

# Question Paper

Exam Date & Time: 24-Mar-2023 10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - MARCH 2023**  
**SUBJECT: BIOCHEMISTRY - PAPER I**  
**(CBME BATCH – REPEATERS)**

Marks: 80

Duration: 160 mins.

**Answer all the questions.**

**Long Question:**

1. A middle-aged male patient came to medical OPD with history of nausea, vomiting edema and decreased urine output for last 15 days. On examination patient was confused and delirious. Laboratory investigations showed:  
serum urea- 170 mg/dl  
serum creatinine- 2.5 mg/dl
  - 1A) What is the probable reason of the above presentation? Write the substrate, site, and pathway of urea synthesis. (1+4 = 5)
  - 1B) Write a note on regulation of urea cycle. (2)
  - 1C) Explain the cause of delirium in this case. (3)
  
2. A 36-year-old female with type 1 diabetes mellitus attended a clinic with a history of fever for 2 days. The following were blood investigations reports  
Fasting glucose - 240 mg/dl, Post prandial glucose - 390 mg/dl, HbA1c - 8.2%,  
Total Cholesterol - 323 mg/dl, Triglycerides - 215 mg/dl
  - 2A) Comment on the glycemic control of this patient. (3)
  - 2B) Explain the cause of hyperlipidemia in diabetes mellites. (2)
  - 2C) Describe the hormonal regulation of blood glucose levels. (5)
  
3. **Short answers:**
  - 3A) List the tests done in lipid profile and write their normal values. Justify why LDL is a bad cholesterol (2+2 = 4)
  - 3B) Define Krebs cycle. Add a note on its energetics and significance. (1+3 = 4)
  - 3C) Write the effect of sulfonamides and methotrexate on nucleotide synthesis. (2+2 = 4 marks)
  - 3D) 2-year-old girl came with potbelly, complains of weakness & sweating, mother told she had **delay in milestone development**. On examination she had hepatomegaly. Lab findings are as follows:

Fasting Glucose: 45mg/dl, blood pH: 7.25. serum triglyceride: 400mg/dl & uric acid -12mg/dl.

- i) What is the probable disorder seen in this girl?
- ii) Explain the biochemical basis for the abnormalities of blood parameters.

(1+3 = 4)

3E) A 3-week-old infant was brought to pediatric OPD by her mother complaining of urine smelling like burnt sugar. Baby was having repeated vomiting. On investigation, branched-chain amino acid level was raised in plasma and urine.

- i) What disorder is seen in this baby?
- ii) Name the enzyme defect responsible for this disorder.
- iii) Name the branched chain amino acid.

(1+1+2 = 4)

3F) A 50-year-old man presented with severe back pain and weakness. He has significant weight loss in last 3 months. Bone marrow biopsy shows plasma cells in excess. X ray skull shows punched out lesions. Urine is positive for Bence Jones proteins.

- i) Explain the cause for above presentation.
- ii) Discuss the serum protein electrophoresis findings in this case.
- iii) Describe Bence Jones proteins.

(1+2+1 = 4)

3G) Write significance of creatine. Write the pathway of creatine synthesis.

(2+2 = 4)

3H) Name catecholamines. Write pathway of their synthesis.

(1+3 = 4 marks)

3I) Several people suspected to have consumed illicit liquor, were brought to the emergency department in serious condition. After preliminary care, they were treated by giving ethyl alcohol.

- i) Name the poisonous substance consumed via illicit liquor and write its metabolic product which can cause deleterious effect.
- ii) What is the rationale behind the use of ethyl alcohol as therapy?
- iii) Explain the metabolism of alcohol in liver.

(1+1+2 = 4)

3J) Explain the chemiosmotic hypothesis using a suitable diagram.

(4)

3K) 15-year-old female with type I diabetes mellitus was brought to emergency room with history of hyperventilation, fruity odour in her breath and unconsciousness. Blood glucose value was 410mg/dl, urine glucose +++, and ketone bodies +++++

- i) Write the synthesis of ketone bodies.
- ii) Mention TWO conditions in which their levels are elevated.

(3+1 = 4)

3L) Write the rationale for using oral rehydration solution in case of diarrhea.

(4)

3M) Write the functions of Alkaline phosphatase (ALP). Write the clinical significance of different isoenzyme for ALP.

(1 + = 4 marks)

3N) What is Lpa? Mention its clinical significance.

(2+2 = 4 marks)

3O) Enumerate the function of Lysosome. Describe any two disorders associated with lysosome.

(2+2 = 4)

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# Question Paper

Exam Date & Time: 27-Mar-2023 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - MARCH 2023**  
**SUBJECT: BIOCHEMISTRY - PAPER II**  
**(CBME BATCH – REPEATERS)**

Marks: 80

Duration: 160 mins.

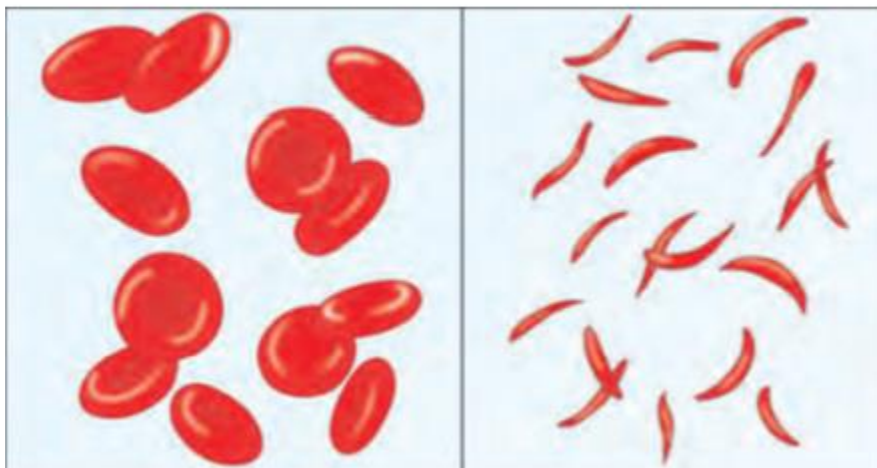
**Answer all the questions.**

**Long Questions:**

1. A 3-year-old girl presented with swelling, pain in joints of finger and toes. She also had fever and weakness. Patient had similar episodes in the past. Her mother also complained of developmental delay. Her Blood investigation reports are as follows- Hb: 7.1g%, serum total bilirubin 4.2mg/dl, unconjugated 3.4 mg/dl, peripheral blood smear shows:

Normal Blood picture

Patients blood picture



- 1A) What is the probable diagnosis? (1)  
1B) Explain the genetic mutation and pathophysiology of this disease. (4)  
1C) What is the reason for low hemoglobin levels in this patient? (2)  
1D) What is the normal serum bilirubin levels and give reasons for its alteration in the above condition? (3)
- 2) Explain the steps of transcription in prokaryotes. What are the different post transcriptional modifications? (7+3 = 10)
3. **Short Answer Questions:**
- 3A) A 10yr old boy presented with muscle pain, cramp and spasm of both hands and feet. He was a vegetarian and would not consume even milk or dairy products. On examination, there was no signs of rickets, but he had positive Trousseau's sign and Chvostek's sign.
- i) What is the nutritional deficiency the child is suffering from? List any TWO factors affecting its absorption.

- ii) Which blood investigation you would like to perform to confirm nutritional deficiency and write its normal values.
- iii) Explain the biochemical basis for his manifestations. (1+1+2 = 4)
- 3B) i) What is the normal pH of plasma and urine.
- ii) Write importance of glutamine in regulation of acid base balance. (1+3 = 4)
- 3C) A 40-year-old female with high BMI was suffering from acute abdominal pain in the right upper quadrant. Patient was passing pale stools since few days, following were the laboratory findings: Serum Total bilirubin: 9.0 mg/dl, Conjugated bilirubin: 8.1 mg/dl, Unconjugated bilirubin :0.8 mg/dl, ALP :480 IU/L, AST: 110 IU/L, ALT: 100 IU/L, Urine urobilinogen - negative, Urine bile pigments & bile salts - positive.
- i) Write the probable diagnosis?
- ii) Explain the bilirubin metabolism. (1+3 = 4 marks)
- 3D) 34-year-old male comes with history of cough, breathlessness, and malaise, he had attended a marriage ceremony 5 days back. He got the information that three people attending the wedding with covid-19 infection 2 days back.
- i) Which molecular technique can used for Covid 19 confirmation.
- ii) Enumerate and explain its steps in brief. (1+3 = 4)
- 3E) Define basal metabolic rate (BMR). Write a note on factors affecting BMR. (1+3 = 4 marks)
- 3F) An obese young lady comes to the OPD with history of hoarseness of voice, sensitivity to cold and history of amenorrhea for last 3 months. Her urine pregnancy test was negative.
- i) What is the probable diagnosis?
- ii) Estimation of which hormone levels will confirm the diagnosis.
- iii) Explain the hormone analysis for the above patient with ELISA technique. (1+1+2 = 4)
- 3G) Describe the principle and write the applications of the following technique.
- i) Hybridoma technique
- ii) Recombinant DNA technology (2+2 = 4)
- 3H) Give reasons for the following:
- i) Some enzymes are released as zymogens.
- ii) Vitamin K deficiency presents with increased prothrombin time.
- iii) Tetracycline is an antibiotic.
- iv) Methotrexate is an anticancer drug. (4)
- 3I) What is xenobiotic? Explain phase-II reaction with TWO suitable examples. (1+3 = 4)
- 3J) What is FIGLU Excretion test? Write clinical manifestations in a patient with positive FIGLU excretion test. (2+2 = 4)
- 3K) What is Glomerular Filtration Rate (GFR)? Why creatinine clearance is better than urea clearance to assess glomerular function? (1+3 = 4 marks)
- 3L) Describe the source and functions of NADPH. (1+3 = 4)

- 3M) Enumerate the dietary sources of iron. Explain its absorption and add a note on Mucosal block theory. (1+3 = 4)
- 3N) What is mutation? Explain different types of mutation with suitable example. (1+3 = 4)
- 3O) A 19 yr. old girl is brought to the emergency. She had a panic attack and was breathing rapidly. On examination she is found to have tachycardia and carpopedal spasm was noted when BP measurement was attempted. ABG analysis shows:
- pH - 7.54  
pCO<sub>2</sub> - 25 mm Hg  
HCO<sub>3</sub> - 25 mEq/L
- i) Comment on the laboratory parameters and write the acid-base disorder.  
ii) Describe respiratory regulation of blood pH.
- (1+3 = 4)

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