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63/2 (SEM-4) ZOO 402 (C,F,W)

2022

ZOOLOGY

(Theory Paper)

Paper Code : ZOO 402(C)

(Molecular Biology of the Cell)

Full Marks – 80

Time – Three hours

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

**1. Answer the following multiple choice questions
(all compulsory) : 1×6=6**

**(i) Which of the following is the reason for the
instability of the microtubule ?**

**(a) Tubulin subunits near the Cc
concentration**

**(b) Tubulin subunits above the Cc
concentration**

**(c) Tread milling concentration of tubulin
subunit**

(d) All of the above.

[Turn over

(ii) Which of the following mitochondrial ETS complex do not contain Fe-S-group ?

- (a) Complex - I (b) Complex - II
(c) Complex - III (d) Complex - IV

(iii) p^{53} concentration in normal cell is regulated by

- (a) E^{2f} factor (b) Rb protein
(c) Mdm² protein (d) Arf protein

(iv) Which of the following structures is not found in the lateral side of epithelial cell wall ?

- (a) Tight junctions
(b) Hemi desmosomes
(c) Desmosomes
(d) Gap junctions

(v) In a lipid bilayer membrane, the flexibility of the structure is maintained by

- (a) Length of the fatty acid chain
(b) Nature of polar head group
(c) Hydrophobicity of Fatty acid chain
(d) High unsaturated hydrocarbon chain

(vi) If the cellular condition is not favorable for cell division, which checkpoint will come into play ?

- (a) G_1 -checkpoint
(b) G_2 -checkpoint
(c) Mitotic checkpoint
(d) None of the above.

2. Answer the following questions : $2 \times 5 = 10$

- (a) What is substrate level phosphorylation ?
(b) What is protein motive force ?
(c) What do you mean by critical concentration of tubulin monomers ?
(d) What do you mean by motor proteins ?
(e) What do you mean by protein sorting ?

3. Answer the following questions (any six) :

$5 \times 6 = 30$

- (a) Write short notes on the regulation of ATP synthesis.
(b) Describe the structure and function of Kinesin proteins.

- (c) Write short notes on Gap junctions.
- (d) Describe briefly about the composition of extra cellular matrix.
- (e) Write short notes on trans epithelial transport.
- (f) Write short notes on microtubule structure and function.
- (g) Describe briefly about the transport mechanisms of plasma membrane
- (h) Write short notes on receptor mediated endocytosis.
- (i) Describe the functions of p^{53} protein in the origin of cancer.

4. Answer any *two* of the following questions :

$$10 \times 2 = 20$$

- (a) What is electron transport system ? Describe the flow of electrons in ETS leading to the synthesis of ATP.
- (b) What are Oncogenes ? Describe the role of proto-oncogenes and tumor suppressor genes in the origin of cancer.

- (c) Describe the mechanism of protein sorting with suitable diagram.

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5. Answer any *one* of the following questions :

$$14 \times 1 = 14$$

- (a) Describe the structure and dynamics of actin filament. Add note on the actin filament polymerisation and depolymerization.

$$4 + 6 + 4 = 14$$

- (b) What is cell cycle ? Describe the different checkpoints of cell cycle and factors that regulate the cell cycle.

$$2 + 12 = 14$$