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3 (Sem-2/CBCS) ZOO HC 2

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. $2+8=10$