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3 (Sem-1/CBCS) BOT HC 2

2022

BOTANY

(Honours)

Paper : BOT-HC-1026

(Biomolecules and Cell Biology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : **(any seven)**

1×7=7

(a) Transfer of H-atom among water molecules takes place through _____.

(b) The linkage between two mono-saccharide sugar molecules is called _____.

Contd.

- (c) _____ is a lipid involved in cell signalling and functions as second messengers.
- (d) Unlike the actin filaments and microtubules, the _____ are not directly involved in cell movement.
- (e) Membrane lipids are _____ molecules having a hydrophilic end and a hydrophobic or non-polar end, most of which spontaneously form bilayers.
- (f) During a _____, not only electrons move from one molecule to another, transfer of energy also takes place.
- (g) _____ is an example of single pass transmembrane protein which extends through the lipid bilayer as a single helix.
- (h) The group of characteristics that identifies a particular chromosome set is termed as _____.

- (i) Every living cell in higher plants are connected to adjacent living cells by fine cytoplasmic bridges, called _____.
- (j) The endoplasmic reticulum carrying ribosomes are called _____.
- (k) When two electric charges of opposite signs but equal in magnitude are separated by a distance, a _____ is established.
- (l) Nuclear pore complexes (NPCs) are composed of 30 unique proteins, called _____.

2. Answer **any four** of the following :

2×4=8

- (a) What is the difference between nucleoside and nucleotide?
- (b) What do you understand by 'RNA world'?

- (c) Differentiate between holoenzyme and apoenzyme.
- (d) What role do the kinetochores play during anaphase in mitosis?
- (e) Distinguish between enthalpy and entropy.
- (f) What is autophagy?
- (g) State in what way non-genetic RNA is different from genetic RNA.
- (h) What is Z-DNA?

3. Answer **any three** of the following briefly :
5×3=15

- (a) What is an active site of an enzyme? Explain 'lock and key' hypothesis for enzyme specificity.
- (b) Differentiate between euchromatin and heterochromatin.

- (c) Discuss on chloroplast :
The photosynthetic apparatus or site
- (d) Distinguish between endocytosis and exocytosis.
- (e) Write a short note on endosymbiotic theory.
- (f) Describe the ultrastructure and chemical composition of mitochondria.
- (g) Discuss the biological role of proteins.
- (h) How is the solar energy captured by plant cells and stored in the form of ATP?

4. Answer **any three** of the following questions :
10×3=30

- (a) With the help of a neat labelled diagram describe the structure of B-form of DNA. State the differences between A-DNA and C-DNA. 7+3=10

(b) Discuss in detail the chemical composition and function of the plant cell wall. $6+4=10$

(c) What is synaptonemal complex? Describe its structure and functional role in meiotic chromosome pairing. $2+8=10$

(d) Draw the structures of glucose and fructose and point out the major differences between them. Why are monosaccharides called simple sugars? $(4+4)+2=10$

(e) "Nucleolus can be seen as a very conspicuous structure in the interphase nucleus." Describe the structure of the nucleolus and its role in biogenesis of ribosome. $5+5=10$

(f) What are buffers? How do buffers work? Discuss Henderson Hasselbalch equation. $2+4+4=10$

(g) Write explanatory notes on : $5+5=10$

(a) Golgi apparatus

(b) Peroxisomes

(h) With the help of a neat labelled sketch describe the structure of a cell. List out the differences between a plant cell and an animal cell. $7+3=10$
