

Topic :- Cell the Unit of Life

- 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 nucleosome. 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 *r*RNA and the small subunit 12-13 S *r*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 50 \AA 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	Formed from nuclear membrane with

	ribosome	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, *ie*, 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.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	b	c	a	d	d	d	b	b	d	d
Q.	11	12	13	14	15	16	17	18	19	20
A.	b	a	d	c	c	a	c	b	b	b

PE