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**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 :  $1 \times 7 = 7$ 
  - (i) The structure associated with the formation of aster during nuclear division is
    - (a) Endoplasmic reticulum
    - (b) Centriole
    - (c) Sphaerosome
    - (d) Ribosome

Contd.

(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

(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

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

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