

1	a a)	Adenine (A) is paired with Thymine (T) and Guanine (G) is paired with Cytosine(C).
2	c c)	Holes in the center of the nuclear pore complex provide the main channel through which water soluble molecules shuttle between the nucleus and cytoplasm. This channel also contains a protein called nucleoplasmin, which facilitates nucleocytoplasmic traffic through the pore.
3	b b)	Eukaryotes possess split genes, where the coding bases are interrupted by some non-coding sequences. These coding sequences of DNA are called exons, while the non-coding DNA sequences are called introns.
4	c c)	Desmosomes are intercellular junctions occurring typically where animal cells require adhesion against stress. Desmosomes hold cells together.
5	d d)	The plasma membrane of eubacteria resembles that of a eukaryotic cell. It is made of phospholipid, protein and some amount of polysaccharides. However, it lacks sterol, the characteristic of eukaryotic cell membrane. Instead, there is sterol-like hopanoid.
6	d d)	Cell wall consists of lignin, hemicellulose, pectin and cellulose.
7	d d)	Kappa particles are self-replicating cytoplasmic bodies containing DNA. They are present in <i>Paramecium</i> and associated with the production of a poisonous substance used for self-defence. It shows cytoplasmic inheritance.
8	d d)	Adenosine monophosphate (AMP), ADP and ATP are the nucleotides of RNA due to the presence of ribose sugar along with nitrogenous base adenine and PO_4^{3-} . The nucleotides of DNA are deoxyadenosine monophosphate (d-AMP), d-GMP, d-CMP and d-TMP.
9	a a)	In a prokaryotic cell, the genetic material is not organised into a nucleus and all the membrane-bound organelles (mitochondria, chloroplast, Golgi body, endoplasmic reticulum, lysosomes) are absent. The histone proteins are absent and therefore, the genetic material is not organised into chromatin.
10	b b)	Plant and animal cells both have a cell membrane and nucleolus.
11	b b)	Flip-flop movement is rarely found in lipids, whereas it remains absent in protein molecules.
12	a a)	As per the fluid mosaic model of the plasma membrane, the cell membrane consists of a highly viscous fluid matrix of two layers of phospholipid molecules. Ribosomes mainly consist of rRNA and protein. Chromosomes are made up of DNA and basic proteins, whereas the nucleolus mainly consists of rRNA.
13	d d)	Prokaryotic cells differ from eukaryotic cells in the organisation of nuclear material. In eukaryotes, nuclear material is present in the nucleus, which is surrounded by a nuclear membrane, while in prokaryotes nuclear material is dispersed in the cytoplasm; there is no well-organised nucleus in prokaryotes.

14	b b)	<p>Protoplasm is a complex, granular, elastic viscous, colourless fluid-like substance, which is selectively permeable.</p> <p>J Huxley defined it as Physical basis of life .</p> <p>Dujardin discovered it and called Sarcode .</p> <p>Purkinje renamed it as Protoplasm.</p>
15	b b)	<p>Within the nucleus, DNA is organised along with proteins into material called chromatin and thick condensed chromatin is called chromosome.</p>
16	b b)	<p>Plant cell wall is mainly composed of cellulose. Other ingredients lignin, cutin, suberin, silica, minerals (<i>e.g</i> ., iron, calcium, carbonate) waxes, tannins, resins, gum, etc.</p>
17	c c)	<p>RNA has two purines (adenine and guanine) and two pyrimidines (uracil and cytosine) bases. Thymine is not present in RNA, instead of it, uracil is present.</p>
18	b b)	<p>Phospholipids are formed from the precursor called phosphatidic acid. A molecule of this acid consists of two non-polar (hydrophobic) fatty acid tails ester-linked to C_1 and C_2 of the glycerol backbone of a hydrophilic head and a negatively charged phosphate group linked to C_3 of glycerol.</p>
19	d d)	<p>Cellulose $(C_6H_{10}O_5)_n$ is the most abundant organic polymer. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by β , 1-4 glycosidic bonds.</p>
20	b b)	<p>The smooth endoplasmic reticulum produces nearly all of the lipids required for the elaboration of new cell membranes, including both phospholipids and cholesterol. The major phospholipid is made up of phosphatidylcholine also called lecithin.</p> <p>Lecithin maintains continuity between the water and lipid phases inside and outside the cell.</p>
21	b b)	<p>Cytology or cell biology is the branch of biology dealing with study of structure and function of a cell.</p>
22	d d)	<p>The primary cell wall contains many small openings or pores situated in primary pit fields. The cytoplasm of adjacent cells communicates through the pores by means of cytoplasmic bridges called plasmodesmata. The plasmodesmata permit circulation of fluids and passage of solutes between cells.</p>
23	d d)	<p>Four major classes of lipids are commonly presents in the plasma membrane, <i>ie.</i>, phospholipids, sphingolipids, glycolipids and sterols. According to fluid mosaic model, the lipids are present as bilayer at right angle to the surface (<i>i.e.</i> , head parallel).</p>
24	b b)	<p>Robert Hook (1665) discovered hollow cavities like compartments in a thin slice of cork under his microscope. He coined the term <i>cellula</i> and wrote the book Micrographia. M Schleiden and T Schwann gave the cell theory.</p>
25	c c)	<p>In fluid mosaic model of plasma membrane, phospholipids form a bimolecular layer in the middle part.</p>
26	a a)	<p>The bacterium <i>E. coli</i> is a prokaryote.</p>
27	a a)	<p>Enzyme acid phosphatase is found functional in lysosome. It acts on substrate phosphomonoester and convert it into monophosphates.</p>
28	b b)	<p>Smooth endoplasmic reticulum is the part of endoplasmic reticulum on which ribosomes are not present and it takes part in lipid synthesis, fat synthesis, glycosylation of carbohydrates, steroid synthesis and detoxification. Whereas rough endoplasmic reticulum is the site of protein synthesis.</p>

29	d d)	The central vacuole of plant cells function in storage, waste disposal, cell elongation and protection, whereas peroxisomes produce hydrogen peroxides as a waste product.
30	c c)	In 1967, Breidenback and Beevers discovered glyoxysomes in fat storing cells or germinating fatty seeds.
31	b b)	Prokaryotic ribosomes have sedimentation coefficients of 70S type.
32	a a)	Endoplasmic reticulum is a network of 60 nm diameter. The surface of rough endoplasmic reticulum is covered by ribosomes. Ribosomes are the site of protein synthesis.
33	b (b)	Mitochondria is rich in catabolic enzymes.
34	b (2)	Nuclear membrane with pores separates nucleus from surrounding cytoplasm.
35	a (1)	Secondary active transport is of two main types- Co-transport (<i>e.g.</i> , glucose and some amino acids along with inward pushing of excess Na^+) and counter transport (Ca^{+} and H^{+} import outwardly as excess Na^{+} passes inwardly).
36	b (2)	The inner membrane of mitochondria possess finger like projections called cristae. Cristae bear racket or club-shaped structures called oxisomes or F_1 -particles. Each oxisome has a spherical head subtended by a stalk and a base (F_0).
37	b (2)	Rudolf Virchow (1855) first explained that the cells get divided and new cells are formed from pre-existing cells (<i>omnis cellula-e-cellula</i>)
38	c (3)	A-Plasma membrane, B-Interdoublet bridge, C-Central microtubule and D-Radial spoke
39	d (4)	Ribosomes are large, non-membranous RNA-protein complexes, which are necessary for protein synthesis.
40	d (4)	The prokaryotic cells are represented by bacteria, blue-green algae, mycoplasma and PPLO
41	d (4)	The saccules or cisternae are frequently curved to give a definite polarity to the Golgi apparatus. One face of the apparatus is convex while the other is concave. The convex side is called forming (<i>cis</i> face) face while the concave side of the apparatus is known as maturing face (<i>trans</i> face)
42	d (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.
43	b (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).
44	b (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.
45	b (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>i.e.</i> , 55-60 S type, with a large subunit of 40 S and a small subunit of 30 S. The large subunit contains 16-17 S and 5S <i>r</i> RNA and the small subunit 12-13 S <i>r</i> RNA.