

352

M. Sc. Examination, 2022
Semester – I
Biotechnology
Core Course – I
(Cell Biology)

Time: 3 hours

Full marks: 40

Questions are of value as indicated in the margin

Answer any *four* questions.

- 1) a) Describe proto-oncogenes and tumor suppressor genes. Explain how mutation affects their functions.
b) Which mitotic structure is targeted by vincristine and colchicine, and what effect would that have on cell division?
c) Mutations in the gene for p53 generally enhance cell's ability to commit phagocytosis in response to chemotherapeutic drugs - True or False, explain.

4+3+3 = 10
- 2) a) Describe pro- and anti-apoptotic proteins with example. What cell-cycle events will be affected in a cell that produces mutated (non-functional) cohesin protein?
b) What steps are necessary for Cdk to become fully active?
c) "Rb is a negative regulator that blocks the cell cycle at the G1 checkpoint until the cell achieves a requisite size" - What molecular mechanism does Rb employ to halt the cell cycle?

(3+2)+2+3 = 10
- 3) a) Explain how an external signaling molecule can produce a cellular response without even entering the target cell. Compare Protein Tyrosine Kinases (PTKs) and Receptor Tyrosine Kinases (RTKs). What is primary target of Janus Kinase?

6+3+1=10
- 4) a) Illustrate different classes of ATP-powered pumps.
b) Classify CAMs

4+6 = 10
- 5) a) Trans-Golgi Network (TGN) is an essential protein sorting station - Justify.
b) Explain the nature of different topological types of membrane attached proteins sorted via secretory pathway.

4+6 = 10
- 6) Write short notes on any four of the followings

2.5 x 4 = 10

 - a) Caspases
 - b) Macroautophagy
 - c) GPCR
 - d) Regulated Necrosis
 - e) Ran Protein
 - f) Microtubule disassembly