3 (Sem–2/CBCS) ZOO HC2

2023

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 : 1×7=7

(i) The structure associated with the formation of aster during nuclear division is

(a) Endoplasmic reticulum

(b) Centriole

(c) Sphaerosome

(d) Ribosome

(ii) Cytoskeleton consists of

(a) Microtubules

(b) Microfilaments

(c) Intermediate filaments

(d) All of the above

(iii) The unit membrane model of plasma membrane was proposed by

(a) Nicolson

(b) Danielli and Davson

(c) Robertson

(d) Mitchel

(iv) An octamer of histone proteins associated with DNA forms

(a) Endosome

(b) Nucleosome

(c) Mesosome

(d) Centromere

(v) Pairing of homologous chromosomes in Prophase–I of meiosis takes place in

(a) Zygotene

(b) Pachytene

(c) Diplotene

(d) Diakinesis

(vi) Nucleolus is the site for the synthesis of

(a) DNA

(b) mRNA

(c) tRNA

(d) rRNA

Contd.

(vii) A molecule acting as a 'second messenger' in biological system is

(a) cDNA

(b) cAMP

(c) tRNA

(d) hn RNA

2. Answer the following : 2×4=8

(a) Write the basic difference between active and passive transport.

(b) Draw the structure of a typical mycoplasma.

(c) Define nucleoplasmic index.

(d) Write the difference between euchromatin and heterochromatin.

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

(a) How do Na^+/K^+ ATPase regulate the balance of Na^+ and K^+ in the cell?

(b) "Mitochondria is considered as a semi autonomous cell organelle." Justify the statement.

(c) What is nucleosome? Write its importance in DNA packaging. 2+3=5

(d) What do you mean by autocrine cell signalling? Draw the outline of major signalling pathways by which extracellular messenger molecules can elicit intracellular responses. 2+3=5

(e) What is facilitated diffusion? Briefly comment on the glucose transporter as an example of facilitated diffusion. 1+4=5

Contd.

4. *(a)* Briefly explain the structure and function of Golgi apparatus. 5+5=10

Or

(b) Write the difference between rough and smooth endoplasmic reticulum with special reference to the nature of their cytosolic surface. Briefly explain the structure and function of rough endoplasmic reticulum. 2+5+3=10

5. *(a)* What do you mean by a cell cycle? Describe the role of cyclins and kinases in the transition from G_1 to S and G_2 to M during the process of cell cycle regulation. 3+7=10

Or

(b) Elucidate the structural composition of microtubules. Write its functional significance with special emphasis on its role in cellular organization and intracellular motility. 5+5=10

6. *(a)* Describe the structure of nuclear pore complex with proper labelled diagram. 7+3=10

Or

(b) What is oxidative phosphorylation? Write a note on the mitochondrial electron transport system showing the enzymes and the coenzymes involved in the process. 2+8=10
