

U.G. 4th Semester Examination-2025

ZOOLOGY

[MAJOR]

Course Code : ZOO-MJ-T-4

(Cell Biology)

[NEP-2020]

Full Marks : 40

Time : 2½ Hours

The figures in the right hand margin indicate marks.

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

1. Answer any five of the following: $2 \times 5 = 10$
- a) How bacterial cell wall differs from the cell wall of fungi?
 - b) What are the differences between the genetic material of bacteria, virus and eukaryotes?
 - c) How smooth endoplasmic reticulum functionally different from rough endoplasmic reticulum?
 - d) What is the role of MPF in cell cycle?
 - e) What is the role of ATP in membrane transport?
 - f) What is GERL complex?

[Turn Over]

- g) How cAMP is produced? What role does it play in cell signalling?
- h) What is Knudson's two hit hypothesis?
2. Answer any two of the following: $5 \times 2 = 10$
- a) What are Histone and non-histone proteins? Describe solenoid and zigzag model of DNA compaction. $2+3$
- b) Why is Mitochondria considered as semiautonomous cell organelle? 'Mitochondria evolved from bacteria' – give proper justification of the statement. $2+3$
- c) How euchromatins are structurally different from heterochromatins? What is the functional significance of euchromatins and heterochromatins? In this respect what will be the structural state of an insulin gene in pancreatic beta cells and skin cells? $2+1+2$
- d) Explain the JAK-STAT signal transduction pathway with example. Describe the structure and functions of two different types of cell junctions. $3+2$

3. Answer any two of the following: $10 \times 2 = 20$
- a) Briefly describe the fluid mosaic model of plasma membrane. Explain the different types of transport mechanisms in cell membrane with example. $5+5$
- b) Explain the Ras-MAP kinase signaling pathway. How is the pathway modified in cancerous cell? Mention the role of APC in development of polyp cancer. State the role of P53 as DNA damage checkpoint. $4+2+2+2$
- c) What are caspase? Distinguish between initiator and executioner caspase. Explain the extrinsic pathway of apoptosis. How are perforin and granzyme involved in apoptosis? $2+2+4+2$
- d) Explain the role of signal sequence and SRP in protein sorting. What is the Nuclear Localization Signal in case of Protein targeted towards nucleus. How nuclear pore complex helps in the above process? Describe the role of TIM / TOM complex in protein targeting. $4+1+2+3$