

THE CELL

Chapter 3 — Complete MCQ Bank with Solved Answers

68 Solved MCQs

Answers Ticked & Highlighted

Detailed Explanations

Topics Covered

- Discovery of the Cell & Cell Theory
- Prokaryotic vs Eukaryotic Cells
- Cell Wall & Cell Membrane
- Cytoplasm & Cytoskeleton
- Nucleus, Chromatin & Chromosomes
- Ribosomes & Endoplasmic Reticulum
- Golgi Apparatus & Lysosomes
- Mitochondria & Plastids
- Vacuoles & Turgor Pressure
- Centrioles, Cilia & Flagella
- Plant vs Animal Cell Comparison

Prepared for Students of Class 9

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 **Green option = Correct Answer (Ticked & Highlighted)**

| Each question includes a short explanation box below it.

Multiple Choice Questions — Chapter 3: The Cell

1 What is described as the basic unit of life?

A Tissue

B Organ

 **C** Cell

D Organelle

Correct Answer: C

Why? The cell is the basic unit of life, just as bricks are the building blocks of a house.

2 Cells are compared to which of the following in the chapter's analogy?

 **A** busy city

B A quiet village

C A factory line

D A school

Correct Answer: A

Why? A cell is compared to a busy city, where different structures perform functions like power generation, transport, and waste disposal, directed by the nucleus (the 'government').

3 In the cell-city analogy, which structure represents the 'government' that directs activities?

A Mitochondria

✓ **Nucleus**

C Cell membrane

D Ribosome

Correct Answer: B

Why? Just like a city has a government, a cell has a nucleus that directs its activities by giving instructions for every function of the cell.

4 Who discovered the cell in 1665 using a simple microscope?

A Robert Brown

B Camillo Golgi

✓ **Robert Hooke**

D Christian de Duve

Correct Answer: C

Why? Robert Hooke, an English scientist, examined a thin slice of cork in 1665 and discovered tiny, box-like structures he called 'cells.'

5 What material did Robert Hooke examine to discover cells?

A Onion peel

✓ B Cork

C Human cheek cells

D Pond water

Correct Answer: B

Why? Hooke examined a thin slice of cork under a simple microscope and observed box-like structures which he named cells.

6 Which scientist observed the 'nucleus' while studying plant cells in 1831?

A Robert Hooke

✓ B Robert Brown

C Camillo Golgi

D Christian René de Duve

Correct Answer: B

Why? In 1831, Scottish scientist Robert Brown observed the nucleus while studying plant cells under a microscope.

7 Which of the following is an example of a unicellular organism mentioned in the text?

☒ **A** Amoeba

☐ **B** Frog

☐ **C** Mushroom

☐ **D** Human

Correct Answer: A

Why? The unicellular giant Amoeba is given as an example of a single-celled organism large enough to be seen with the naked eye.

8 Prokaryotic cells differ from eukaryotic cells mainly because they lack:

☐ **A** A cell membrane

☒ **B** Membrane-bound organelles

☐ **C** Cytoplasm

☐ **D** A cell wall

Correct Answer: B

Why? Prokaryotic cells are simple and do not have membrane-bound organelles, while eukaryotic cells are more complex and possess them.

9 The cell wall in plants is mainly composed of:

- ☐ A Chitin
- ☐ B Peptidoglycan
- ☒ C Cellulose
- ☐ D Keratin

Correct Answer: C

Why? The cell wall of plants (as well as algae) is mainly composed of cellulose, which provides shape, strength, protection, and support.

10 Arrange the layers of a plant cell wall from outside to inside: which is present between adjacent cell walls?

- ☐ A Primary wall
- ☐ B Secondary wall
- ☒ C Middle lamella
- ☐ D Cell membrane

Correct Answer: C

Why? The middle lamella holds together the primary walls of adjacent cells and contains magnesium, calcium, and pectin.

11 The primary wall of a plant cell is mainly composed of cellulose, hemicellulose, and:

A Chitin

✓ **Pectin**

C Lignin

D Peptidoglycan

Correct Answer: B

Why? The primary wall, present just above the cell membrane, is mainly composed of cellulose, hemicellulose, and pectin.

12 Which type of plant cells make a secondary wall on the inner side of the primary wall?

A Epidermal cells

✓ **Xylem cells**

C Mesophyll cells

D Root hair cells

Correct Answer: B

Why? Some plant cells, such as xylem cells, make a secondary wall mainly composed of cellulose, lignin, and other chemicals.

13 The cell wall of prokaryotes (bacteria) is made of:

A Cellulose

B Chitin

☒ **C** Peptidoglycan

D Lignin

Correct Answer: C

Why? The cell wall of prokaryotes is made of peptidoglycan, a single molecule made of amino acids and sugars.

14 The cell wall of fungi is composed mainly of:

A Cellulose

☒ **B** Chitin

C Peptidoglycan

D Pectin

Correct Answer: B

Why? Unlike plants, the cell wall of fungi is made of chitin.

15 Plasmodesmata are best described as:

A Pores in the nuclear envelope

✓ Channels in cell walls allowing exchange between adjacent cells

C Folds of the inner mitochondrial membrane

D Vesicles budding from the Golgi apparatus

Correct Answer: B

Why? Plasmodesmata (singular plasmodesma) are channels in cell walls that allow the exchange of molecules between adjacent plant cells.

16 The cell membrane is described as 'selectively-permeable' because it:

A Blocks all molecules

B Allows all molecules to pass freely

✓ Allows very few molecules to pass while blocking many others

D Only allows water to pass

Correct Answer: C

Why? The cell membrane is thin and elastic, allowing very few molecules to pass through it while blocking many other molecules.

17 The structure of the cell membrane is best described by which model?

A Solid-brick model

✓ **Fluid-mosaic model**

C Rigid-lattice model

D Static-bilayer model

Correct Answer: B

Why? The structure of the cell membrane is described as the fluid-mosaic model, where lipids form a fluid-like bilayer with proteins submerged in it.

18 Carbohydrates attached to lipids in the cell membrane form:

A Glycoproteins

✓ **Glycolipids**

C Phospholipids

D Lipoproteins

Correct Answer: B

Why? Carbohydrates joined with lipids in the cell membrane form glycolipids, while those joined with proteins form glycoproteins.

19 Which lipid, attached to the inner sides of the lipid bilayer, is notably absent in most bacterial membranes?

A Phospholipid

✓ C Cholesterol

C Glycolipid

D Triglyceride

Correct Answer: B

Why? Cholesterol is attached to the inner sides of the lipid bilayer and is absent in the membranes of most bacteria.

20 Which term describes the liquid part of the cytoplasm that includes molecules and small particles like ribosomes, but not membrane-bound organelles?

A Nucleoplasm

✓ C Cytosol

C Matrix

D Stroma

Correct Answer: B

Why? Cytosol is a liquid part of the cytoplasm that includes molecules and small particles, such as ribosomes, but not membrane-bound organelles.

21 Glycolysis, the breakdown of glucose, occurs as a metabolic reaction in the:

A Nucleus

☒ **Cytoplasm**

C Golgi apparatus

D Cell wall

Correct Answer: B

Why? The cytoplasm acts as the site for various metabolic reactions, such as glycolysis, the breakdown of glucose.

22 In mature plant cells, the nucleus is pushed to one side mainly due to the presence of a:

☒ **Large central vacuole**

B Cell wall

C Chloroplast

D Golgi apparatus

Correct Answer: A

Why? In mature plant cells, the nucleus is pushed to the side due to a large central vacuole, unlike animal cells where it is centrally located.

23 The nucleus is bounded by a double membrane known as the:

A Nuclear pore

B Nucleolus

☒ **Nuclear envelope**

D Plasma membrane

Correct Answer: C

Why? The nucleus is bounded by a double membrane known as the nuclear envelope, which is semi-permeable and contains many small pores.

24 Small pores present in the nuclear envelope that allow exchange of material are called:

A Plasmodesmata

☒ **Nuclear pores**

C Cisternae

D Thylakoids

Correct Answer: B

Why? The nuclear envelope is semi-permeable and has many small pores called nuclear pores.

25 The jelly-like material inside the nucleus is called:

A Cytoplasm

✓ **Nucleoplasm**

C Cytosol

D Matrix

Correct Answer: B

Why? The inner jelly-like material of the nucleus is called nucleoplasm.

26 Ribosomes are assembled within which small bodies found in the nucleoplasm?

A Chromatin

✓ **Nucleoli**

C Nuclear pores

D Centrioles

Correct Answer: B

Why? Small bodies called nucleoli (singular: nucleolus) are found in the nucleoplasm, where ribosomes are assembled.

27 The fine, thread-like material in the nucleoplasm composed of DNA and proteins is called:

A Chromosome

☒ **Chromatin**

C Chromoplast

D Cristae

Correct Answer: B

Why? Nucleoplasm contains fine thread-like material known as chromatin, composed of DNA and proteins.

28 When a cell starts dividing, chromatin condenses and takes the shape of thick structures called:

☒ **Chromosomes**

B Chromoplasts

C Centromeres

D Nucleoli

Correct Answer: A

Why? When a cell starts dividing, its chromatin condenses and takes the shape of thick chromosomes.

29 Why is DNA referred to as the hereditary material?

A It produces energy for the cell

✓ It contains genes that control activities and are transmitted to the next generation

C It forms the cell wall

D It stores water and salts

Correct Answer: B

Why? DNA contains genes which control all the activities of the cell and is responsible for the transmission of characteristics to the next generation, hence called hereditary material.

30 In prokaryotic cells, the chromosome is made of DNA only and is located:

A Inside a nuclear envelope

✓ Floating freely in the cytoplasm

C Inside the nucleolus

D Attached to the Golgi apparatus

Correct Answer: B

Why? Prokaryotic cells do not contain a prominent nucleus; their chromosome is made of DNA only and floats freely in the cytoplasm.

31 The cytoskeleton is a network of thin tubes and filaments consisting of three parts: microtubules, microfilaments, and:

A Cristae

☒ **Intermediate filaments**

C Cisternae

D Thylakoids

Correct Answer: B

Why? The cytoskeleton consists of three parts: microtubules, microfilaments, and intermediate filaments.

32 Microtubules are hollow tubes made up of which protein?

A Actin

B Keratin

☒ **Tubulin**

D Vimentin

Correct Answer: C

Why? Microtubules are hollow tubes made up of tubulin protein and hold organelles in place, maintain cell shape, and act as tracks.

33 Which cytoskeletal component makes up the mitotic spindle, cilia, and flagella?

- ☐ A Microfilaments
- ☐ B Intermediate filaments
- ☒ C **Microtubules**
- ☐ D Ribosomes

Correct Answer: C

Why? Microtubules maintain a cell's shape, act as tracks for organelles, and also make the mitotic spindle, cilia, and flagella.

34 Microfilaments are contractile proteins mainly made of:

- ☐ A Tubulin
- ☒ B **Actin**
- ☐ C Keratin
- ☐ D Collagen

Correct Answer: B

Why? Microfilaments are finer than microtubules and are made up of contractile proteins mainly actin, helping in cell movement and muscle contraction.

35 Intermediate filaments, which anchor the nucleus and form cell-to-cell junctions, are mainly made of keratin and:

A Actin

B Tubulin

✓ C Vimentin

D Collagen

Correct Answer: C

Why? Intermediate filaments are rods made of a variety of proteins, mainly keratin and vimentin, which anchor the nucleus and other organelles.

36 Ribosomes are composed of almost equal amounts of proteins and:

A DNA

✓ C Ribosomal RNA (rRNA)

C Lipids

D Carbohydrates

Correct Answer: B

Why? Ribosomes are composed of almost equal amounts of proteins and ribosomal RNA (rRNA).

37 A ribosome consists of how many subunits that unite during protein synthesis?

A One

✓ **Two**

C Three

D Four

Correct Answer: B

Why? Each ribosome consists of two subunits (large and small) that unite during protein synthesis and separate again once the work is finished.

38 Ribosomes are the sites of:

A Lipid metabolism

✓ **Protein synthesis**

C Photosynthesis

D Waste digestion

Correct Answer: B

Why? Ribosomes are tiny granular structures that are the sites of protein synthesis.

39 Which type of endoplasmic reticulum has ribosomes attached to its surface?

A Smooth Endoplasmic Reticulum (SER)

✓ **Rough Endoplasmic Reticulum (RER)**

C Golgi apparatus

D Nuclear envelope

Correct Answer: B

Why? Rough Endoplasmic Reticulum (RER) has numerous ribosomes attached to its surface and serves the function of protein synthesis.

40 Smooth Endoplasmic Reticulum (SER) is mainly involved in:

A Protein synthesis

✓ **Lipid metabolism and detoxification**

C DNA replication

D Formation of chromosomes

Correct Answer: B

Why? SER lacks ribosomes and is involved in lipid metabolism, transport of materials, and detoxifying harmful chemicals that enter the cell.

41 In muscle cells, which organelle is involved in the contraction process?

A Rough Endoplasmic Reticulum

✓ **Smooth Endoplasmic Reticulum**

C Golgi apparatus

D Lysosome

Correct Answer: B

Why? In muscle cells, the SER is also involved in the contraction process, in addition to its role in lipid metabolism and detoxification.

42 Who discovered the Golgi apparatus in 1898?

A Robert Hooke

✓ **Camillo Golgi**

C Christian René de Duve

D Robert Brown

Correct Answer: B

Why? In 1898, Italian physician Camillo Golgi discovered a set of flattened sacs in the cytoplasm, later named the Golgi apparatus.

43 The flattened sacs that stack over each other to form the Golgi apparatus are called:

A Cristae

B Thylakoids

✓ C Cisternae

D Nucleoli

Correct Answer: C

Why? The flattened sacs of the Golgi apparatus, stacked over each other, are called cisternae.

44 What is the main function of the Golgi apparatus?

A It produces ATP energy

✓ B It modifies proteins from RER and packs them into Golgi vesicles

C It stores DNA

D It forms the cell wall

Correct Answer: B

Why? The Golgi apparatus modifies proteins coming from the rough ER and packs them into small membrane-bound sacs called Golgi vesicles.

45 Who discovered lysosomes?

A Camillo Golgi

B Robert Hooke

☒ **Christian René de Duve**

D Robert Brown

Correct Answer: C

Why? Lysosomes were discovered by Belgian scientist Christian René de Duve.

46 Lysosomes are predominantly found in which type of cells?

A Plant cells

☒ **Animal cells**

C Fungal cells

D Bacterial cells

Correct Answer: B

Why? Lysosomes are small membrane-bound vesicles containing digestive enzymes and are predominantly found in animal cells.

47 Lysosomes bud off from which organelle?

- ☐ A Nucleus
- ☐ B Mitochondria
- ☒ C Golgi apparatus
- ☐ D Endoplasmic reticulum

Correct Answer: C

Why? Lysosomes bud off from the Golgi apparatus and fuse with food vacuoles to digest food material using digestive enzymes.

48 Mitochondria are often referred to as the 'powerhouse of the cell' because they:

- ☐ A Store genetic material
- ☒ B Produce energy through aerobic respiration
- ☐ C Synthesize proteins
- ☐ D Digest cellular waste

Correct Answer: B

Why? Mitochondria produce energy by performing the reactions of aerobic respiration, in which oxygen is used to break down glucose to release energy as ATP.

49 The folds formed by the inner membrane of mitochondria are called:

A Cisternae

✓ C **Cristae**

C Thylakoids

D Grana

Correct Answer: B

Why? The inner membrane of mitochondria forms many folds called cristae (singular crista), which increase surface area for respiration.

50 The inner fluid-like material of the mitochondrion is called the:

A Stroma

B Cytosol

✓ B **Matrix**

D Nucleoplasm

Correct Answer: C

Why? The inner fluid-like material inside a mitochondrion is called the matrix.

51 Mitochondrial ribosomes are more similar to which type of ribosomes?

A Eukaryotic ribosomes

✓ Prokaryotic ribosomes

C Free ribosomes only

D Ribosomes of the Golgi apparatus

Correct Answer: B

Why? Mitochondria contain their own DNA and ribosomes, and these ribosomes are more similar to prokaryotic ribosomes than to eukaryotic ribosomes.

52 Which of the following is NOT one of the three main types of plastids?

A Chloroplasts

B Chromoplasts

C Leucoplasts

✓ Mitoplasts

Correct Answer: D

Why? The three main types of plastids are chloroplasts, chromoplasts, and leucoplasts; 'mitoplasts' is not a recognized type of plastid.

53 Chloroplasts capture light energy and convert it into chemical energy to prepare:

A Proteins

☒ **Glucose**

C Lipids

D DNA

Correct Answer: B

Why? Chloroplasts contain the photosynthetic pigment chlorophyll and use captured light energy to convert it into chemical energy to prepare glucose.

54 In a chloroplast, the sac-like structures that make up a granum are called:

A Cristae

B Cisternae

☒ **Thylakoids**

D Nucleoli

Correct Answer: C

Why? The sac-like structures which make up a granum (plural: grana) in a chloroplast are called thylakoids.

55 The fluid that surrounds the thylakoids inside a chloroplast is called:

A Matrix

✓ **Stroma**

C Cytosol

D Nucleoplasm

Correct Answer: B

Why? A fluid called stroma surrounds the thylakoids inside the chloroplast, and like mitochondria, chloroplasts also contain DNA and ribosomes.

56 Chromoplasts, which contain pigments such as carotenoids, are mainly present in:

A Underground stems and roots

✓ **Flower petals and fruits**

C Xylem cells

D Muscle cells

Correct Answer: B

Why? Chromoplasts contain bright-colored pigments such as carotenoids and are present in flower petals and fruits, helping in pollination and seed dispersal.

57 Leucoplasts, which store starches, lipids, and proteins, are typically found in:

A Flower petals

B Fruits

✓ **Underground stems, seeds, and roots**

D Green leaves

Correct Answer: C

Why? Leucoplasts are plastids that have no pigments and are involved in storage; they are present in parts of plants where food is stored, such as underground stems, seeds, and roots.

58 The membrane surrounding the plant cell vacuole is called the:

A Cell wall

✓ **Tonoplast**

C Nuclear envelope

D Plasma membrane

Correct Answer: B

Why? The membrane of the plant vacuole is called the tonoplast, and the fluid inside it is called cell sap.

59 The outward pressure of the vacuole on the cytoplasm and cell wall, which keeps plant cells firm, is called:

A Osmotic pressure

✓ **Turgor pressure**

C Atmospheric pressure

D Blood pressure

Correct Answer: B

Why? The outward pressure of the vacuole on the cytoplasm and cell wall makes plant cells turgid; this pressure is called turgor pressure.

60 Contractile vacuoles, which pump out extra water and wastes, are found in organisms such as:

✓ **Amoeba and sponges**

B Xylem cells

C Liver cells

D Neurons

Correct Answer: A

Why? Some freshwater organisms like Amoeba and sponges have contractile vacuoles which collect and pump out extra water and other wastes.

61 Centrioles are absent in the cells of:

- ☐ A Animals
- ☐ B Most protists
- ☒ C Higher plants and fungi
- ☐ D Sperm cells

Correct Answer: C

Why? Centrioles are barrel-shaped organelles found in the cells of animals and most protists, but they are absent in prokaryotes, higher plants, and fungi.

62 In animal cells, a pair of centrioles located near the nuclear envelope is together called a:

- ☒ A Centrosome
- ☐ B Cisterna
- ☐ C Basal body
- ☐ D Nucleolus

Correct Answer: A

Why? In animal cells, the pair of centrioles is called a centrosome and is located near the nuclear envelope.

63 Each centriole is formed of how many triplets of microtubules?

A 6

✓ **9**

C 11

D 12

Correct Answer: B

Why? Each centriole is formed of 9 triplets of microtubules, which are made up of tubulin protein.

64 Centrioles found near the cell membrane in cells with cilia or flagella are called:

A Centrosomes

✓ **Basal bodies**

C Spindle fibres

D Cisternae

Correct Answer: B

Why? The cells which have cilia or flagella contain centrioles near the cell membrane called basal bodies, responsible for the formation of cilia and flagella.

65 Compared to flagella, cilia are usually:

- ☐ A Longer but less numerous
- ☒ B Shorter and more numerous
- ☐ C Absent in eukaryotic cells
- ☐ D Found only in bacteria

Correct Answer: B

Why? Cilia are short in length and usually numerous, while flagella are longer but less numerous in a cell.

66 Prokaryotic flagella are made of a protein called:

- ☐ A Tubulin
- ☐ B Actin
- ☒ C Flagellin
- ☐ D Keratin

Correct Answer: C

Why? Unlike eukaryotic flagella, prokaryotic flagella are made of a protein called flagellin, and their structure is completely different.

67 Which of the following is a structural advantage of plant cells due to the presence of chloroplasts?

A Ability to change shape easily

☒ **Conversion of light energy into chemical energy for food production**

C Rapid cell movement

D Digestion of cellular waste

Correct Answer: B

Why? Plant cells contain chloroplasts, which are responsible for photosynthesis, converting light energy into chemical energy to allow plants to produce food.

68 Which structural feature allows animal cells to change shape easily, aiding processes like white blood cell movement?

A Presence of a rigid cell wall

B Presence of a large central vacuole

☒ **Absence of a rigid cell wall**

D Presence of chloroplasts

Correct Answer: C

Why? Animal cells lack a rigid cell wall, allowing them to change shape easily — crucial for cell movements such as white blood cells moving to sites of infection or injury.

Great Work, Future Biologist!

You've completed all 68 MCQs from Chapter 3: The Cell.
Keep revising — understanding cells is the foundation of all
biology!

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