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 _____.

(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

———