2021

MICROBIOLOGY — HONOURS

Paper : CC-4

(Cell Biology)

(Unit 1 to Unit 5)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***Question No.*** **1** and ***any three*** from the rest.

1. Answer ***any ten*** from the following : 2×10

(a) Can phospholipid molecules move across the membrane from one leaflet to the other? Explain the answer.

(b) What are the two main classes of membrane transport proteins? Give suitable examples.

(c) Differentiate between homophilic and heterophilic interactions.

(d) What is the normal function of tight junction?

(e) What is chromatin fibre? In which phase of cell cycle it is formed?

(f) What are the components of nuclear lamina?

(g) Ribosome cannot be considered as a true organelle— Justify.

(h) What are the four main histone proteins forming the nucleosome core structure?

(i) Why is zygote not considered as stem cell?

(j) Explain the following terms— (i) Sarcoma (ii) Metastasis.

(k) Why is cholesterol important in eukaryotic plasma membrane?

(l) What is the significance of meiotic cell division in higher eukaryotes?

(m) Describe two differences between primary and secondary active transport.

(n) What are the identifying features of a cell undergoing apoptosis?

(o) What will be the effect on cell cycle if the regulation of cyclin dependent kinases is lost?

2. (a) What are the different components of ECM?

(b) Discuss the role of integrins in interaction of cells with ECM.

(c) How do nucleosomes help in compaction of chromosome structure? What is the next level of compaction?

(d) What is the function of peroxisomes? 2+2+(2+2)+2

3. (a) Comment on the role of the followings in cell cycle regulation :

(i) CAK

(ii) Wee1 kinase

(iii) Cdc25c.

(b) 'Sustrate ubiquitination plays key role in cell cycle regulation'— Justify.

(c) What is the difference between MPF and mitogen?

(d) 'DNA damage always does not lead to cancer'— Justify.

(e) Define asymmetric cell division. (1×3)+2+2+2+1

4. (a) Which subunit of G-protein can act as a molecular switch? How it is turned on?

(b) How is receptor tyrosine kinase activated by EGF? How does this signal activate a downstream Ras protein?

(c) What is an oncogene? Give an example.

(d) Differentiate between pluripotent and totipotent stem cells. (1+2)+(2+1)+2+2

5. Write short notes on : 2½×4

(a) Lysosomes

(b) ABC-type transporter

(c) Receptor mediated endocytosis

(d) Golgi apparatus.

6. (a) Differentiate between SER and RER.

(b) What are the functions of nucleolus?

(c) Give example of a gaseous signalling molecule? What is its function?

(d) What are lipid rafts?

(e) Name any three cytoskeletal elements mentioning one function of each. 2+2+2+1½+2½

7. (a) Differentiate with example— symport and antiport.

(b) Mention the role of COP I and COP II coated vesicles in protein trafficking.

(c) How are proteins selectively transported to and from the nucleus?

(d) Distinguish between endocrine and autocrine signalling. 2+(1½+1½)+3+2