

# Question Paper

Exam Date & Time: 12-Jan-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - JANUARY 2024**  
**SUBJECT: BIOCHEMISTRY - PAPER - I**  
**(CBME BATCH)**

**Marks: 80**

**Duration: 160 mins.**

**Answer all the questions.**

**Essay questions:**

**Long Question:**

- 1) Describe the pathway of beta-oxidation of fatty acid under the following headings: activation, transport, steps, energetics  
(2+2+4+2 = 10 marks)
- 2) 52-Year-old executive, smoker & alcoholic for 32 years came to emergency at 3 AM with throbbing chest pain radiating to left jaw and inner side of the left hand. Patient was diabetic, hypertensive for 5 years, BP was 180/90 mmHg, his laboratory investigations reports were. Blood glucose: 430mg/dl, serum cholesterol and CKMB levels were also found to be elevated. ECG was suggestive of ischemia.
  - 2A) Write the probable cause for the above symptoms. (1)
  - 2B) Explain with help of a graph, diagnostically important enzymes, and proteins for confirming the diagnosis and write the significance of each marker. (4)
  - 2C) Define isoenzyme and write the significance of various isoenzymes of Creatine Kinase.  
(1+2 = 3 marks)
  - 2D) Explain the mechanism of action of statins. (2)
- 3) **Short answers:**
  - 3A) Name various plasma proteins in the blood. Write the function of ceruloplasmin.  
(2+2 = 4 marks)
  - 3B) i) Describe deamination reaction with suitable example.  
ii) Explain the functions of nitric oxide in our body  
(2+2 = 4 marks)
  - 3C) Write the reaction of active methionine synthesis.  
Write a note on cystinuria.  
(2+2 = 4 marks)

- 3D) A person suffering from gout was treated with allopurinol. What is the gout?  
Explain the rationale behind the treatment of gout with allopurinol. (2+2 = 4 marks)
- 3E) Describe TCA cycle under the following headings: Reactions, Energetics, Anapleurosis (2+1+1 = 4 marks)
- 3F) Describe the formation and significance of 2,3 Bisphosphoglycerate. (4)
- 3G) Define uncouplers. Enlist the TWO uncouplers. Explain the mechanism with suitable example of any ONE uncouplers. (1+1+2 = 4 marks)
- 3H) **Give the biochemical basis for**  
i) Development of respiratory distress syndrome in premature babies.  
ii) LDL causes atherosclerosis (2+2 = 4 marks)
- 3I) Describe glycogen breakdown and add a note on regulation of glycogen phosphorylase? (4)
- 3J) **Write biochemical basis of the following:**  
i) Paracetamol is prescribed for fever and pain  
ii) Bile salts are needed for digestion and absorption of lipids. (2+2 = 4 marks)
- 3K) Explain the mechanism of oedema due to hypoalbuminemia. The cause of hypo-calcemic due to hypoalbuminemia (2+2 = 4 marks)
- 3L) Define gluconeogenesis. List the substrates for gluconeogenesis. Explain the steps of conversion of lactate to glucose using a suitable diagram. (1+1+2 = 4 marks)
- 3M) Write the amino acid composition of glutathione and explain Two of its functions. (1+3 = 4 marks)
- 3N) A 50-year-old man with 2 years of history of refractory hypertension and occasional panic attack reported to a clinic with severe headache. He had similar attacks earlier. On examination BP was 200/110 mmHg. Weight was 80 kg. 24 hours urinary vanillyl mandelic acid (VMA) was elevated.  
i) Which metabolic disorder is the patient suffering from?  
ii) Write the pathway of VMA synthesis. (1+3 = 4 marks)
- 3O) Write the pathway of synthesis of ketone bodies and breakdown in our body. Add a note on ketosis. (3+1 = 4 marks)

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# Question Paper

Exam Date & Time: 15-Jan-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - JANUARY 2024**  
**SUBJECT : BIOCHEMISTRY - PAPER - II**  
**(CBME BATCH - SUPPLEMENTARY)**

**Marks: 80**

**Duration: 160 mins.**

**Answer all the questions.**

1) Write the steps of replication in prokaryotes. Write TWO inhibitors of prokaryotic replication with their mechanism of action. (7+3 = 10 marks)

2) A young lady from low socioeconomic class came to medicine OPD with complaints of easy fatigability, tiredness, giddiness, and breathlessness. On examination she was pale, her heart and lungs were normal. Her hemoglobin concentration was 8gm%.

2A) What is the probable cause for breathlessness in this lady? (1)

2B) Describe the pathway of heme synthesis, add a note on its regulation. (6)

2C) Name the mineral important for synthesis of heme? Write its dietary source. (1+1 = 2 marks)

2D) Describe the peripheral smear finding in this case. (1)

3) **Short Questions:**

3A) A 45-year-old woman presents to the clinic, feeling tired and fatigued all the time. She had constipation and intolerance to cold. She has an enlarged, nontender swelling in front of the neck. (1+3 = 4 marks)

On blood investigation:

TSH - 15.6 mIU/L (0.3 - 4.5 mIU/L)

FT4 - 0.5 ng/dl (0.8 - 1.9 ng/dl)

Total Cholesterol - 300 mg/dl

Triglycerides - 270 mg/dl

i) What is the probable diagnosis?

ii) Interpret the result and explain the lab findings.

3B) A 50 yr. old male with a history of chronic obstructive pulmonary disease (COPD) is brought to the emergency with shortness of breath and respiratory infection. ABG analysis shows pH- 7.24,

pCO<sub>2</sub> - 60 mm Hg,

HCO<sub>3</sub><sup>-</sup> - 26 mEq/L

i) What is the probable diagnosis?

ii) Discuss the acid base disturbance in this case.

(1+3 = 4 marks)

- 3C) Write the active form of pyridoxine. Describe the role of pyridoxine in various metabolisms. (1+3 = 4 marks)
- 3D) Write a note on genetic code. (4)
- 3E) Enzyme telomerase is associated with aging process. Explain the function of telomerase with a diagram. (4)
- 3F) Young married couple came to gynecologist and expressed a desire to have a baby. After examining, doctor advised her to start folic acid along with other medications.
- Write the reason behind prescribing folic acid in this case.
  - What are the manifestations expected in folate deficiency during pregnancy and the fetal outcomes? (1+3 = 4 marks)
- 3G) Describe the functions of copper in our body. What is the biochemical basis of Wilsons disease? (3+1 = 4 marks)
- 3H) **Justify the statement**
- Vitamin E and selenium acts synergistically.
  - Warfarin is used as anticoagulant. (2+2 = 4 marks)
- 3I) Describe the function of zinc. Write about acrodermatitis enteropathica (3+1 = 4 marks)
- 3J) The following are the findings of a jaundiced patient. Serum bilirubin - 9.0 mg/dl, Conjugated bilirubin - 8.6 mg/dl, Unconjugated bilirubin - 0.4 mg/dl, ALP - 480 IU/L, AST - 40 IU/L, ALT - 30 IU/L, Urine urobilinogen - Negative, Urine bile pigments & bile salts - Positive (+++)
- Analyze the laboratory investigation and identify the type of jaundice in the above case?
  - Write the differences between various types of jaundice. (1+3 = 4 marks)
- 3K) Explain the pathway of uric acid synthesis. Name **ONE** drug used to treat hyperuricemia and write its mechanism of action. (3+1 = 4 marks)
- 3L) During covid pandemic, after first dose of covishield vaccine, booster dose was given to all. Write the mechanism of immunity development due to booster dose. (4)
- 3M) What is biological value of protein? Give examples of **TWO** dietary supplement with high biological value of protein. (2+2 = 4 marks)
- 3N) What is limiting amino acids? Name the limiting amino acids for rice and dal. (1+3 = 4 marks)
- 3O) i) Describe the structure of immunoglobulin with a suitable diagram.  
ii) Enumerate the functions of IgA. (2+2 = 4 marks)

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