

RAMAKRISHNA MISSION VIDYAMANDIRA
(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2025
SECOND YEAR [BATCH 2023-27]

Date : 08/05/2025

Time : 11 am – 1 pm

MICROBIOLOGY

PAPER : 4MCBMJC3

Full Marks : 50

1. Answer **any ten** questions :

[10×2]

- a) How do bacterial cells communicate among themselves in a population?
- b) What is the role of nitric oxide in blood vessel dilation?
- c) What do you mean by acid growth hypothesis of auxin?
- d) Steroid hormones do not require cell surface receptors to get into the target cells-explain
- e) Describe a situation where a cell present in G₀ stage can enter into G₁ stage of a cell cycle.
- f) Why p53 is called the “Guardian of genome”?
- g) What is the significance of apoptosis in the cellular development of certain organisms?
- h) Define secondary messenger. Give an example.
- i) What are the different types of bacterial pemeases?
- j) Name the structural analogue of FtsZ in eukaryotic cell.
- k) How and where, the misfolded proteins are degraded?
- l) What is cortical cytoskeleton?
- m) What is the function of signal recognition particle?
- n) What is the function of cytosolic Hsp70?
- o) What do you understand by activation of oncogenes?

Answer **any three** questions:

2. a) What are the open and closed mitosis?
b) Mention the different cyclin-cdk combinations involved in each phases of a cell cycle.
c) Discuss the role of pRB in cell cycle regulation.
d) Suppose in an in-vitro cell culture experiment upon the treatment of a drug you find significant death of the target cells; how do you examine the root cause of the cell death events?
e) Give example of each- Pluripotent Stem cells and Multipotent Stem cells. [2+2+2+2+2]
3. a) What is angiogenesis and why it is crucial for tumor metastasis?
b) Name two cancer types caused by microbial infection.
c) Explain why Golgi complex is called “processing unit of the cell.”
d) Describe the role of Hematopoietic stem cells and iPSCs in Cancer treatment.
e) Why the cancer patients undergoing radiation therapy are more prone to microbial infection? [2+2+2+2+2]
4. a) What could happen if cellular membranes were pure phospholipid bilayers?
b) What is cellulose microfibril made up of?
c) “A single signalling molecule often has different effects on different target cells.” Justify the statement.
d) How does procollagen differ from tropocollagen? [2+2+3+3]

5. a) Explain inside-out activation of integrin.
b) How does catenin protein function?
c) What happens if a signal sequence is added to a normally nonsecreted protein?
d) Name one intermediate filament. [3+3+2+2]
6. a) State the role of protein kinase A (PKA) in glycogen metabolism.
b) What is nuclear localization signal? Write down the difference between simple and bipartite nuclear localization signal.
c) With a neat diagram describe processing of pre-rRNA. [3+(2+2)+3]

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