
C) 0.2 µm to 2.5 µm D) 0.3 µm to 2.0 µm

95. The convex – face of cisternae of Golgi body is also known as:- **Pg-134**
i) Cis – face ii) Forming face iii) Trans – face iv) Maturing face
A) (i) & (ii) B) (ii) & (iii) C) (iv) & (iii) D) (i) & (iv)

96. Which of the following statement is correct:- **Pg-134, easy**
A) Cis & Trans faces are same but inter connected.
B) Cis & Trans faces different & not inter connected
C) Cisternae is 0.1 to 2.0 µm in diameter.
D) None of the above

97. Golgi body principally performs the functions of:- **Pg-134, easy**
A) Secretion B) Packaging of materials.
C) Both D) None

98. Materials to be packed in the _____Fuses with the _____face:- **Pg-134, easy**
A) Cis – face and Trans – face
B) Trans – face and cis – face
C) E.R and cis – face
D) E.R and trans – face

99. A number of proteins synthesized by ribosomes on the _____(i)_____ are modified in the ____(ii)____of the ____(iii)____ **Pg-134, easy**
A) (i) ER (ii) Golgi body (iii) cisternae
B) (i)Golgi body (ii) cisternae (iii)ER
C) (i) cisternae (ii) RE (iii) Golgi body
D) (i) ER (ii) cisternae (iii) Golgi body

100. The vesicular structure formed by the process of packing in Golgi apparatus is:- **Pg-134, easy**
A) Vacuole B) ER C) Lysosome D) All

101. The isolated lysosomal vesicle have been found to be very rich in **Pg-134, easy**
i) Lipases ii) Proteases iii) Carbohydrases
A) Only i) & ii) B) Only ii) & iii) C) Only i) & iii) D) All

102. Enzymes present in lysosomes are accumulatively known as:- **Pg-134, easy**

A) Acid proteases B) Lipases C) Acid hydrolases D) Carbohydrases

103. The membrane bound space in cytoplasm is known as:- **Pg-135, easy**
A) ER B) Golgi body C) Lysosome D) Vacuole

104. Vacuole contains hydrolases; lipases; proteases; water; sap; excretory products & material not useful for the cell **Pg-135, easy**
A) Only four of the above B) Only three of the above
C) Only five of the above D) All of them.

105. The membrane of vacuole is **Pg-134, easy**
A) Single membrane B) Tonoplast C) Both D) none

106. In a plant cell vacuole can occupy up to _____% space of cell **Pg-134, easy**
A) 70 B) 80 C) 90 D) 50

107. In plant tonoplast facilitates the transport of a number of ___(i)___; ____(ii)_____ the concentration gradient. **Pg-134, easy**
A) (i) Solutes (ii) Along B) (i) ions (ii) Along
C) (i) ions (ii) against D) (i) solutes (ii) against

108. How many of the following statements are not wrong:- **Pg-134, medium**
i) Concentration of same ions inside the vacuole is significantly higher.
ii) In amoeba contractile vacuole helps in osmoregulation & excretion.
iii) In Protistans, food vacuoles are formed by engulfing the food particle.
A) Only two B) Only one C) All three D) None

Paragraph – 8.5.4
Mitochondria

109. Which of the following statement is correct about mitochondria:-**Pg-134, medium**
A) Easily visible under the microscope; without stain.
B) Number of mitochondria per cell is invariable
C) Number of mitochondria depends on the physiological activity of cell.
D) All of the above.

110. How many of the following statement is correct regarding mitochondria- **Pg-134, medium**
i) A sausage – shaped str. ii) Diameter is 0.2 – 1.0 µm
iii) Avg. Diameter is 0.5 µm iv) Length is 1.0 – 4.1 µm
A) One B) Two C) Three D) Four

111. Each mitochondria is ___X_____ membrane bound structure; dividing its lumen into ____Y___ distinct compartment **Pg-135, easy**
A) X→ single Y→one B) X →double Y→one
C) X→single Y→two D) X → double Y→two

112. Matrix of mitochondria is:- **Pg-135, easy**
A) Filled with a dense homogenous substance.
B) Outer aqueous compartment
C) Space present between Inner and Outer membrane of Mitochondria
D) Present within the outer membrane of mitochondria

113. The outer membrane of mitochondria forms the ____ limiting boundary of the organelle, while the inner membrane forms a number of_____ **Pg-135, easy**
A) Discontinuous ; infoldings B) Infoldings; Cristae
C) Continuous ; Cristae D) Cistae ; Infoldings

114. Which of the following increase the surface area:- **Pg-135, easy**
A) Matrix B) Inner membrane
C) Outer membrane D) Cristae

115. How many of the following statements are correct:- **Pg-135, easy**
i) Only outer membrane has enzyme for ETS

ii) Only inner membrane has enzymes.
iii) Outer membrane is devoid of enzymes.
iv) Mitochondria matrix has enzyme of kerb's cycle.
v) Mitochondria is the site of aerobic respiration
vi) Matrix also possess SS – DNA molecule & few RNA molecules.
A) Only two B) Only four C) Only five D) Only three

116. The matrix of mitochondria possess:- **Pg-135, easy**
Single circular DNA molecules; A few RNA molecules; 70s' ribosomes; Components required for the synthesis of proteins.
A) Only two of them B) Only three of them
C) All of them D) None of them

117. Mitochondria divides by:- **Pg-135, easy**
A) Endomitosis B) Meiosis C) Budding D) Fission

Paragraph – 8.5.5
Plastids

118. Plastids are found in:- **Pg-135, easy**
A) Only plants cells B) Only Euglenoids
C) Both Plants and Euglenoids D) Plants; Euglenoids & Cyanobacteria.

119. Classification of plastids are based on- **Pg-135, easy**
A) Chromatophores B) Mesosomes
C) Inclusions D) Pigments

120. Which of the following is responsible for trapping of light energy **Pg-135, easy**
A) Chlorophyll like a, b, c etc. B) Carotenoids
C) Chlorophylls & carotenoids D) Chromosomes

121. Carotenoids is group of **Pg-135, easy**
A) Chlorophyll pigments B) Chlorophylls & carotene
C) Carotenes and xanthophyll's
D) Carotenes ; xanthophyll's & other pigments.

122. Leucoplast is :- **Pg-135, easy**
A) Unmodified plastids B) Contains stored nutrients
C) Imparts colour to the plant cell D) Imparts colour to the cyanobacteria

123. What are types of chloroplast:- **Pg-135, easy**
i) Chromoplast ii) Leucoplast
iii) Amyloplast iv) Aleuroplast
v) Elaioplast
A) Three of the above B) Four of the above
C) Five of the above D) None of the above

124. Elaioplast contains **Pg-135, easy**
A) Proteins and fats B) Fats and starch
C) Fats and oils D) Fats ; Protein and oils.

125. Aleuroplast contains **Pg-136, easy**
A) Proteins and fats B) Fats and oils
C) Proteins & starch D) Protein only

126. Majority of chloroplast of the green plants are found in :- **Pg-136, easy**
A) Mesophyll cells of roots B) Mesophyll cells of stems
C) Mesophyll cells of leaves D) Mesophyll cells of flowers.

127. Mesophyll cells are:- **Pg-136, easy**
A) Lens – shaped; Oval; Spherical only
B) Oval &spherical only
C) Discoidal & ribbon – shaped

D) None of them

128. What is dimension of chloroplast :- **Pg-136, easy**
A) Length 2 – 4 µm & width 5 – 10 µm
B) Length 1 – 2 µm & width 2 – 4 µm
C) Length 5 – 10 µm & width 2 – 4 µm
D) Length 2 – 4 µm & width 1 – 2 µm

129. Number of chloroplast per cell may vary from_____ per cell of chlamydomonas to _____ per cell in mesophylls. **Pg-136, easy**
A) 20 – 40; 1 – 5 B) 1 ; 20 – 40
C) 10 – 20; 20 – 40 D) 5; 10 – 20

130. Common features of mitochondria & chloroplasts are :- **Pg-136, easy**
A) Number of membrane & type of DNA molecules only
B) Number of membrane; Ribosomes type and DNA molecule type
C) Types of thylakoid & genetic material.
D) Types of thylakoid, genetic material and permeability of membrane.

131. What are types of thylakoid inside the chloroplast:- **Pg-136, easy**
A) Intergranal thylakoid and stroma lamellae
B) Granum thylakoid only
C) Stroma thylakoid only
D) None of the above

132. Flat membranous tubules connecting the thylakoids in chloroplast is known as:- **Pg-136, easy**
A) Granal thylakoid B) Grama
C) Stroma thylakoid / lamellae D) All of the above

133. The membrane of chloroplast encloses a space known as:- **Pg-136, easy**
A) Matrix B) Cytoplasm C) Lumen D) All of them

134. The stroma of chloroplast contains:- **Pg-136, easy**
(i) Enzyme for carbohydrate & proteins synthesis.
(ii) Small single stranded DNA molecule.
(iii) Ribosomes of 70's type.
A) Only one the above B) Only two of the above
C) Only three of the above D) None of the above

135. Chlorophyll pigments are present in the:- **Pg-136, easy**
A) Matrix B) Stroma C) Membrane D) Thylakoid

136. The ribosomes of chloroplast are:- **Pg-136, easy**
A) Same as Eukaryotic cell B) 70's type with single subunit
C) 70's type with two subunits D) All of the above

Paragraph – 8.5.6
Ribosomes

137. Which of the following statements are true regarding ribosomes :- **Pg-136, easy**
i) Granular structure
ii) First observed as dense particles by George Palade in 1953
iii) Composed of m – RNA & proteins.
iv) Surrounded by a single unit membrane
A) Two of them B) Three of them
C) All of them D) Only one of them

138. What are the types of Ribosomes in a Prokaryotic and Eukaryotic cell. **Pg-136, easy**
A) 70s' and 80s' B) 80s' and 70s'

C) 70s′ and 70s′ D) 80s′ and 80s′

139. How many subunits are presents in a ribosome **Pg-136, easy**
A) Two; one large and one smaller subunits
B) Three; two large and one smaller subunits
C) Only one subunits
D) Three; one large and two smaller subunits.

140. Subunits 50s′ and 30s′ are found in **Pg-136, easy**
A) 60s′ type B) 70s′ type C) 80s′ type D) 90s′ type

141. What is sedimentation co-efficient **Pg-136, easy**
A) Svedberg unit B) Measurement of density
C) Measurement of size D) All of these

142. What type of ribosome are found in Eukaryotic cell **Pg-136, easy**
A) 70s′ type only B) 80s′ type only
C) Both 70s′ and 80s′ type D) 70s′ ; 80s′ & 60s′ type

Paragraph – 8.5.7
Cytoskeleton

143. Cytoskeleton refers to the :- **Pg-136, easy**
A) Cilia and flagella only
B) Network of filamentous proteinaecious structure
C) Microtubules only D) Both (A) & (C)

144. Microtubules; microfilaments & intermediate filaments are constituents of:- **Pg-136, easy**
A) Ribosomes B) Central sheath
C) Cytoskeleton D) Cytolamellae

145. Cytoskeleton in a cell is involved in functions like **Pg-136, easy**
A) Mechanical supports B) Motility
C) Maintenance of the shape of cell D) All of the above

Paragraph – 8.5.8
Cilia and Flagella

146. Which of the following statements in untrue:- **Pg-137, easy**
A) Cilia and flagella are hair like outgrowth
B) Cilia are small and works like oars.
C) Flagella are longer and responsible for cell movement.
D) None of them

147. Statement – (I): both eukaryotic and prokaryotic cells contains flagella.
Statement – (II): eukaryotic flagella are structurally different from prokaryotic flagella. **Pg-137, easy**
A) Both statements are correct
B) Both statements are not correct
C) Statement – (I) is correct but statement – (II) is wrong
D) Statement – (I) is wrong but statement – (II) is correct

148. The core of cilia and flagella is known as **Pg-137, easy**
A) Central sheath B) Central microtubule
C) Axoneme D) Bridge

149. The microtubules in the cilia and flagella:- **Pg-137, easy**
A) Runs parallel to each other.
B) Forms the axoneme and outer membrane
C) Both (A) & (B)

D) Arranged centrally only

150. What is arrangement of microtubules in the cilium and flagellum **Pg-137, easy**
A) 9 – peripheral & 3 – central B) Two – peripheral & 9 – central
C) 9 – peripheral & two central D) All peripheral

151. The central sheath is:- **Pg-137, easy**
A) Connected to inter doublet bridges
B) Encloses peripheral doublets
C) Connected to peripheral microtubules
D) All of the above

152. Which of the following statement regarding cilia and flagella are not correct:- **Pg-137, easy**
A) Peripheral doublets are inter connected by linker
B) Linker are also known as inter doublet bridge
C) Both emerges out from a centriole like structure
D) Linker are also known as basal body

Paragraph 8.5.9
Centrosome and centrioles

153. Centrosome and centrioles can be found in:- **Pg-137, easy**
A) Animal cells only B) Plant cells only
C) Both animal & plant cells D) In plant & Bacterial cells

154. Centrioles in the centrosome are:- **Pg-137, easy**
A) Parallely arranged to each other
B) Perpendicularly arranged to each other
C) Arranged like a cart wheel
D) Made up of triplets of centrally arranged microtubules

155. The basal body of centriole has micro tubular arrangement of:- **Pg-137, easy**
A) 9 + 0 B) 9 + 2 C) 9 + 3 D) 3 + 9

156. The central part of the proximal region of the centriole is:- **Pg-137, easy**
A) Known as radial spoke B) Known as a central hub
C) Connected to the peripheral doublets D) All of the above

157. The structure that give rise to the spindle fibers during cell division in animal cell is:- **Pg-137, easy**
A) Cilia B) Flagella C) Both D) Centriole

Paragraph 8.5.10
Nucleus

158. i) Nucleus as an organelle was first described by Robert brown
ii) Stained by the basic dyes, the material is known as chromatin by Robert brown
iii) Double membrane bound structure
How many of the above statement are not true about the nucleus & its material:- **Pg 138, easy**
A) Only one B) Only two C) Only three D) Only four

159. The nucleus has highly extended and elaborate nucleoprotein fibers known as:- **Pg 138, easy**
A) Nucleoli B) Chromosome C) Chromatin D) Nuclear matrix

160. The contents of an inter phase nucleus are:- **Pg 137, easy**
Nucleoli ; chromatin ; nuclear matrix; two membranes
A) Only two of the above B) Only three of the above
C) Only four of the above D) Only of the above

161. What forms the barrier between the cytoplasmic content and nuclear matrix:- **Pg 137, easy**

A) The outer membrane only B) The inner membrane only
C) The perinuclear space D) All of the above

162. i) The outer membrane of nucleus is continuous with rest of the cellular organelles
ii) The inner membrane is continuous with E.R **Pg 138, easy**
iii) Their are interruption known as pores present in outer membrane of nucleus
iv) Pores are formed by the fusion of both of the membranes.
How many of the above statements are incorrect:-
A) 2 B) 1 C) 3 D) 4

163. The nuclear pores facilitates :- **Pg 138, easy**
A) Movement of RNA & protein molecules in only one direction
B) Only proteins in both direction
C) Proteins in one direction & RNA in both directions
D) None of the these

164. Few of the mature cells have no any nucleus:- **Pg 138, easy**
A) Their function are not specific
B) Are dead cells with cytoplasm
C) Their function are controlled by some another cells.
D) All of the above

165. Statement – (I): The nucleus per cell varies per cell.
Statement – (II): Normally there is only one nucleus per cell. **Pg 138, medium**
A) Both (I) & (II) are true & (II) is correct explanation of (I)
B) Both (I) & (II) are true but (II) is not the correct explanation of (I)
C) (II) is wrong but (I) is true. D) (I) is wrong but (II) is true.

166. The nucleus matrix contains:- **Pg 138, easy**
A) Nucleoplasm and chromatin
B) Nucleoplasm, Chromatin and Mitochondria
C) Nucleoplasm, chromatin &E.R
D) None of the above

167. What is not true about the nucleolus:- **Pg 138, easy**
A) Spherical structure present in the nucleoplasm ‘
B) Membrane less structure.
C) Also known as Ribosomal factory of the cell.
D) None of the above

168. At which phase of cell cycle the nucleolus has a loose and indistinct network of nucleoprotein fibers known as chromatin:- **Pg 138, easy**
A) Prophase B) Anaphase C) Interphase D) Metaphase

169. Cell show structured chromosome during:- **Pg 139, easy**
A) All phases except anaphase B) All phases except metaphase
C) All phases except Inter phase D) All phases except m – phase

170. Chromatin contains **Pg 139, easy**
A) Histones; Non – histones & RNA
B) Histones & non – histone proteins only
C) DNA & some basic proteins
D) Both (A) & (C)

171. A human cell has approximately _____ meters long thread of DNA, distributed among its _____ chromosomes:- **Pg 139, easy**
A) 4; 46 B) 2; 46 C) 4; 23 D) 2; 23

172. Each chromosome **Pg 139, easy**

A) Has primary constriction
B) Is visible only in dividing cells.
C) Has disc shaped structure known as kinetochore
D) All of the above

173. Function of centriole is: **Pg 139, easy**
A) Provides site of attachment to the spindle fibers on chromosome
B) Holds two chromatids of a chromosome
C) Both (A) & (B) D) None

174. What is type of chromosome having a middle centromere:- **Pg 139, easy**
A) Metacentric B) Sub – metacentric
C) Acrocentric D) Telocentric

175. What is the type of chromosome having its centromere near the telomere **Pg 139, easy**
A) Metacentric B) Sub – metacentric
C) Telocentric D) Acrocentric

176. Chromosomes having centromere slightly away from the middle is:- **Pg 139, easy**
A) Metacentric B) Sub – metacentric
C) Telocentric D) Acrocentric

177. Chromosome having one long and one short arm are:- **Pg 139, easy**
A) Metacentric & sub – metacentric
B) Sub – metacentric & acrocentric
C) Acrocentric & telocentric
D) Telocentric & metacentric

178. A non – staining is present on a few chromosome
A) Secondary constriction or centromere
B) Satellite or centromere
C) Secondary constriction or satellite
D) None of the above

Paragraph – 8.5.11
Micro bodies

179. Membrane bound minute vesicles containing enzymes are known as:- **Pg 140, easy**
A) Chloroplast B) Mitochondria C) Ribosomes D) Micro bodies

NEET PREVIOUS YEARS QUESTIONS

1. Which of the following is true for nucleolus? **[2018]**
   (a) Larger nucleoli are present in dividing cells.
   (b) It is a membrane-bound structure.
   (c) It is a site for active ribosomal RNA synthesis.
   (d) It takes part in spindle formation.
2. The Golgi complex participates in**:** **[2018]**
   (a) Fatty acid breakdown (b) Formation of secretory vesicles
   (c) Activation of amino acid (d) Respiration in bacteria
3. Which of the following events does not occur in rough endoplasmic reticulum? **[2018]**
   (a) Protein folding (b) Protein glycosylation
   (c) Phospholipid synthesis (d) Cleavage of signal peptide
4. Select the incorrect match. **[2018]**
   (a) Lampbrush – Diplotene bivalents chromosomes
   (b) Allosomes – Sex chromosomes
   (c) Polytene – Oocytes of amphibians chromosomes
   (d) Submetacentric – L-shaped chromosomes chromosomes
5. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP? **[2017]**
   (a) Ribosome (b) Chloroplast (c) Mitochondrion (d) Lysosome
6. Mitochondria and chloroplast are **[2016]**
   1. semi-autonomous organelles.
   2. formed by division of pre-existing organelles and they contain DNA but lack protein synthesising machinary.
   Which one of the following options is correct?
   (a) Both 1 and 2 are true (b) 2 is true but 1 is false
   (c) 1 is true but 2 is false (d) Both 1 and 2 are false
7. Microtubules are the constituents of : **[2016]**
   (a) Cilia, Flagella and Peroxisomes (b) Spindle fibres, Centrioles and Cilia
   (c) Centrioles, Spindle fibres and Chromatin (d) Centrosome, Nucleosome and Centrioles
8. Which one of the following cell organelles is enclosed by a single membrane? **[2016]**
   (a) Mitochondria (b) Chloroplasts (c) Lysosomes (d) Nuclei
9. A protoplast is a cell: **[2015]**
   (a) Without nucleus (b) Undergoing division
   (c) Without cell wall (d) Without plasma membrane
10. Which one of the following is not an inclusion body found in prokaryotes? **[2015]**
    (a) Cyanophycean granule (b) Glycogen granule (c) Polysome (d) Phosphate granule
11. Which of the following are not membrane-bound? **[2015]**
    (a) Ribosomes (b) Lysosomes (c) Mesosomes (d) Vacuoles
12. Identify the correct order of organisation of genetic material from largest to smallest. **[2015]**
    (a) Genome, chromosome, nucleotide, gene

(b) Genome, chromosome, gene, nucleotide
(c) Chromosome, genome, nucleotide, gene
(d) Chromosome, gene, genome, nucleotide

13. Balbiani rings are sites of: **[2015]**
(a) Nucleotide synthesis (b) Polysaccharide synthesis
(c) RNA and protein synthesis (d) Lipid synthesis

14. Match the columns and identify the correct option. **[2015]**

Column-I	**Column-II**
A. Thylakoids	I. Disc-shaped sacs in Golgi apparatus
B. Cristae	II. Condensed structure of DNA
C. Cisternae	III. Flat membranous sacs in stroma
D. Chromatin	IV. Infoldings in mitochondria

(a) A – III; B – IV; C – I; D – II (b) A – III; B – I; C – IV; D – II
(c) A – III; B – IV; C – II; D – I (d) A – IV; B – III; C – I; D – II

15. Cellular organelles with membranes are **[2015]**
(a) chormosomes, ribosomes and endoplasmic reticulum.
(b) endoplasmic reticulum, ribosomes and nuclei.
(c) lysosomes, Golgi apparatus and mitochondria.
(d) nuclei, ribosomes and mitochondria.

16. Satellite DNA is important because it **[2015]**
(a) Shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children.
(b) Does not code for proteins and is same in all members of the population.
(c) Codes for enzymes needed for DNA replication.
(d) Codes for proteins needed in cell cycle.

17. DNA is not present in: **[2015]**
(a) Ribosomes (b) Nucleus (c) Mitochondria (d) Chloroplast

18. Nuclear envelope is a derivative of : **[2015]**
(a) Membrane of Golgi complex (b) Microtubules
(c) Rough endoplasmic reticulum (d) Smooth endoplasmic reticulum

19. Select the correct matching in the following pairs. **[2015]**
(a) Smooth ER – Synthesis of lipids (b) Rough ER – Synthesis of glycogen
(c) Rough ER – Oxidation of fatty acids (d) Smooth ER – Oxidation of phospholipid

20. The function of the gap junction is to **[2015]**
(a) Facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules.
(b) Separate two cells from each other.
(c) Stop substance from leading across a tissue
(d) Performing cementing to keep neighbouring cells together.

21. Cell wall is absent in: **[2015]**
(a) *Funaria* (b) Mycoplasma (c) *Nostoc* (d) *Aspergillus*

22. The chromosomes in which centromere is situated close to one end are: **[2015]**
(a) Acrocentric (b) Telocentric (c) Sub-metacentric (d) Metacentric

23. Which structures perform the function of mitochondria in bacteria? **[2014]**
(a) Nucleoid (b) Ribosomes (c) Cell wall (d) Mesosomes

24. The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as: **[2014]**
(a) Microtubules (b) Microfilaments (c) Intermediate filaments (d) Lamins

25. The osmotic expansion of a cell kept in water is chiefly regulated by: **[2014]**
(a) Mitochondria (b) Vacuoles (c) Plastids (d) Ribosomes

26. Match the following and select the correct answer. **[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

(a) A – IV; B – II; C – I; D – III (b) A – I; B – II; C – IV; D – III
(c) A – I; B – III; C – II; D – IV (d) A – IV; B – III; C – I; D – II

27. The shorter and longer arms of a submetacentric chromosome are referred to as **(NEET-2019)**
(1) s-arm and l-arm respectively (2) p-arm and q-arm respectively
(3) q-arm and p-arm respectively (4) m-arm and n-arm respectively

28. Which of the following pair of organelles does not contain DNA :- **(NEET-2019)**
(1) Mitochondria and Lysosomes (2) Chloroplast and Vacuoles
(3) Lysosomes and Vacuoles (4) Nuclear envelope and Mitochondria

29. Which of the following statement is not correct? **(NEET-2019)**
(1) Lysosomes have numerous hydrolytic enzymes.
(2) The hydrolytic enzymes of lysosomes are active under acidic pH.
(3) Lysosomes are membrane bound structures.
(4) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.

30. The concept of " Omnis cellula-e cellula" regarding cell division was first proposed by: **(NEET-2019)**
(1) Rudolf Virchow (2) Theodore Schwann (3) Schleiden (4) Aristotle

31. Which of the following cell organelles is present in the highest number in secretory cells? **(NEET-2019 ODISSA)**
(1) Mitochondria (2) Golgi complex (3) Endoplasmic reticulum (4) Lysosomes

32. Non-membranous nucleoplasmic structures in nucleus are the site for active synthesis of **(NEET-2019 ODISSA)**
(1) Protein synthesis (2) mRNA (3) rRNA (4) tRNA

33. Which of the following nucleic acids is present in an organism having 70S ribosomes only? **(NEET-2019 ODISSA)**
(1) Single stranded DNA with protein coat
(2) Double stranded circular naked DNA
(3) Double stranded DNA enclosed in nuclear membrane
(4) Double stranded circular DNA with histone proteins

34. Match the column-I with column-II :- **(NEET-2019 ODISSA)**

Column-I	**Column-II**

(a) Golgi apparatus (i) Synthesis of protein
(b) Lysosomes (ii) Trap waste and excretory products
(c) Vacuoles (iii) Formation of glycoproteins and glycolipids
(d) Ribosomes (iv) Digesting biomolecules
Choose the right match from options given below :-
(1) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i) (2) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
(3) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i) (4) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

35. "Ramachandran plot" is used to confirm the structure of :- **(NEET-2019 ODISSA)**
(1) RNA (2) Proteins (3) Triacylglycerides (4) DNA

36. Inclusion bodies of blue- green, purple and green photosynthetic bacteria are **(NEET-2020 COVID-19)**
(1) Contractile vacuoles (2) Gas vacuoles (3) Centrioles (4) Microtubules

37. The biosynthesis of ribosomal RNA occurs in : **(NEET-2020 COVID-19)**
(1) Ribosomes (2) Golgi apparatus (3) Microbodies (4) Nucleolus

38. The size of Pleuropneumonia - like Organism (PPLO) is : **(NEET-2020 COVID-19)**
(1) 0.02 mm (2) 1-2 mm (3) 10-20 mm (4) 0.1 mm

39. Which of the following statements about inclusion bodies is incorrect? **(NEET-2020)**

1) These represent reserve material in cytoplasm

2) They are not bound by any membrane

3) These are involved in ingestion of food particles

4) They lie free in the cytoplasm

40. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells? **(NEET-2020)**

1) Polysomes 2) Endoplasmic reticulum

3) Peroxisomes 4) Golgi bodies

41. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as: **[NEET-2021]**
(1) Telocentric (2) Sub-metacentric (3) Acrocentric (4) Metacentric

42. Which of the following is an incorrect statement? **[NEET-2021]**
(1) Microbodies are present both in plant and animal cells.
(2) The perinuclear space forms a barrier -between the materials present inside the nucleus and that of the cytoplasm
(3) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.
(4) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.

43. Match List-I with List-II **[NEET-2021]**

List-I	**List-II**
a) Cristae	i) Primary constriction in chromosome
b) Thylakoids	ii) Disc-shaped sacs in Golgi apparatus
c) Centromere	iii) Infoldings in mitochondria
d) Cisternae	iv) Flattened membranous sacs in stroma of plastids

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

44. The organelles that are included in the endomembrane system are : **[NEET-2021]**
1. Endoplasmic reticulum, Golgi complex, Lysosomes and vacuoles
2. Golgi complex, Mitochondria, ribosomes and Lysosomes
3. Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes
4. Endoplasmic reticulum, Mitochondria , Ribosomes and Lysosomes

45. Match List – I with List – II **[NEET-2022]**

List – I	**List – II**
a) Metacentric chromosome	i) Centromere situated close to the end forming one extremely short and one very long arms
b) Acrocentric chromosome	ii) Centromere at the terminal end
c) Sub-metacentric	iii) Centromere in the middle forming two equal arms of chromosomes
d) Telocentric chromosome	iv) Centromere slightly away from the middle forming one shorter arm and one longer arm

Choose the correct answer from the options given below:
1) (a) – (iii), (b) – (i), (c)- (iv), (d) – (ii)
2) (a) – (i), (b) – (iii), (c)- (ii), (d) – (iv)
3) (a) – (ii), (b) – (iii), (c)- (iv), (d) – (i)
4) (a) – (i), (b) – (ii), (c)- (iii), (d) – (iv)

46. Which of the following statements with respect to Endoplasmic Reticulum is incorrect? **[NEET-2022]**
1) RER has ribosomes attached to ER
2) SER is devoid of ribosomes
3) In prokaryotes only RER are present
4) SER are the sites for lipid synthesis

NCERT LINE BY LINE QUESTIONS – ANSWERS

1) C	2) C	3) D	4) C	5) B	6) A	7) D	8) D	9) A	10) A
11) A	12) C	13) D	14) A	15) C	16) A	17) A	18) C	19) D	20) B
21) D	22) C	23) D	24) B	25) C	26) D	27) B	28) D	29) B	30) C
31) A	32) B	33) A	34) C	35) D	36) D	37) D	38) C	39) C	40) B
41) C	42) D	43) D	44) D	45) D	46) C	47) C	48) C	49) C	50) C
51) A	52) C	53) D	54) C	55) D	56) A	57) C	58) A	59) C	60) A
61) A	62) A	63) A	64) D	65) C	66) A	67) A	68) D	69) B	70) A
71) D	72) D	73) C	74) B	75) B	76) D	77) C	78) C	79) A	80) D
81) A	82) D	83) C	84) C	85) A	86) A	87) A	88) A	89) A	90) A
91) C	92) A	93) C	94) A	95) A	96) B	97) B	98) C	99) D	100) C
101) D	102) C	103) D	104) A	105) C	106) C	107) C	108) C	109) C	110) D
111) D	112) B	113) C	114) D	115) A	116) C	117) D	118) C	119) D	120) C
121) D	122) B	123) D	124) C	125) D	126) C	127) D	128) C	129) B	130) B
131) A	132) C	133) C	134) A	135) D	136) C	137) B	138) A	139) A	140) B
141) D	142) B	143) B	144) C	145) D	146) D	147) A	148) C	149) A	150) C
151) C	152) D	153) C	154) B	155) A	156) B	157) D	158) A	159) C	160) C
161) D	162) B	163) D	164) C	165) B	166) A	167) D	168) C	169) C	170) D
171) B	172) D	173) C	174) A	175) C	176) B	177) C	178) C	179) D	

NEET PREVIOUS YEARS QUESTIONS-ANSWERS

1) c	2) b	3) c	4) c	5) c	6) c	7) b	8) c	9) c	10) c
11) a	12) b	13) c	14) a	15) c	16) a	17) a	18) c	19) a	20) a
21) b	22) a	23) d	24) b	25) b	26) a	27) 2	28) 3	29) 4	30) 1
31) 2	32) 3	33) 2	34) 1	35) 2	36) 2	37) 4	38) 4	39) 3	40) 4
41) 4	42) 4	43) 2	44) 1	45) 1	46) 3				

NEET PREVIOUS YEARS QUESTIONS-EXPLANATIONS

1. (c) The nucleolus (plural nucleoli) is a large, distinct, spheroidal subcompartment of the nucleus of eukaryote cells that is the site of ribosomal RNA (rRNA) synthesis and assembly of ribosomal subunits.
2. (b) Golgi complex after processing, packages them in vesicles, and either stores them for later use or sends them out of the cell. It is also the organelle that builds lysosomes (cell digestion machines).
3. (c) Phospholipid synthesis does not take place in rough endoplasmic reticulum (RER). Smooth endoplasmic reticulum (SER) is involved in lipid synthesis.
4. (c) Polytene chromosomes are found in salivary glands of insects of order Diptera
5. (c) The site of aerobic oxidation of carbohydrates in cells to generate ATP are mitochondria.
6. (c) Mitochondria & chloroplast are semi-autonomous cell organelle which are formed by division of pre-existing organelle & contain DNA but they also contain protein synthesizing machinery, thus (1) is true & (2) is false.

7. (b)
8. (c) Double membrane bound organelles are mitochondria, chloroplasts, endoplasmic reticulum, golgi body, and nucleus. Single membrane bound organelles are lysosomes, peroxisomes, and vacuoles. Organelles lacking any membrane are ribosomes, centrioles, nucleolus.
9. (c) Cell wall is absent in a protoplast.
10. (c) Polysomes are found in eukaryotes and are defined as a cluster of ribosomes attached to a mRNA molecule. Polysomes are number of ribosomal complexes situated on mRNA.
11. (a) Ribosomes are not membrane-bound cell organelle.
12. (b) Genome > chromosomes > gene > nucleotide.
13. (c) RNA and protein synthesis occur in Balbiani rings.
14. (a)
15. (c) Lysosomes, golgi apparatus and mitochondria are the cell organelles which have membranes.
16. (a) Satellite DNA displays high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is inherited from parents to children (offsprings).
17. (a) Ribosomes are composed of ribonucleic acid and proteins and are not surrounded by any membrane. These are the site for protein synthesis.
18. (c) In late prophase, nuclear envelope disappears and reappears in late telophase from rough endoplasmic reticulum (RER).
19. (a) Lipid synthesis takes place in smooth endoplasmic reticulum.
20. (a) The function of the gap junction is to facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules.
21. (b) Mycoplasma lacks cell wall.
22. (a) In acrocentric chromosomes, one arm is very short but another is long.
23. (d) In some bacteria (*e.g., Bacillus subtilis*), the plasma membrane form certain invaginations or infoldings called mesosomes in the cytoplasm. The mesosomes have various functions, viz., respiratory, secretory etc.
24. (b) Microtubule, microfilament and intermediate filaments along with ER form cytoskeleton. Microfilaments are nonliving, solid and consist of actin protein. They are 4-6 nm in diameter.
25. (b) The vacuole is bound by a single membrane called tonoplast. It also functions as semipermeable membrane. It segregates vacuolar contents from cytoplasm, allows osmotic entry or exit of water, concentration and storage of nutrients as well as wastes.
26. (a)
39. Phosphate granules, glycogen granules and cyanophycean granules are inclusion bodies. They are freely present in cytoplasm and are not bound by any membrane

40: Golgi bodies is useful for formation of glycoproteins and glycolipids

41. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as Metacentric. When the centromere is present slightly away from the middle, it is called sub-metacentric chromosome.When the centromere is present very close to one end of the chromosome, it is called acrocentric chromosome.When the centromere is present at terminal position, the chromosome is called telocentric
42. A mature sieve tube elements possess a peripheral cytoplasm and a large central vacuole but lacks a nucleus. Rest of other statements are correct.
43. iii---iv---i—ii

44. Endo membrane system

Endoplasmic reticulum
Golgi complex , Lysosomes and vacuoles

45. (a) – (iii), (b) – (i), (c)- (iv), (d) – (ii)

46 In prokaryotes membrane bound organelles are absent