

Question Paper

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



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER M.Sc. MOLECULAR BIOLOGY & HUMAN GENETICS DEGREE EXAMINATION - JULY 2023
SUBJECT: MBH 107-MOLECULAR BIOLOGY - I
(OBE 2020 REGULATION)

Answer ALL questions.
Illustrate where necessary.

Marks: 70

Duration: 180 mins.

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|----|---|------|
| 1) | Describe eukaryotic transcription in detail | (14) |
| 2) | Write an essay on
a) DNA damaging agents
b) Base-excision repair mechanism | (14) |

Explain the following briefly:

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|-----|--|-----|
| 3A) | DNA replication and role of various enzymes in prokaryotic DNA replication | (7) |
| 3B) | RNA World Hypothesis | (7) |
| 4A) | Translation in prokaryotes | (7) |
| 4B) | Regulation of <i>lac</i> operon in <i>E. coli</i> | (7) |

5) Write short notes on the following:

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|-----|--------------------------|-------|
| 5A) | Photoreactivation | (3.5) |
| 5B) | Protein folding | (3.5) |
| 5C) | Yeast mating type switch | (3.5) |
| 5D) | Alternative splicing | (3.5) |

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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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Question Paper

Exam Date & Time: 28-Dec-2023 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER MSc. (MEDICAL BIOTECHNOLOGY / MOLECULAR BIOLOGY AND HUMAN GENETICS / GENOME ENGINEERING / TISSUE ENGINEERING) DEGREE EXAMINATION - DEC 2023 / JAN 2024
SUBJECT: MBT-503 / MBH 503 / MGE-503 / MTE-503 BIOMOLECULES
(OBE-2023 REGULATION - REGULARS)

Marks: 60

Duration: 180 mins.

Answer all the questions.

Explain in Detail:

- 1) Describe beta-oxidation process of fatty acids. Add a note on fatty acid synthase complex. (12)
- 2) Explain glycolysis and its energetics. Write the key reactions of gluconeogenesis. (12)

Explain the following briefly:

- 3A) Describe respiratory regulation of acid-base balance. Explain the anion gap. (6)
- 3B) Explain the metabolism of Glycine. What are the specialized products formed from it? (6)
- 4A) Explain the synthesis and activation of vitamin D. (6)
- 4B) What are the functions of copper? Describe the disorders associated with it. (6)

5. Write short notes:

- 5A) Bence-Jones protein. (3)
- 5B) Bilirubin conjugation. (3)
- 5C) Dietary fibers. (3)
- 5D) Ionophores. (3)

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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 / 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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