

001/25

The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulation),
October - November 2025

Subject: Biochemistry

Full Marks: 100

Paper: I

Time: 3 hours

Attempt all questions. The figures in the margin indicate full marks.

1. A 60 year old person is suffering from diabetes for last 10 years. 2+6+7
- List the biochemical investigations you should advise him as a part of regular check-up.
 - Write down the biochemical reference range of those parameters.
 - Explain the alteration of lipid metabolism in diabetes.

2. Explain the following statements: 5x3

- Allopurinol is used to treat gout.
- Misfolding of protein causes disease.
- G6PDH deficiency leads to haemolytic anaemia.
- Hemolysis should be avoided in blood samples collected for potassium estimation.
- Hypoalbuminemia leads to peripheral oedema.

3. Short questions(applied aspect): 4x5

- Creatine kinase(CK) has relevance in diagnosis of more than one condition. In light of the statement answer the following: 1+2+2
 - Name the Iso enzymes of Creatine kinase.
 - Mention the method by which the iso enzymes can be separated.
 - Mention at least three conditions where isoenzyme as well as total CK is raised.
- Oligomycin and cyanide can inhibit respiratory chain. Give the mechanism of inhibition by both agents. 5
- Function of Cyclo-oxygenase and role of Cyclo-oxygenase inhibitors as drug. 2+3
- Mention the structure of glucose transporter in membrane bound state. Give at least three examples of glucose transporters mentioning the tissue they work for. 2+3

4. Short notes: 3x6

- Channelopathies.
- Salvage pathway of Purine metabolism with its clinical significance.
- Renal regulation to maintain pH of blood.

5. Write short notes on the following: 4x5

- Mechanism of action of Methotrexate and Ethanol in Methanol poisoning.
- Segregation and identification of cell organelle.
- Role of Indian Medical Graduates as lifelong learner.
- Hepatic Porphyria.

6. Choose the correct option among each of the following: 12x1

- A 10 year old boy presented with abdominal pain, muscle weakness and fatigue. On investigation, serum lead level was found increased in blood. Which of the following enzymes in the liver is affected?
 - ALA synthase
 - Ferro chelatase
 - PBG deaminase
 - Heme oxygenase

- ii) A 45 year old man is prescribed methotrexate for rheumatoid arthritis. This drug inhibits dihydrofolate reductase by binding at the enzyme's active site, competing with folate. Which kinetic change is expected?
- Decreased K_m , no change in V_{max}
 - Increased K_m , unchanged V_{max}
 - Decreased V_{max} , unchanged K_m
 - Increased V_{max} , Increased K_m
- iii) A 65 year old male patient with history of chronic kidney disease presents to the emergency with complaints of muscle weakness, fatigue, irregular heartbeats over past few days. On examination his blood pressure is 160/90mmHg, heart rate is irregular and he has diminished deep tendon reflexes. Which electrolyte imbalance is most likely responsible for these symptoms?
- Hypernatremia
 - Hyponatremia
 - Hyperkalemia
 - Hypokalemia
- iv) A 61 year old man was reported to have multiple fractures of bones due to trivial trauma. He was having severe hip and low back pain for last 5 months with fatigue. His lab reports revealed Hb % 7.8g/dl, serum albumin 2.5g/dl and serum globulin 4.1g/dl. Serum protein electrophoresis revealed a spike in the gamma globulin region. Most probable diagnosis is:
- Osteomalacia
 - Rickets
 - Multiple myeloma
 - Chronic kidney disease
- v) A 6 year old chubby, fair boy was brought to the paediatrics OPD with complaints of mental retardation, delayed developmental milestones, frequent seizures and eczema. He has light coloured hair, hypopigmentation in skin and iris. The probable diagnosis is:
- Alkaptonuria
 - Phenylketonuria
 - MSUD
 - Hereditary homocystinuria
- vi) A 38 year old alcoholic male patient with previous history of pancreatitis was brought to the emergency with vomiting and pain in upper abdomen radiating to back. The most appropriate biochemical test to be done is:
- Serum ALT and AST
 - Serum urea and creatinine
 - Serum amylase and lipase
 - Plasma glucose and HbA1c
- vii) All are true about $Na^+ - K^+$ pump except:
- It is inhibited by Digoxin and Ouabain
 - It spends large amount of ATP
 - It drives sodium inside and potassium outside
 - It acts against Concentration gradient
- viii) A pedestrian, hit by a car was brought to the emergency department and presented with hypovolemia due to blood loss. Which of the following can be administered to maintain the blood pressure?
- Dextran
 - Dextrin
 - Hemicellulose
 - Heparin sulphate
- ix) A 18 year old male patient presents with sudden limb pain and hematuria. History revealed that he suffered similar attacks previously. On examination RBC showed sickling under microscope. What may be the probable mutation he is suffering from?
- $\beta 6 \text{ Glu} \rightarrow \text{Val}$
 - $\beta 6 \text{ Lys} \rightarrow \text{Val}$
 - $\beta 26 \text{ Val} \rightarrow \text{Glu}$
 - $\beta 6 \text{ Val} \rightarrow \text{Glu}$
- x) Which of the following statement is true regarding function of Insulin in lipid metabolism?
- It activates hormone sensitive lipase, but inhibits lipoprotein lipase.
 - It inhibits hormone sensitive lipase, but activates lipoprotein lipase.
 - It activates both hormone sensitive lipase and lipoprotein lipase.
 - It inhibits both hormone sensitive lipase and lipoprotein lipase.
- xi) Milk curdles with lemon juice. Which may be true for the casein protein of milk?
- Maximum net charge
 - Maximum solubility
 - Zero net charge
 - Acidification increases negative charge
- xii) A young woman is brought to ER after a panic attack. She has rapid breathing. ABG report shows: - pH-7.52, $PCO_2=28\text{mm of Hg}$, $HCO_3^-=22\text{mmol/L}$.
- Acute respiratory alkalosis
 - Metabolic alkalosis
 - Acute respiratory acidosis
 - Compensated metabolic acidosis