

(e) Briefly describe the structure of nuclear pore complex.

4. Define Chemi-osmotic hypothesis. Briefly discuss the process of ATP synthesis in mitochondria with special reference to electron transport chain. $3+7=10$

Or

What are microtubule-associated proteins? Give a brief account of the structure and functions of microtubules. $2+(4+4)=10$

5. Describe the various phases of prophase-I of meiosis with suitable diagram. Write the significance of meiosis. $(6+2)+2=10$

Or

Give an account of the ultrastructure and macromolecular assembly of nucleolus. $5+5=10$

6. How would you justify that Golgi components are dynamic in nature? How do secretory vesicles move across Golgi network? Discuss the importance of vesicular transport as the primary function of Golgi. $5+5=10$

Or

Describe the molecular structure of plasma membrane. Briefly enumerate the methods of transport of various substances across the membrane. $5+5=10$

Total number of printed pages—4

3 (Sem-2/CBCS) ZOO HC 2

2024

ZOOLOGY

(Honours Core)

Paper : ZOO-HC-2026

(Cell Biology)

Full Marks : 60

Time : Three hours

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

1. Choose the correct answer : $1 \times 7 = 7$

(i) Which of the following types of molecules are the major structural components of the cell membrane?

- (a) Glycoprotein and cholesterol
- (b) Phospholipid and cellulose
- (c) Phospholipid and protein
- (d) Protein and cellulose

(ii) The protein coat of virus is called as

- (a) Capsid
- (b) Capsomere
- (c) Nucleid
- (d) Outer envelope

(iii) Crossing over takes place between

- (a) Sister chromatid
- (b) Non-sister chromatid
- (c) Chromosome
- (d) None of the above

(iv) Which of the following has its own DNA?

- (a) Lysosome
- (b) Peroxisome
- (c) Mitochondria
- (d) Dictyosome

(v) The Nucleosome

- (a) contains DNA and non-histone proteins
- (b) has a core of histones with DNA around it
- (c) is fully responsible for DNA packaging into chromosomes
- (d) surrounds nuclear pores

(vi) Microtubules are made up of

- (a) Actin and Myosin
- (b) Tubulin
- (c) Flagellin
- (d) Desmin

(vii) Which of the following is the largest family of cell surface receptor?

- (a) Ion-channel receptors
- (b) G Protein-Coupled Receptors
- (c) Nuclear receptors
- (d) Enzyme-linked receptors

2. Answer the following questions : $2 \times 4 = 8$

- (a) Define Synaptonemal complex.
- (b) How can you distinguish intermediate filaments from microtubule and microfilaments?
- (c) Write the characteristics of second messenger.
- (d) Distinguish between outer and inner nuclear membranes.

3. Answer **any three** of the following :

- (a) What is cell signalling? State the role of G proteins in cell signalling. $5 \times 3 = 15$
- (b) Write a short note on regulator molecules of cell cycle. $1 + 4 = 5$
- (c) Explain the 'Endosymbiotic hypothesis' for evolutionary origin of mitochondria.
- (d) Discuss the role of cellular junctions in maintaining the integrity of animal tissue.