

# Question Paper

Exam Date & Time: 07-Jul-2023 (02:00 PM - 05:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER M. Sc. (MEDICAL BIOTECHNOLOGY / MOLECULAR BIOLOGY AND HUMAN GENETICS / GENOME ENGINEERING / TISSUE ENGINEERING) DEGREE EXAMINATION - JULY 2023  
SUBJECT: MBT 501 / MBH 501 / MGE 501 / MTE 501 - CELL BIOLOGY  
(OBE - 2021 REGULATION)

Marks: 70

Duration: 180 mins.

**Answer all the questions.**

**Illustrate where necessary**

- 1) Explain a process of protein sorting in eukaryotic cells. Add a note on glycosylation of proteins. (14)
- 2) What is SCF? Explain the derivation of the acronym by highlighting its functional significance (14)

**3) Explain the following:**

- 3A) 3D bioprinters in tissue engineering (7)
- 3B) Enzyme linked receptors and their functional relevance in human diseases. (7)

**4) Explain the following briefly:**

- 4A) Inhibitory phosphorylation and its significance in cell biology. (7)
- 4B) How did the technique FLIP help the biologists to understand the biomembrane transitions? (7)

**Answer all the questions.**

**5) Write short notes on the following:**

- 5A) Protein half-life and significance in regulating cellular signalling (3.5)
- 5B) Tyrosine kinase receptors as therapeutic targets (3.5)
- 5C) Lipid rafts (3.5)
- 5D) Negative feedback regulation (3.5)

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FIRST SEMESTER M.Sc. (MEDICAL BIOTECHNOLOGY / MOLECULAR BIOLOGY AND HUMAN GENETICS / SYSTEMS BIOLOGY / GENOME ENGINEERING / TISSUE ENGINEERING) DEGREE EXAMINATION - JULY 2023  
SUBJECT: MBT 503/MBH 503/MSB 501/MGE 503/MTE 503 - BIOMOLECULES  
(OBE - 2021 REGULATION)

Marks: 70

Duration: 180 mins.

Answer all the questions.

Essays:

- 1) Explain TCA cycle. Describe its amphibolic nature and calculate the energetics. (14)  
2) Describe beta-oxidation process in detail. Explain fatty acid synthase complex. (14)

3) Short essays:

- 3A) Explain the metabolism of Glycine. Write a note on important products formed from it. (7)  
3B) Explain the factors which regulate the normal serum calcium level. (7)  
4A) Describe the structure of heme. What is porphyria? Explain its characteristic features and symptoms. (7)  
4B) What are the functions of Vitamin A? Explain Wald's visual cycle. (7)

5) Short notes:

- 5A) Uncouplers of electron transport chain. (3.5)  
5B) Dietary fibers (3.5)  
5C) Anion gap (3.5)  
5D) Bence-Jones proteins (3.5)

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