

**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**MD (BIOCHEMISTRY) DEGREE EXAMINATION – OCTOBER 2022**

**PAPER I**

Monday, October 03, 2022

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer ALL the questions.**

✍ **Long Answer Questions:**

1. Discuss the structure-function relationships with respect to hemoglobin and myoglobin with suitable illustrations.

(15 marks)

2. Explain the role of second messengers in signal transduction with examples.

(15 marks)

3. **Short answer questions:**

3A. Classify phospholipids and discuss their properties and importance.

3B. Composition and biomedical importance of extracellular matrix.

3C. Discuss the role of Apo proteins in lipoprotein metabolism.

3D. Synthetic analogues of purine/pyrimidine bases and nucleosides used as therapeutic agents.

3E. Explain different mechanisms of transport across biological membranes with examples.

3F. Discuss the mechanism of protein targeting.

3G. Describe the stages and regulation of cell cycle.

3H. Discuss the principle and applications of turbidimetry and nephelometry.

3I. Describe the principle, procedure, applications and advantage of isoelectric focusing electrophoresis.

3J. Discuss the statistical methods of validation of diagnostic tests.

(7 marks × 10 = 70 marks)



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**PAPER II**

Tuesday, October 04, 2022

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

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✍ **Answer ALL the questions.**

✍ **Long answer questions:**

1. Discuss the metabolism of lipoproteins.

(15 marks)

2. Discuss the synthesis and regulation of heme. Add a note on associated disorders.

(15 marks)

3. **Short answer questions:**

3A. Explain the regulation of enzyme activity with examples.

3B. Describe the process of oxidative phosphorylation. Add a note on inhibitors and uncouplers.

3C. Summarize the regulation of blood glucose.

3D. Discuss the formation, transport and disposal of ammonia.

3E. Discuss the disorders associated with purine metabolism.

3F. Compare and contrast metabolism in liver during fed and fasting states.

3G. Explain the steps of calculation of energy requirement of a person.

3H. Discuss the role of vitamins in preventing nutritional anemia

3I. Describe the biochemical role, sources, requirement and disorders of iron.

3J. Discuss the generation of free radicals and role of antioxidants in neutralizing free radicals.

(7 marks × 10 = 70 marks)



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**PAPER III**

Thursday, October 06, 2022

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

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✍ **Answer ALL the questions.**

✍ **Long Essays:**

1. Explain the process of eukaryotic translation. Add a note on post translational modification and inhibitors of translation.

(15 marks)

2. Discuss the regulation of gene expression.

(15 marks)

3. **Write short notes on:**

3A. Oncogenes

3B. Mechanisms and consequences of DNA damage

3C. Gene therapy

3D. Hypersensitivity reactions

3E. Stem cells and application in clinical medicine

3F. Triple test

3G. FISH

3H. DNA fingerprinting

3I. Food adulterants

3J. Telomere and telomerase

(7 marks × 10 = 70 marks)



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**PAPER IV**

Friday, October 07, 2022

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer ALL the questions.**

✍ **Long Essays:**

1. Discuss the laboratory tests used in the assessment of cardiovascular risk  
(15 marks)
  
2. Describe the collection process and precautions employed for blood and urine samples. Add a note on preanalytical errors.  
(15 marks)

3. **Write short note on:**

- 3A. Blood gas analysis
- 3B. Hypothalamo-Pituitary-Adrenal (HPA) axis
- 3C. Assessment of anaemia
- 3D. eGFR and investigations in a renal transplant patient
- 3E. Gut hormones
- 3F. Exploratory investigations in a case of jaundice
- 3G. Markers of bone health
- 3H. Protein aggregation- Effects and associated disorders
- 3I. Mitochondrial disorders
- 3J. Mechanism of action of hormones

(7 marks × 10 = 70 marks)

