

Cell: The Unit of Life — NEET Biology PYQ (2005-2021)

Class 11 Biology · 76 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. Which of the following is an incorrect statement ?

- (A) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.
- (B) Microbodies are present both in plant and animal cells.
- (C) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm.
- (D) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.

NEET 2021

2. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as :

- (A) Metacentric
- (B) Telocentric
- (C) Sub-metacentric
- (D) Acrocentric

NEET 2021

3. Match List - I with List - II.

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

Choose the correct answer from the options given below.

- (A) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
- (B) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)
- (C) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
- (D) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

NEET 2021

4. The organelles that are included in the endomembrane system are :

- (A) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes
- (B) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles
- (C) Golgi complex, Mitochondria, Ribosomes and Lysosomes
- (D) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes

NEET 2020 · Q16

5. Which of the following statements about inclusion bodies is incorrect?

- (A) They are not bound by any membrane.
- (B) These are involved in ingestion of food particles.
- (C) They lie free in the cytoplasm.
- (D) These represent reserve material in cytoplasm.

NEET 2020 · Q17

6. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells?

- (A) Endoplasmic reticulum
- (B) Peroxisomes
- (C) Golgi bodies
- (D) Polysomes

NEET 2019 · Q94

7. The shorter and longer arms of a submetacentric chromosome are referred to as :

- (A) s-arm and l-arm respectively
- (B) p-arm and q-arm respectively
- (C) q-arm and p-arm respectively
- (D) m-arm and n-arm respectively

NEET 2019 · Q110

8. Which of the following statements is not correct ?

- (A) Lysosomes have numerous hydrolytic enzymes.
- (B) The hydrolytic enzymes of lysosomes are active under acidic pH.
- (C) Lysosomes are membrane bound structures.
- (D) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.

NEET 2019 · Q119

9. Which of the following pair of organelles does not contain DNA ?

- (A) Mitochondria and Lysosomes
- (B) Chloroplast and Vacuoles
- (C) Lysosomes and Vacuoles
- (D) Nuclear envelope and Mitochondria

NEET 2019 · Q133

10. Which of the following statements regarding mitochondria is incorrect ?

- (A) Outer membrane is permeable to monomers of carbohydrates, fats and proteins.
- (B) Enzymes of electron transport are embedded in outer membrane.
- (C) Inner membrane is convoluted with infoldings.
- (D) Mitochondrial matrix contains single circular DNA molecule and ribosomes.

NEET 2019 · Q173

11. The concept of "Omnis cellula-e cellula" regarding cell division was first proposed by :

- (A) Rudolf Virchow
- (B) Theodore Schwann
- (C) Schleiden
- (D) Aristotle

NEET 2018 · Q119

12. The Golgi complex participates in

- (A) Respiration in bacteria
- (B) Formation of secretory vesicles
- (C) Fatty acid breakdown
- (D) Activation of amino acid

NEET 2018 · Q121

13. Which of the following is true for nucleolus?

- (A) It takes part in spindle formation.
- (B) It is a membrane-bound structure.
- (C) Larger nucleoli are present in dividing cells.
- (D) It is a site for active ribosomal RNA synthesis.

NEET 2018 · Q171

14. Select the incorrect match:

- (A) Submetacentric chromosomes – L-shaped chromosomes
- (B) Allosomes – Sex chromosomes
- (C) Lampbrush chromosomes – Diplotene bivalents
- (D) Polytene chromosomes – Oocytes of amphibians

NEET 2018 · Q174

15. Many ribosomes may associate with a single mRNA to form multiple copies of a polypeptide simultaneously. Such strings of ribosomes are termed as

- (A) Plastidome
- (B) Polyhedral bodies
- (C) Polysome
- (D) Nucleosome

NEET 2017 · Q96

16. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?

- (A) Lysosome
- (B) Ribosome
- (C) Chloroplast
- (D) Mitochondrion

NEET 2017 · Q112

17. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen?

- (A) Bacillus
- (B) Pseudomonas
- (C) Mycoplasma
- (D) Nostoc

NEET 2017 · Q119

18. Which of the following components provides sticky character to the bacterial cell?

- (A) Cell wall
- (B) Nuclear membrane
- (C) Plasma membrane
- (D) Glycocalyx

NEET 2017 (Gujarati paper) · Q47

19. The correct sequence of involvement of cell organelles in secretion of proteins from the cell is:

- (A) Nucleus → Ribosomes → Endoplasmic reticulum → Golgi apparatus → Secretory vesicles → Plasma membrane
- (B) Nucleus → Ribosomes → Endoplasmic reticulum → Lysosomes → Plasma membrane
- (C) Nucleus → Endoplasmic reticulum → Ribosomes → Golgi apparatus → Lysosomes → Plasma membrane
- (D) Nucleus → Endoplasmic reticulum → Ribosomes → Golgi apparatus → Secretory vesicles → Plasma membrane

NEET 2017 (Gujarati paper) · Q63

20. The type of ribosomes is same in:

- (A) Cytoplasm of eukaryotic cells, their mitochondria and chloroplasts.
- (B) Cytoplasm of eukaryotic cells, their chloroplasts and microbodies.
- (C) Prokaryotes, mitochondria and chloroplasts.
- (D) Eukaryotic cytoplasm, mitochondria and endoplasmic reticulum.

NEET 2017 (Gujarati paper) · Q77

21. Reserved material in prokaryotic cells is stored as:

- (A) Inclusion Bodies
- (B) Mesosome
- (C) Polysome
- (D) Basal body

NEET 2017 (Gujarati paper) · Q98

22. A complex of ribosomes attached to a single strand of mRNA is known as:

- (A) Polymer
- (B) Polyribosome
- (C) Polypeptide
- (D) Okazaki fragment

NEET 2017 (Gujarati paper) · Q105

23. Which of the following pathways is involved for packaging of secretory proteins?

- (A) Trans face of Golgi body → Cis face of Golgi body → RER → SER → Secretory vesicles
- (B) RER → Cis face of Golgi body → Trans face of Golgi body → Secretory vesicles
- (C) Cis face of Golgi body → Trans face of Golgi body → RER → Secretory vesicles
- (D) RER → Trans face of Golgi body → Cis face of Golgi body → Secretory vesicles

NEET 2016 Phase 2 · Q104

24. Select the mismatch.

- (A) Gas vacuoles—Green bacteria
- (B) Large central vacuoles—Animal cells
- (C) Protists—Eukaryotes
- (D) Methanogens—Prokaryotes

NEET 2016 Phase 2 · Q105

25. Select the wrong statement.

- (A) Bacterial cell wall is made up of peptidoglycan.
- (B) Pili and fimbriae are mainly involved in motility of bacterial cells.
- (C) Cyanobacteria lack flagellated cells.
- (D) Mycoplasma is a wall-less microorganism.

NEET 2016 Phase 2 · Q106

26. A cell organelle containing hydrolytic enzymes is

- (A) lysosome
- (B) microsome
- (C) ribosome
- (D) mesosome

NEET 2016 Phase 1 · Q101

27. Mitochondria and chloroplast are:

(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?

- (A) Both (a) and (b) are correct.
- (B) (b) is true but (a) is false.
- (C) (a) is true but (b) is false.
- (D) Both (a) and (b) are false.

NEET 2016 Phase 1 · Q109

28. Microtubules are the constituents of:

- (A) Cilia, Flagella and Peroxisomes
- (B) Spindle fibres, Centrioles and Cilia
- (C) Centrioles, Spindle fibres and Chromatin
- (D) Centrosome, Nucleosome and Centrioles

NEET 2016 Phase 1 · Q136

29. Which one of the following cell organelles is enclosed by a single membrane?

- (A) Mitochondria
- (B) Chloroplasts
- (C) Lysosomes
- (D) Nuclei

30. Water soluble pigments found in plant cell vacuoles are:

- (A) Xanthophylls
- (B) Chlorophylls
- (C) Carotenoids
- (D) Anthocyanins

AIPMT 2015

31. Nuclear envelope is a derivative of:

- (A) Rough endoplasmic reticulum
- (B) Smooth endoplasmic reticulum
- (C) Membrane of Golgi complex
- (D) Microtubules

AIPMT 2015

32. The structures that are formed by stacking of organized flattened membranous sacs in the chloroplasts are:

- (A) Stroma
- (B) Cristae
- (C) Grana
- (D) Stroma lamellae

AIPMT 2015

33. DNA is not present in:

- (A) Mitochondria
- (B) Chloroplast
- (C) Ribosomes
- (D) Nucleus

AIPMT 2015

34. Select the correct matching in the following pairs:

- (A) Rough ER — Oxidation of fatty acids
- (B) Smooth ER — Oxidation of phospholipids
- (C) Smooth ER — Synthesis of lipids
- (D) Rough ER — Synthesis of glycogen

AIPMT 2015

35. Which one of the following is not an inclusion body found in prokaryotes?

- (A) Polysome
- (B) Phosphate granule
- (C) Cyanophycean granule
- (D) Glycogen granule

AIPMT 2015

36. The chromosomes in which centromere is situated close to one end are:

- (A) Sub-metacentric
- (B) Metacentric
- (C) Acrocentric
- (D) Telocentric

AIPMT 2014

37. Which structures perform the function of mitochondria in bacteria?

- (A) Ribosomes
- (B) Cell wall
- (C) Mesosomes
- (D) Nucleoid

AIPMT 2014

38. The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as:

- (A) Microfilaments
- (B) Intermediate filaments
- (C) Lamins
- (D) Microtubules

AIPMT 2014

39. The osmotic expansion of a cell kept in water is chiefly regulated by:

- (A) Vacuoles
- (B) Plastids
- (C) Ribosomes
- (D) Mitochondria

AIPMT 2014

40. Match the following and select the correct answer: (a) Centriole (b) Chlorophyll (c) Cristae (d) Ribozymes — (i) Infoldings in mitochondria (ii) Thylakoids (iii) Nucleic acids (iv) Basal body cilia or flagella

- (A) a-(i), b-(ii), c-(iv), d-(iii)
- (B) a-(i), b-(iii), c-(ii), d-(iv)
- (C) a-(iv), b-(iii), c-(i), d-(ii)
- (D) a-(iv), b-(ii), c-(i), d-(iii)

AIPMT 2014

41. The motile bacteria are able to move by:

- (A) flagella
- (B) cilia
- (C) pili
- (D) fimbriae

NEET 2013

42. A major site for synthesis of lipids is

- (A) RER
- (B) SER
- (C) Symplast
- (D) Nucleoplasm

NEET 2013

43. The Golgi complex plays a major role

- (A) in trapping the light and transforming it into chemical energy
- (B) in digesting proteins and carbohydrates
- (C) as energy transferring organelles
- (D) in post translational modification of proteins and glycosidation of lipids

AIPMT 2012 Mains

44. Which one of the following structures is an organelle within an organelle ?

- (A) Ribosome
- (B) Peroxisome
- (C) ER
- (D) Mesosome

AIPMT 2012 Mains

45. Which one of the following cellular parts is correctly described ?

- (A) Thylakoids – flattened membranous sacs forming the grana of chloroplasts
- (B) Centrioles – sites for active RNA synthesis
- (C) Ribosomes – those on chloroplasts are larger (80S) while those in the cytoplasm are smaller (70S)
- (D) Lysosomes – optimally active at a pH of about 8.5

AIPMT 2012 Prelims

46. Ribosomal RNA is actively synthesized in

- (A) Ribosomes
- (B) Lysosomes
- (C) Nucleolus
- (D) Nucleoplasm

AIPMT 2012 Prelims

47. Which one of the following does not differ in E. coli and Chlamydomonas?

- (A) Cell membrane
- (B) Ribosomes
- (C) Chromosomal Organization
- (D) Cell wall

AIPMT 2012 Prelims

48. What is true about ribosomes ?

- (A) These are self - splicing introns of some RNAs
- (B) The prokaryotic ribosomes are 80S, where "S" stands for sedimentation coefficient
- (C) These are composed of ribonucleic acid and proteins
- (D) These are found only in eukaryotic cells

AIPMT 2012 Prelims

49. Select the correct statement from the following regarding cell membrane

- (A) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson
- (B) Na⁺ and K⁺ ions move across cell membrane by passive transport
- (C) Proteins make up 60 to 70% of the cell membrane
- (D) Lipids are arranged in a bilayer with polar heads towards the inner part

AIPMT 2011 Mains

50. Which one of the following is not considered as a part of the endomembrane system?

- (A) Vacuole
- (B) Lysosome
- (C) Golgi complex
- (D) Peroxisome

AIPMT 2011 Prelims

51. Important site for formation of glycoproteins and glycolipids is

- (A) Lysosome
- (B) Vacuole
- (C) Golgi apparatus
- (D) Plastid

AIPMT 2011 Prelims

52. Peptide synthesis inside a cell takes place in

- (A) Ribosomes
- (B) Chloroplast
- (C) Mitochondria
- (D) Chromoplast

AIPMT 2011 Prelims

53. In eubacteria, a cellular component that resembles eukaryotic cell is

- (A) Cell wall
- (B) Plasma membrane
- (C) Nucleus
- (D) Ribosomes

AIPMT 2010 Mains · Q44

54. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called :

- (A) Thylakoid
- (B) Endoplasmic Reticulum
- (C) Plasmalemma
- (D) Cytoskeleton

AIPMT 2010 Prelims · Q110

55. The plasma membrane consists mainly of

- (A) Proteins embedded in a carbohydrate bilayer
- (B) Phospholipids embedded in a protein bilayer
- (C) Proteins embedded in a phospholipid bilayer
- (D) Proteins embedded in a polymer of glucose molecules

AIPMT 2010 Prelims · Q111

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

- (A) Plasmalemma
- (B) Plasmodesmata
- (C) Plastoquinones
- (D) Endoplasmic reticulum

AIPMT 2010 Prelims · Q112

57. Which one of the following has its own DNA?

- (A) Peroxisome
- (B) Mitochondria
- (C) Dictyosome
- (D) Lysosome

AIPMT 2010 Prelims · Q113

58. The main arena of various types of activities of a cell is

- (A) Nucleus
- (B) Plasma membrane
- (C) Mitochondrion
- (D) Cytoplasm

AIPMT 2010 Prelims · Q115

59. Algae have cell wall made up of

- (A) Cellulose, hemicellulose and pectins
- (B) Cellulose, galactans and mannans
- (C) Hemicellulose, pectins and proteins
- (D) Pectins, cellulose and proteins

AIPMT 2010 Prelims · Q116

60. Membrane-bound organelles are absent in

- (A) Plasmodium
- (B) Saccharomyces
- (C) Streptococcus
- (D) Chlamydomonas

AIPMT 2009 Prelims · Q83

61. There is no DNA in:

- (A) Mature RBCs
- (B) A mature spermatozoan
- (C) Hair root
- (D) An enucleated ovum

AIPMT 2009 Prelims · Q95

62. Plasmodesmata are:

- (A) Locomotary structures
- (B) Membranes connecting the nucleus with plasmalemma
- (C) Connections between adjacent cells
- (D) Lignified cemented layers between cells

AIPMT 2009 Prelims · Q104

63. Cytoskeleton is made up of:

- (A) Callose deposits
- (B) Cellulosic microfibrils
- (C) Proteinaceous filaments
- (D) Calcium carbonate granules

AIPMT 2009 Prelims · Q139

64. Middle lamella is composed mainly of:

- (A) Muramic acid
- (B) Calcium pectate
- (C) Phosphoglycerides
- (D) Hemicellulose

AIPMT 2008 Prelims · Q111

65. Vacuole in a plant cell

- (A) Lacks membrane and contains water and excretory substances
- (B) Is membrane-bound and contains storage proteins and lipids
- (C) Is membrane-bound and contains water and excretory substances
- (D) Lacks membrane and contains air

AIPMT 2008 Prelims · Q116

66. 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)?

- (A) Neither lipids nor proteins can flip-flop
- (B) Both lipids and proteins can flip-flop
- (C) While lipids can rarely flip-flop, proteins cannot
- (D) While proteins can flip-flop, lipids cannot

AIPMT 2008 Prelims · Q117

67. In germinating seeds fatty acids are degraded exclusively in the

- (A) Mitochondria
- (B) Proplastids
- (C) Glyoxysomes
- (D) Peroxisomes

AIPMT 2008 Prelims · Q118

68. The two sub-units of ribosome remain united at a critical ion level of

- (A) Calcium
- (B) Copper
- (C) Manganese
- (D) Magnesium

AIPMT 2007 Prelims · Q120

69. Select the wrong statement from the following.

- (A) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane
- (B) Both chloroplasts and mitochondria contain DNA
- (C) The chloroplasts are generally much larger than mitochondria
- (D) Both chloroplasts and mitochondria contain an inner and an outer membrane

70. Which one of the following is not a constituent of cell membrane?

- (A) glycolipids
- (B) proline
- (C) phospholipids
- (D) cholesterol

71. Which of the following statements regarding mitochondrial membrane is not correct ?

- (A) The outer membrane is permeable to all kinds of molecules
- (B) The enzymes of the electron transfer chain are embedded in the outer membrane
- (C) The inner membrane is highly convoluted forming a series of infoldings
- (D) The outer membrane resembles a sieve

72. A major breakthrough in the studies of cells came with the development of electron microscope. This is because :

- (A) the resolution power of the electron microscope is much higher than that of the light microscope
- (B) the resolving power of the electron microscope is 200 – 350 nm as compared to 0.1 – 0.2 nm for the light microscope
- (C) electron beam can pass through thick materials, whereas light microscopy requires thin sections
- (D) 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

73. The main organelle involved in modification and routing of newly synthesized proteins to their destinations is :

- (A) mitochondria
- (B) endoplasmic reticulum
- (C) lysosome
- (D) chloroplast

74. 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 ?

- (A) Yellow
- (B) Green
- (C) Blue
- (D) Red

75. Protein synthesis in an animal cell occurs :

- (A) only on the ribosomes present in cytosol
- (B) on ribosomes present in cytoplasm as well as in mitochondria
- (C) only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
- (D) on ribosomes present in the nucleolus as well as in cytoplasm

76. 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?

- (A) Proteins in cell membranes can travel within the lipid bilayer
- (B) Proteins can remain confined within certain domains of the membrane
- (C) Proteins can also undergo flip-flop movements in the lipid bilayer
- (D) Many proteins remain completely embedded within the lipid bilayer

Answer key and explanations

1. Answer: (A) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.

Mature sieve tube elements lose their nucleus and are controlled by the companion cells, so saying they have a conspicuous nucleus is incorrect. Microbodies occur in both plant and animal cells, the perinuclear space separates the two nuclear membranes, and nuclear pores allow two-way traffic of RNA and proteins.

2. Answer: (A) Metacentric

A chromosome whose centromere lies in the middle, giving two equal arms, is metacentric. A sub-metacentric centromere lies slightly away from the middle, giving one shorter and one longer arm.

3. Answer: (C) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

Cristae are infoldings of the inner mitochondrial membrane, thylakoids are flattened membranous sacs in the stroma of plastids, the centromere is the primary constriction of a chromosome, and cisternae are the disc-shaped sacs of the Golgi apparatus. Hence (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii).

4. Answer: (B) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles

The endomembrane system is the group of organelles that work in coordination: endoplasmic reticulum, Golgi complex, lysosomes and vacuoles. Mitochondria, chloroplasts and peroxisomes are not part of it, and ribosomes have no membrane.

5. Answer: (B) These are involved in ingestion of food particles.

Inclusion bodies are reserve materials such as phosphate granules, cyanophycean granules and glycogen granules lying free in the prokaryotic cytoplasm without any membrane. They play no part in ingesting food, which is the wrong statement.

6. Answer: (C) Golgi bodies

The Golgi apparatus is the main site where glycoproteins and glycolipids are formed, as it adds sugars to proteins and lipids received from the ER. The ER makes and folds proteins and lipids, while peroxisomes and polysomes do not do this.

7. Answer: (B) p-arm and q-arm respectively

The short arm of a chromosome is called the p-arm (petite) and the long arm the q-arm. Writing them the other way round reverses the convention.

8. Answer: (D) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.

Lysosomes are membrane-bound vesicles formed by packaging in the Golgi apparatus, not the endoplasmic reticulum. They do contain many acid hydrolases active at acidic pH.

9. Answer: (C) Lysosomes and Vacuoles

Lysosomes and vacuoles are single-membrane bound organelles without their own DNA. Mitochondria and chloroplasts are semi-autonomous and carry their own circular DNA, so any pair containing them is wrong.

10. Answer: (B) Enzymes of electron transport are embedded in outer membrane.

The electron transport chain enzymes are located in the inner mitochondrial membrane (on the cristae), not the outer membrane. The outer membrane is porous, the inner membrane forms cristae, and the matrix holds circular DNA and 70S ribosomes.

11. Answer: (A) Rudolf Virchow

Rudolf Virchow (1855) explained that cells divide and new cells arise from pre-existing cells (Omnis cellula-e cellula), modifying the cell theory. Schleiden and Schwann proposed the original cell theory but could not explain how new cells form.

12. Answer: (B) Formation of secretory vesicles

The Golgi apparatus packages and modifies materials received from the ER and buds them off as secretory vesicles from its trans face. Bacteria have no Golgi, fatty acid breakdown occurs in mitochondria and peroxisomes, and amino acid activation occurs in the cytoplasm by aminoacyl-tRNA synthetases.

13. Answer: (D) It is a site for active ribosomal RNA synthesis.

The nucleolus is a non-membrane-bound body in the nucleus where rRNA is actively synthesised. It is not membrane-bound, it disappears during cell division instead of forming the spindle, and larger, more numerous nucleoli occur in cells actively making proteins, not specifically in dividing cells.

14. Answer: (D) Polytene chromosomes - Oocytes of amphibians

Polytene chromosomes occur in the salivary glands of insect larvae such as *Drosophila*; the giant chromosomes of amphibian oocytes are lampbrush chromosomes, which are diplotene bivalents. Submetacentric chromosomes look L-shaped and allosomes are the sex chromosomes, so those matches are correct.

15. Answer: (C) Polysome

Several ribosomes translating the same mRNA together form a polysome (polyribosome), which makes many copies of the polypeptide at once. A nucleosome is a unit of DNA wound on a histone octamer, and a plastidome is the total plastid content of a cell.

16. Answer: (D) Mitochondrion

Mitochondria are the sites of aerobic respiration, where the energy of carbohydrates is extracted and stored as ATP; they are called the powerhouses of the cell. Chloroplasts trap light energy to make carbohydrates rather than break them down.

17. Answer: (C) Mycoplasma

Mycoplasmas have no cell wall, are the smallest known living cells (about 0.3 μm), can survive without oxygen, and many cause diseases in plants and animals. *Bacillus*, *Pseudomonas* and *Nostoc* all have cell walls and are much larger.

18. Answer: (D) Glycocalyx

The glycocalyx, the outermost envelope as a loose slime layer or a thick capsule, makes the bacterial cell sticky. The cell wall gives shape and support, and bacteria have no nuclear membrane at all.

19. Answer: (A) Nucleus → Ribosomes → Endoplasmic reticulum → Golgi apparatus → Secretory vesicles → Plasma membrane

mRNA made in the nucleus is translated on ribosomes attached to the ER; the protein enters the ER lumen, is passed to the Golgi for modification and packaging, and leaves in secretory vesicles that fuse with the plasma membrane. Lysosomes are not on the secretory route, and ribosomes come before (not after) the ER in the sequence.

20. Answer: (C) Prokaryotes, mitochondria and chloroplasts.

Prokaryotes, mitochondria and chloroplasts all have 70S ribosomes, which supports the endosymbiotic origin of these organelles. The eukaryotic cytoplasm and rough ER carry 80S ribosomes, so any grouping that mixes cytoplasm with mitochondria or chloroplasts is wrong.

21. Answer: (A) Inclusion Bodies

Prokaryotes store reserve materials such as phosphate granules, cyanophycean granules and glycogen granules in the cytoplasm as inclusion bodies, which are not bounded by membranes. The mesosome is an infolding of the plasma membrane, a polysome is a chain of ribosomes on mRNA, and the basal body anchors the flagellum.

22. Answer: (B) Polyribosome

Several ribosomes translating the same mRNA together form a polyribosome (polysome). A polypeptide is the product of translation and an Okazaki fragment is a short piece of lagging-strand DNA made in replication.

23. Answer: (B) RER → Cis face of Golgi body → Trans face of Golgi body → Secretory vesicles

Proteins made on the RER reach the receiving cis (forming) face of the Golgi, move through the cisternae and leave from the trans (maturing) face in secretory vesicles. Entering at the trans face reverses the polarity of the Golgi.

24. Answer: (B) Large central vacuoles—Animal cells

A large central vacuole is a feature of mature plant cells; animal cells have small vacuoles or none. Gas vacuoles do occur in blue-green, purple and green photosynthetic bacteria, protists are eukaryotes and methanogens are prokaryotic archaeobacteria.

25. Answer: (B) Pili and fimbriae are mainly involved in motility of bacterial cells.

Bacterial motility comes from flagella; pili and fimbriae are surface outgrowths that help in attachment to surfaces or host tissues (and pili in conjugation), not in movement. The other statements about peptidoglycan walls, non-flagellated cyanobacteria and wall-less Mycoplasma are correct.

26. Answer: (A) lysosome

Lysosomes are membrane-bound vesicles from the Golgi that are rich in acid hydrolases such as lipases, proteases and carbohydrases. Ribosomes make proteins, mesosomes are infoldings of the bacterial membrane, and microsomes are ER fragments formed when cells are homogenised.

27. Answer: (C) (a) is true but (b) is false.

Mitochondria and chloroplasts are semi-autonomous: they arise by division of pre-existing organelles and have their own circular DNA. They also have their own 70S ribosomes, so they do possess protein-synthesising machinery, which makes the second statement false.

28. Answer: (B) Spindle fibres, Centrioles and Cilia

Microtubules (tubulin polymers) form the spindle fibres, the triplet fibrils of centrioles and the 9+2 axoneme of cilia. Peroxisomes are membrane-bound vesicles, and chromatin and nucleosomes are made of DNA and histones, not microtubules.

29. Answer: (C) Lysosomes

Lysosomes are single-membrane vesicles containing hydrolytic enzymes. Mitochondria, chloroplasts and the nucleus (nuclear envelope) are all bounded by a double membrane.

30. Answer: (D) Anthocyanins

Anthocyanins are water-soluble flavonoid pigments dissolved in the vacuolar cell sap, giving red, purple and blue colours. Chlorophylls, carotenoids and xanthophylls are fat-soluble pigments located in plastids.

31. Answer: (A) Rough endoplasmic reticulum

The outer membrane of the nuclear envelope is continuous with the rough endoplasmic reticulum and also carries ribosomes, so it is regarded as derived from rough ER. Microtubules are protein structures, not membranes.

32. Answer: (C) Grana

Thylakoids are flattened membranous sacs that are stacked like coins to form grana. Stroma lamellae are the flat tubules joining grana, and cristae are folds of the inner mitochondrial membrane.

33. Answer: (C) Ribosomes

Ribosomes are made of rRNA and proteins and contain no DNA. Mitochondria and chloroplasts have their own circular DNA, and the nucleus holds the chromosomal DNA.

34. Answer: (C) Smooth ER — Synthesis of lipids

Smooth ER is the main site of lipid synthesis, including steroid hormones in animal cells. Rough ER carries ribosomes and makes proteins; fatty acid oxidation happens in mitochondria and peroxisomes.

35. Answer: (A) Polysome

Inclusion bodies in prokaryotes are stores of reserve material lying free in the cytoplasm, such as phosphate granules, cyanophycean granules and glycogen granules. A polysome is a chain of ribosomes translating one mRNA, not a storage body.

36. Answer: (C) Acrocentric

In an acrocentric chromosome the centromere lies close to one end, giving one very short and one very long arm. A telocentric chromosome has the centromere at the very end, and a sub-metacentric one has it slightly away from the middle.

37. Answer: (C) Mesosomes

Mesosomes are infoldings of the bacterial plasma membrane thought to bear respiratory enzymes, so they are described as performing the role of mitochondria. Ribosomes make proteins, the nucleoid holds the DNA, and the cell wall gives shape and protection.

38. Answer: (A) Microfilaments

Microfilaments are solid filaments about 6 nm thick made of a single kind of monomer, actin.

Microtubules are hollow tubes of tubulin about 25 nm wide, and intermediate filaments (such as lamins) are about 10 nm and built from varied proteins.

39. Answer: (A) Vacuoles

The large central vacuole contains cell sap with dissolved solutes; it controls the osmotic entry of water and so the expansion and turgidity of a plant cell kept in water. Plastids, ribosomes and mitochondria have no such osmotic role.

40. Answer: (D) a-(iv), b-(ii), c-(i), d-(iii)

Centrioles form the basal bodies of cilia and flagella, chlorophyll is present in thylakoids, cristae are the infoldings of the inner mitochondrial membrane, and ribozymes are catalytic nucleic acids (RNA). Only the option giving exactly these four pairings is correct.

41. Answer: (A) flagella

Motile bacteria move by flagella, thin filamentous extensions of the cell wall and membrane. Pili and fimbriae are surface structures for attachment and conjugation, not locomotion, and bacteria have no cilia.

42. Answer: (B) SER

The smooth endoplasmic reticulum, which lacks ribosomes, is the major site of lipid (including steroid) synthesis. Rough ER bears ribosomes and is the site of protein synthesis.

43. Answer: (D) in post translational modification of proteins and glycosidation of lipids

The Golgi apparatus modifies proteins received from the ER and is the site of formation of glycoproteins and glycolipids. Trapping light belongs to chloroplasts, digestion to lysosomes and energy transfer to mitochondria.

44. Answer: (A) Ribosome

Mitochondria and chloroplasts contain their own 70S ribosomes, so ribosomes occur as an organelle within an organelle. Peroxisomes and ER lie free in the cytoplasm, and mesosomes are infoldings of the bacterial plasma membrane.

45. Answer: (A) Thylakoids - flattened membranous sacs forming the grana of chloroplasts

Thylakoids are flattened membranous sacs stacked into grana inside chloroplasts. Chloroplast ribosomes are the smaller 70S type and cytoplasmic ones are 80S, lysosomes work best at an acidic pH of about 5, and centrioles organise spindles rather than making RNA.

46. Answer: (C) Nucleolus

The nucleolus is the site of active ribosomal RNA synthesis. Ribosomes are made of rRNA but do not synthesise it, and lysosomes are digestive vesicles.

47. Answer: (A) Cell membrane

Both the prokaryote *E. coli* and the eukaryotic alga *Chlamydomonas* have a similar lipid-protein plasma membrane. Their ribosomes (70S versus 80S cytoplasmic), chromosome organisation (naked circular DNA versus chromatin) and cell wall chemistry (peptidoglycan versus cellulose) all differ.

48. Answer: (C) These are composed of ribonucleic acid and proteins

Ribosomes are made of ribosomal RNA and proteins. Prokaryotic ribosomes are 70S (not 80S), ribosomes occur in both prokaryotes and eukaryotes, and they are not introns.

49. Answer: (A) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson

The fluid mosaic model of the cell membrane was proposed by Singer and Nicolson in 1972. Na^+ and K^+ are moved by active transport (Na^+/K^+ pump), proteins form about half (not 60–70%) of the human RBC membrane, and lipid polar heads face outwards with the tails inside.

50. Answer: (D) Peroxisome

The endomembrane system comprises the ER, Golgi complex, lysosomes and vacuoles, whose functions are coordinated. Peroxisomes, like mitochondria and chloroplasts, work independently of this system and are not counted in it.

51. Answer: (C) Golgi apparatus

The Golgi apparatus packages and modifies proteins and lipids coming from the ER, and it is the main site where glycoproteins and glycolipids are formed. Lysosomes are digestive vesicles budded from the Golgi, not the site of glycosylation.

52. Answer: (A) Ribosomes

Peptide bonds are formed on ribosomes during translation. Chloroplasts and mitochondria do contain their own ribosomes, but the synthesis there still happens on those ribosomes, and chromoplasts are pigment-storing plastids.

53. Answer: (B) Plasma membrane

The bacterial plasma membrane is a lipid bilayer with proteins, structurally similar to the eukaryotic membrane. The bacterial cell wall is made of peptidoglycan, there is no true nucleus (only a nucleoid), and bacterial ribosomes are 70S rather than the 80S of the eukaryotic cytoplasm.

54. Answer: (D) Cytoskeleton

The cytoskeleton is a network of protein filaments (microtubules, microfilaments and intermediate filaments) in the cytoplasm that gives mechanical support, maintains cell shape and helps in motility. The ER is a membrane system, not a protein filament network.

55. Answer: (C) Proteins embedded in a phospholipid bilayer

According to Singer and Nicolson's fluid mosaic model, the membrane is a quasi-fluid lipid bilayer with proteins embedded in it as integral and peripheral proteins. The bilayer is made of phospholipids, not proteins or carbohydrates.

56. Answer: (B) Plasmodesmata

Plasmodesmata are cytoplasmic strands that cross the cell walls of neighbouring plant cells, connecting their cytoplasm into a continuous symplast for transport. The plasmalemma surrounds a single cell, and plastoquinone is an electron carrier in photosynthesis.

57. Answer: (B) Mitochondria

Mitochondria have their own circular double-stranded DNA and 70S ribosomes, so they are semi-autonomous. Peroxisomes, dictyosomes (Golgi) and lysosomes have no DNA of their own.

58. Answer: (D) Cytoplasm

NCERT describes the cytoplasm as the main arena of cellular activities, since most metabolic reactions take place there. The nucleus controls the cell, but most of the cell's chemical work happens in the cytoplasm.

59. Answer: (B) Cellulose, galactans and mannans

NCERT states that the algal cell wall is made of cellulose, galactans, mannans and minerals like calcium carbonate. Cellulose, hemicellulose and pectins together describe the wall of other (higher) plants.

60. Answer: (C) Streptococcus

Streptococcus is a bacterium, a prokaryote, so it has no membrane-bound organelles. Plasmodium (protist), Saccharomyces (yeast) and Chlamydomonas (alga) are eukaryotes with nuclei, mitochondria and other organelles.

61. Answer: (A) Mature RBCs

Mature human (mammalian) RBCs lose their nucleus and have no mitochondria, so they contain no DNA. An enucleated ovum still has mitochondrial DNA, and a sperm and hair root cells have nuclei.

62. Answer: (C) Connections between adjacent cells

Plasmodesmata are cytoplasmic strands passing through the cell walls that connect the cytoplasm of neighbouring plant cells. The cementing layer between cells is the middle lamella, made of calcium pectate, not lignin.

63. Answer: (C) Proteinaceous filaments

The cytoskeleton is a network of protein filaments — microtubules (tubulin), microfilaments (actin) and intermediate filaments — in the cytoplasm. Cellulose microfibrils are part of the plant cell wall, outside the cytoplasm.

64. Answer: (B) Calcium pectate

NCERT states that the middle lamella is a layer mainly of calcium pectate that holds neighbouring plant cells together. Muramic acid is found in bacterial cell walls, and hemicellulose is part of the primary wall.

65. Answer: (C) Is membrane-bound and contains water and excretory substances

The plant vacuole is bounded by a single membrane, the tonoplast, and holds water, sap, excretory products and other materials not useful to the cell. Lipids are stored in oil bodies, not the vacuole, and the vacuole is not membrane-less.

66. Answer: (C) While lipids can rarely flip-flop, proteins cannot

Membrane lipids occasionally move from one leaflet to the other (transverse diffusion), though this is slow and rare. Proteins, with their large hydrophilic domains, cannot cross the hydrophobic core, so they move only laterally.

67. Answer: (C) Glyoxysomes

In fat-storing germinating seeds, beta-oxidation of fatty acids and the glyoxylate cycle take place in glyoxysomes, specialised microbodies that convert fat to sugar. In plants mitochondria do not carry out fatty acid beta-oxidation for this purpose.

68. Answer: (D) Magnesium

Mg²⁺ ions hold the large and small ribosomal subunits together; when Mg²⁺ falls below a critical level the subunits dissociate. Calcium, copper and manganese do not play this role.

69. Answer: (A) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane

Thylakoids are found only in chloroplasts; mitochondria have cristae and a matrix but no thylakoid space, so this statement is wrong. Both organelles are double-membraned, contain their own DNA, and chloroplasts are generally larger than mitochondria.

70. Answer: (B) proline

The cell membrane is built of a phospholipid bilayer with cholesterol, proteins and carbohydrate-bearing glycolipids and glycoproteins. Proline is a free amino acid; it occurs only as part of membrane proteins and is not a membrane component by itself.

71. Answer: (B) The enzymes of the electron transfer chain are embedded in the outer membrane

The electron transport chain enzymes lie in the inner mitochondrial membrane, which is folded into cristae; so the statement putting them in the outer membrane is incorrect. The outer membrane is porous and sieve-like.

72. Answer: (A) the resolution power of the electron microscope is much higher than that of the light microscope

Electrons have a much shorter wavelength than light, so an electron microscope has far greater resolving power and shows fine cell structures. The option quoting 200–350 nm for the electron microscope swaps the values, and electron beams need very thin sections.

73. Answer: (B) endoplasmic reticulum

Proteins made on ribosomes attached to the rough endoplasmic reticulum enter its lumen, where they are folded, glycosylated and packed into vesicles for transport onward (via the Golgi) to their destinations. Mitochondria and chloroplasts make ATP and food, and lysosomes digest material; none of them sort and route new proteins.

74. Answer: (C) Blue

Resolving power improves as the wavelength gets shorter (the resolution limit is about $0.61\lambda/NA$). Blue has the shortest wavelength of the colours listed, so it gives the finest resolution. Red has the longest wavelength and gives the poorest.

75. Answer: (B) on ribosomes present in cytoplasm as well as in mitochondria

Animal cells translate proteins on cytoplasmic 80S ribosomes (both free and ER-bound) and also on the 70S ribosomes inside mitochondria, which have their own DNA. The nucleolus assembles ribosomal subunits but does not make proteins.

76. Answer: (C) Proteins can also undergo flip-flop movements in the lipid bilayer

Membrane proteins can move sideways within the bilayer but practically never flip from one face to the other. Their hydrophilic parts cannot cross the hydrophobic core, and this is why membranes stay asymmetric. Lipids can flip-flop slowly; proteins do not.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.