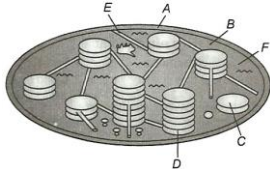


Shiksha Classes, Bhandara
Biology
Cell-The Unit Of Life

- (1.) What are those structures that appear as 'beads-on-string' in the chromosomes when viewed under electron microscope?
- (a.) Nucleotides (b.) Nucleosomes
(c.) Base pairs (d.) Genes
- (2.) The two polynucleotide chains in DNA are
- (a.) Parallel (b.) Discontinuous
(c.) Antiparallel (d.) Semi-conservative
- (3.) Centrosome is not present in
- (a.) Cell of higher plants (b.) Cell of lower plants
(c.) Cell of higher animals (d.) Cell of lower animals
- (4.) Channel proteins are involved in
- (a.) Transport of enzymes (b.) Water transport
(c.) Active transport of ions (d.) Passive transport of ions
- (5.) Part of chromosome after secondary constriction is called
- (a.) Centriole (b.) Centromere
(c.) Chromomere (d.) Satellite
- (6.) Tubulin protein occurs in
- (a.) Digestive enzymes (b.) Rough endoplasmic reticulum
(c.) Thylakoids (d.) Microtubules
- (7.) Quantasomes are found in
- (a.) Mitochondria (b.) Chloroplast
(c.) Lysosome (d.) Endoplasmic reticulum
- (8.) In which one of the following would you expect to find glyoxysomes?
- (a.) Endosperm of wheat (b.) Endosperm of castor
(c.) Palisade cells in leaf (d.) Root hairs
- (9.) The non-membranous organelles are
- (a.) Centrioles (b.) Ribosomes
(c.) Nucleolus (d.) All of these

- (10.) Single stranded DNA is found in
 (a.) Polio viruses (b.) Rich dwarf virus
 (c.) TMV (d.) $\phi \times 174$
- (11.) Ribosomes that occur exclusively in mitochondria is
 (a.) 70 S (b.) 55 S
 (c.) 30 S (d.) 50 S
- (12.) Number of protofilament in microtubule is
 (a.) 13 (b.) 12
 (c.) 5 (d.) 10
- (13.) ...A... are granular structures first observed under electron microscope as dense particles by ...B... (1953). Here, A and B refer to
 (a.) A-Ribosomes; B-Perner (b.) A-Lysosomes; B-de Duve
 (c.) A-Peroxisomes; B-Flemming (d.) A-Ribosomes; B-George Palade
- (14.) Middle lamella is present
 (a.) Inside the secondary wall (b.) Inside the primary wall
 (c.) Outside the primary wall (d.) In between secondary and tertiary walls
- (15.) Rough endoplasmic reticulum differs from smooth walled endoplasmic reticulum due to the presence of
 (a.) DNA (b.) Nucleus
 (c.) Ribosomes (d.) Ergastic substance
- (16.) A widely accepted, improved model of cell membrane is
 (a.) Fluid mosaic model (b.) Robertson's model
 (c.) Danielli and Davson's model (d.) Unit membrane model
- (17.) Organelle important in spindle formation during nuclear division is
 (a.) Golgi body (b.) Chloroplast
 (c.) Centriole (d.) Mitochondrion
- (18.) Identify A to F in the sectional view of a chloroplast showing the different parts



- (a.) A-Inner membrane, B-Granum, C-Outer membrane, D-Stroma lamella, E-Stroma, F-Thylakoid (b.) A-Outer membrane, B-Inner membrane, C-Granum, D-Thylakoid, E-Stroma lamella, F-Stroma

- (c.) A-Thylakoid, B-Outer membrane, C-Stroma, D-Stroma lamella, E-Granum, F-Inner membrane
- (d.) A-Outer membrane, B-Stroma, C-Inner membrane, D-Granum, E-Thylakoid, F-Stroma lamella
- (19.) Consider the following statements and choose the correct one
- (a.) Plant cells have centrioles which are absent in almost all animal cells
- (b.) Ribosomes are the site of protein synthesis
- (c.) The middle lamella is layer mainly of calcium carbonate which holds the different neighbouring cells together
- (d.) In animal cells, steroidal hormones are synthesised by smooth endoplasmic reticulum
- (20.) The backbone of RNA consists of which of the following sugar?
- (a.) Deoxyribose
- (b.) Ribose
- (c.) Sucrose
- (d.) Maltose
- (21.) Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on
- (a.) Proton gradient
- (b.) Accumulation of K ions
- (c.) Accumulation of Na ions
- (d.) Membrane potential
- (22.) Polysome is formed by
- (a.) Several ribosomes attached to a single mRNA
- (b.) Many ribosomes attached to a strand of endoplasmic reticulum
- (c.) A ribosome with several subunits
- (d.) Ribosomes attached to each other in a linear arrangement
- (23.) In eukaryotic cell, plasmodesma is lined by plasma membrane. It encloses tubular extension of endoplasmic reticulum called
- (a.) Microtubule
- (b.) Microfilament
- (c.) Tubule
- (d.) Desmotubule
- (24.) The factors which set the limit of cell size or volume are
- I. nucleo-cytoplasmic or kern-plasma ratio
 - II. rate of metabolic activity
 - III. ability of oxygen and other materials to reach every part of the cell
 - IV. ability of waste products to pass to the outside
 - V. ratio of surface area to the volume of the cell
- Identify the correct set of statements
- (a.) III and IV
- (b.) I and II
- (c.) Only V
- (d.) I, II, III and IV

- (25.) The difference between rough endoplasmic reticulum and smooth endoplasmic reticulum is that rough endoplasmic reticulum
- (a.) Does not contain ribosomes (b.) Contains ribosomes
(c.) Does not transport proteins (d.) Transport proteins
- (26.) Cilia are
- (a.) Short (5-10 μ m) hair-like narrow protoplasmic process (b.) With sweeping or pendular movements
(c.) More numerous (d.) All of the above
- (27.) The enzyme DNA polymerase was discovered by
- (a.) Kornberg (b.) Okazaki
(c.) Watson and Crick (d.) Stahl and Meselson
- (28.) Plant cells possess
- (a.) Cell wall and central vacuole (b.) Cell wall only
(c.) Cell wall and plastids (d.) Cell wall, plastids and large central vacuole
- (29.) Which of the following statements are correct?
I. Occurrence of different types of tissues, organs and organ system results in division of labour
II. A new cell always develops by the division of a pre-existing cells
III. Cells are totipotent
IV. Cell is the smallest unit, capable of independent existence and performing the essential functions of life
The correct option is
- (a.) I, II and III (b.) I, III and IV
(c.) II, III and IV (d.) I, II, III and IV
- (30.) Which of the following features are correct regarding ribosomes?
I. Non-membrane bound
II. Absent in plastids and mitochondria
III. Present in the cytoplasm and RER
IV. Take part in protein synthesis
The correct option is
- (a.) Only II (b.) I and II
(c.) I, II, III and IV (d.) I, III and IV
- (31.) In prokaryotic cell,
I. enveloped genetic material is present
II. ribosomes are absent
III. an organised nucleus is absent
The correct option is
- (a.) Only I (b.) Only II
(c.) Only III (d.) I, II and III

- (32.) In a DNA molecule, distance between two bases is
- (a.) 2 nm/20Å (b.) 0.2 nm/2Å
(c.) 3.4 nm/34Å (d.) 0.34 nm/3.4Å
- (33.) Antiparallel strands of a DNA molecule means that
- (a.) One strand turns anti-clockwise (b.) The phosphate groups of two DNA strands at their ends, share the same position
(c.) The phosphate groups at the start of two DNA strands are in opposite position (d.) One strand turns clockwise
- (34.) Arrange the following steps in a correct sequence as per Gram's staining technique
I. Treatment with 0.5% iodine solution
II. Washing with water
III. Treatment with absolute alcohol/acetone
IV. Staining with weak alkaline solution of crystal violet
The correct sequence is
- (a.) II→I→IV→III (b.) IV→I→II→III
(c.) III→II→I→IV (d.) I→IV→III→II
- (35.) In eukaryotes, basic structural unit made up of histone and DNA is
- (a.) Nucleosome (b.) Nucleolus
(c.) Chromosome (d.) Lysosome
- (36.) Choose the correct statement from the codes given below
I. Separation from extracellular medium allows the cells to maintain its chemical pool, orderliness of structure and reactions in contrast to disorderly distribution and randomly interacting molecules in the extra-cellular medium
II. Cells are unable to recognise one another due to the presence of specific chemicals on their surface
III. Cells of plant tissues are often connected with one another through cytoplasmic bridges called plasmodesmata
IV. Different cells of an organism communicate as well as exchange materials with one another
- (a.) II and III (b.) I and II
(c.) I, III and IV (d.) I, II, III and IV
- (37.) DNA multiplication is called
- (a.) Translation (b.) Replication
(c.) Transduction (d.) Transcription

- (38.) Ribosomes are found in
- (a.) Cytoplasm and nucleus (b.) Golgi complex and nucleus
(c.) Mitochondria and bacterial cell (d.) Endoplasmic reticulum and Golgi complex
- (39.) In protoplasm, fat store in the form of
- (a.) Polypeptide (b.) Triglyceride
(c.) Polysaccharide (d.) Nucleoside
- (40.) Spindles are formed by
- (a.) Microtubules (b.) Endoplasmic reticulum
(c.) Golgi body (d.) Peroxisomes
- (41.) Glycocalyx (mucilage sheath) of a bacterial cell may occur in the form of a loose sheath called ...A... or it may be thick and tough called ...B...
Choose the correct pair from the given option
- (a.) A-capsule; B-slime layer (b.) A-slime layer, B-capsule
(c.) A-mesosome; B-capsule (d.) A-mesosome, B-slime layer
- (42.) Function of rough endoplasmic reticulum is
- (a.) Fat synthesis (b.) Protein synthesis
(c.) Starch synthesis (d.) Autolysis
- (43.) Comparing small and large cells, which statement is correct?
- (a.) Small cells have a small surface area per volume ratio (b.) Exchange rate of nutrients is fast with large cells
(c.) Small cells have a large surface area per volume ratio (d.) Exchange rate of nutrients is slow with small cells
- (44.) Unicellular organisms are
- (a.) Not capable of independent existence because they cannot perform all the essential functions of life (b.) Not capable of independent existence but they can perform all the essential functions of life
(c.) Capable of independent existence and can perform all the essential vital functions (d.) Capable to lead independent existence but they perform few vital functions of life
- (45.) Stain used by Feulgen to stain DNA is
- (a.) Janus green (b.) Basic fuchsin
(c.) Crystal violet (d.) Methylene blue

- (46.) Out of A-T, G-C pairing, bases of DNA may exist in alternate valency state owing to arrangements called
- (a.) Tautomerisational mutation (b.) Analogue substitution
(c.) Point mutation (d.) Frameshift mutation
- (47.) Robert Hooke used the term cell in the year
- (a.) 1650 (b.) 1665
(c.) 1865 (d.) 1960
- (48.) Okazaki fragments are produced during the synthesis of
- (a.) mRNA (b.) Protein
(c.) tRNA (d.) DNA
- (49.) Cellulose, the most important constituent of plant cell wall is made up of
- (a.) Branched chain of glucose molecules linked by α 1-6 glycosidic bond at the site of branching (b.) Unbranched chain of glucose molecules linked by α , 1-4 glycosidic bond
(c.) Branched chain of glucose molecules linked by β , 1-4 glycosidic bond in straight chain and α , 1-6 glycosidic bond at the site of branching (d.) Unbranched chain of glucose molecules linked by β , 1-4 glycosidic bond
- (50.) In flagella membrane, which enzyme catalysis ATP activity?
- (a.) Cytoplasmic dyenin (b.) Asconic dynein
(c.) Kinesis (d.) Myosin

ANSWER

(1.)	b	(2.)	c	(3.)	a	(4.)	d	(5.)	d
(6.)	d	(7.)	b	(8.)	b	(9.)	d	(10.)	d
(11.)	b	(12.)	a	(13.)	d	(14.)	c	(15.)	c
(16.)	a	(17.)	c	(18.)	b	(19.)	b	(20.)	b
(21.)	a	(22.)	a	(23.)	d	(24.)	d	(25.)	b
(26.)	d	(27.)	a	(28.)	d	(29.)	d	(30.)	d
(31.)	c	(32.)	c	(33.)	c	(34.)	b	(35.)	a
(36.)	c	(37.)	b	(38.)	c	(39.)	b	(40.)	a
(41.)	b	(42.)	b	(43.)	c	(44.)	c	(45.)	b
(46.)	a	(47.)	b	(48.)	d	(49.)	d	(50.)	b

Shiksha Classes, Bhandara

EXPLANATION

(1.) (b)

Nucleosome is sub-microscopic sub-unit of chromatin which is formed by wrapping of DNA over a core of histone proteins. The term was coined by Oudet *et.al.*, (1975). It is oblate structure with a length of 10nm and a thickness of 5-5.7nm. Its core is called nu-body. The latter is formed of four pairs of histone molecules H₂A, H₂B, H₃ and H₄. DNA makes 1.75 turns over the octamer to form a nucleosome. Two adjacent nucleosomes are connected by a short segment of unbound DNA called linker DNA. A fifth type of histone called H₁ is attached over the linker DNA. Nucleosomes appear as 'beads-on-string' in the chromosomes under electron microscope.

(2.) (c)

In 1953, **James Watson** and **Francis Crick** suggested that in a DNA molecule there are two polynucleotide chains arranged **antiparallel** or in opposite directions.

(3.) (a)

Centrosome is an organelle containing two cylindrical structures called centrioles and occurs in most algal cells (except red algae) and most animal cells. They are absent in prokaryotes, red algae, yeast, gymnosperms and angiosperms and some non-flagellated or non-ciliated protozoans.

(4.) (d)

There are two major classes of membrane transport proteins carrier proteins and channel proteins. Carrier proteins involved with active as well as passive transport of ions or solutes while channel proteins are involved only with passive transport.

(5.) (d)

Normally, the primary constriction is known as kinetochore. In some cases, chromosome contains non-staining secondary constriction called satellite

(6.) (d)

The ciliary microtubules are made up of tubulin. The two subfibres A and B are composed of α and β tubulin having mol. Wt. 56,000 and 58,000 respectively.

(7.) (b)

On the inner side of the thylakoid membranes of chloroplasts are present a paracrystalline array of particles (20×10 nm); these were called quantosomes by Park and Pon (1963).

(8.) (b)

Glyoxysomes were reported from the endosperm of germinating seeds, rich in fatty acids, by **Beevers** (1969). They serve as enzymatic site for reactions including the conversion of stored fatty acids to carbohydrate. Therefore, glyoxysomes will be present in endosperm of castor but not in endosperm of wheat, which is carbohydrate rich.

(9.) (d)

Nucleolus, ribosomes and centrioles are non-membranous cell organelles.

(10.) (d)

Single stranded DNA virus: Bacteriophage $\phi \times 174$, coliphage S 13, bacteriophage M13.

(11.) (b)

Besides DNA, a mitochondrion has RNA and its ribosomes also. Thus, a complete protein synthesising machinery is present in mitochondria. The ribosomes of mitochondria are small, *i.e.*, 55-60 S type, with a large subunit of 40 S and a small subunit of 30 S. The large subunit contain 16-17 S and 5S α RNA and the small subunit 12-13 S β RNA.

(12.) (a) Microtubules are electron microscopic structures found only in the eukaryotic cellular structures like cilia, flagella, centriole, etc. The wall of microtubule is 50Å thick, which is formed of 13 parallel prototubules.

(13.) (d)

Ribosomes are granular structures, first observed under electron microscope as dense particles by George Palade (1953)

(14.) (c)

Middle lamella is a thin binding layer between the cell wall of adjacent plant cells. It is chemically formed of pectates of calcium and magnesium. It is present towards outside of primary wall.

(15.) (c)

Rough Endoplasmic Reticulum (RER) differs from Smooth Endoplasmic Reticulum (SER) due to presence of ribosomes. Some other difference are as follows:

Character	SER	RER
Origin	Formed from RER by removal of ribosome	Formed from nuclear membrane with attachment of ribosomes
Position	Present near the plasmalemma	Present near the nucleus
Occurrence	Lipid forming cell adipocytes, Leydig's cell of testis, adrenal cortical cells	Protein synthesizing cell pancreatic cell, goblet cell, plasma cell, Nissl's granules
Component	Formed of tubules	Formed of cisternae.
Function	Synthesis of fat, glycogenolysis, detoxification of hepatocytes	Protein and glycoprotein synthesis

(16.) (a)

A widely accepted, improved model of cell membrane is fluid mosaic model

(17.) (c)

The **centrioles** appear as two cylindrical structures. They are formed of microtubules. In higher animals, they form the mitotic pole, $\square\square$, they are involved in formation of spindle.

(18.) (b)

A-Outer membrane, B-Inner membrane, C-Granum, D-Thylakoid, E-Stroma lamella and F-Stroma

(19.) (b)

Ribosomes are the site of protein synthesis, also called proteins factories. In testes, ovary and adrenal cortex, SER has a role in the synthesis of steroid hormones.

(20.) (b)

The back bone of RNA is made up of ribose sugar (5-carbon), whereas DNA consists of deoxyribose sugar.

(21.) (a)

Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on proton gradient.

(22.) (a)

In prokaryotes, ribosome attach to the 5' end of \square RNA as soon as transcription begins. A bunch of ribosome moves along a single \square RNA molecule adding 15 amino acids/second to the polypeptide chain, almost the same speed at which RNA polymerase transcribes the \square RNA.

(23.) (d)

In eukaryotic cell, plasmodesma is lined by plasma membrane. It encloses tubular extension of endoplasmic reticulum called desmotubule

(24.) (d)

I, II, III and IV

(25.) (b)

Endoplasmic Reticulum is a network of interconnected cisternae, tubules and vesicles present in cytoplasm. Depending on presence or absence of ribosomes it is of two types-

(i) **Rough ER** : It has ribosomes attached to its surface by ribophorin

(ii) **Smooth ER**: It does not have ribosomes.

(26.) (d)

A cilium has the appearance of a sharp-pointed straight or curved hair that projects 5-10 μ m. Many cilia often project from a single cell. The cilium moves forward with a sudden rapid whiplike stroke 10-20 times per second than it moves backward slowly to its original position.

(27.) (a)

DNA polymerase enzyme was discovered by **Kornberg** in 1957 in $\square.\square\square\square\square$. There are three polymerases present in $\square.\square\square\square\square$ namely, polymerase-I, polymerase-II, polymerase-III.

(28.) (d)

Plant cells possess cell wall, plastids and large central vacuole.

Schwan (1839), a British Zoologist, studies different types of animal cells and reported that cells had a thin outer layer. Which is today known as the 'plasma membrane'. Based on his studies on plant tissues, he also concluded that the presence of a cell wall is a unique character of the plant cells. On the basis of this, Schwann proposed the hypothesis that the bodies of animals and plants are composed of cells and its products

Scheiden and Schwann together formulated the cell theory. This theory however, did not explain as to how new cells were formed. Rudolf Virchow (1855) first explained that cells gets divided and new cells are formed from pre-existing cells (*Omnis cellula-e-cellula*)

He modified the hypothesis and Schwann to give the cell theory a final shape. *Cell theory as understood today is*

(i) All living organism are composed of cells and products of cells

(ii) All cells arise from pre-existing cells

(29.) (d)

All the statements are correct

(30.) (d)

Ribosomes are naked ribonucleoprotein protoplasmic particles in which a covering membrane is absent. The ribosomes are of two types, i.e., cytoplasmic and organelle.

The organelle ribosomes are found in plastids and mitochondria. The cytoplasmic ribosomes may remain free in the cytoplasmic matrix or attached to the cytosolic surface of ER with the help of SRP protein.

The bound ribosomes, generally transfer their proteins to cisternae of the ER for their transport to other parts, both inside and outside the cell

(31.) (c)

In prokaryotes, a nucleus is absent but nucleoid is found which is equivalent to a single chromosome or prochromosome

(32.) (c)

In a DNA molecule, a complete line measures 34Å (3.4 nm) with a distance of 3.4Å (0.34nm) between two successive base pairs.

(33.) (c)

J D Watson and F H C Crick (1953) showed that DNA has a double helical structure with two polynucleotide chains connected by hydrogen bonds and running in opposite directions (antiparallel). The antiparallel strands of a DNA molecule means that the phosphate groups at the start of two DNA strands are in opposite position (pole).

(34.) (b)

Steps of Gram's staining technique

- (i) Staining with weak alkaline solution of crystal violet
- (ii) Treatment with 0.5% iodine solution
- (iii) Washing with water
- (iv) Treatment with absolute alcohol/acetone

(35.) (a)

In eukaryotes, DNA is tightly bound to histones which form a DNA protein particle called **nucleosome**.

(36.) (c)

The ability to distinguish different neighbouring cells is important for organism's function

Glycolipids are lipids with attached carbohydrate, which acts as recognition sites during cell-cell interaction, as well as sites of attachment in a tissue

Glycoproteins are often integral membrane proteins and are also important for cell recognition

(37.) (b)

DNA multiplication or duplication of DNA takes place by **replication**. It takes place during S-phase of interphase in cell-cycle.

(38.) (c)

70 S ribosomes are found in prokaryotes, $\square.\square.$, bacteria and blue green algae. The 70 S ribosomes have 2 subunits, $\square.\square.$, 50 S and 30 S. The ribosomes of mitochondria are small, $\square.\square.$, 55-60 S type, which are comparable to 70 S than 80 S type.

(39.) (b)

In protoplasm, fat store in the form of **triglycerides**. Polypeptides, polysaccharides and nucleoside are proteins, carbohydrates and nucleic acid, respectively.

(40.) (a)

Each spindle is a bipolar fibrous structure composed mainly of microtubules. The spindle fibres are mainly composed of tubulin protein.

(41.) (b)

Glycocalyx (mucilage sheath) of a bacterial cell may occur in the form of a loose sheath called

I. Slime layer or it may be thick and tough called

II. Capsule

(42.) (b)

Rough endoplasmic reticulum contains ribosomes on their surface, which are the site for protein synthesis by the processes of translation in cytoplasm.

(43.) (c)

Small cells have a large surface area per volume ratio as compared to large cells.

(44.) (c)

Unicellular organisms are capable of (i) independent existence, (ii) performing the essential functions of life. Anything less than a complete structure of a cell do not ensure independent living. Hence, cell is the fundamental structural and functional unit of all living organisms

(45.) (b)

Basic fuchsin is used by **Feulgen** to stain DNA.

(46.) (a)

Out of A-T-, G-C pairing, bases of DNA may exist in alternate valency state owing to arrangement called tautomerisational mutation. It involves presence of tautomeric forms of nitrogen bases, $\square.\square.$, imino tautomer instead of amino group ($\square.\square.$, cytosine-adenine) or enol group instead of keto group ($\square.\square.$, thymine-guanine).

(47.) (b)

Cell is a unit of structure and function of an organism. Term 'Cell' was coined by **Robert Hooke** in 1665.

(48.) (d)

Okazaki fragments are produced during DNA synthesis.

(49.) (d)

Cellulose ($\alpha_6\alpha_{10}\alpha_5$) is the most abundant organic polymer. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by α , 1-4 glycosidic bonds.

(50.) (b)

Motility of eukaryotic flagella is dependent upon ATPase activity. Enzyme **axonic dynein** catalyses ATP activity.

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