



KING GEORGE'S MEDICAL UNIVERSITY, LUCKNOW U.P.
DEPARTMENT OF BIOCHEMISTRY

2nd Terminal Examination MBBS Phase 1 2025 Batch

Time Allowed: 20 min

Maximum Marks – 20

Date: 25.04.2026

Note: Attempt all questions and write the correct answer to the MCQs.

SECTION A

<p>Q1. Which hypersensitivity reaction is involved in tuberculosis skin test (Mantoux test)?</p> <ul style="list-style-type: none">a) Type Ib) Type IIc) Type IIId) Type IV <p>Ans.</p>	<p>Q6. Deficiency of the following vitamin can be precipitated by tuberculostatic isoniazid</p> <ul style="list-style-type: none">a) Thiamine pyrophosphateb) Methyl cobalaminec) Methyl tetrahydrofolated) Pyridoxal phosphate <p>Ans.</p>
<p>Q2. The rate-limiting enzyme of the urea cycle is:</p> <ul style="list-style-type: none">a) Arginaseb) Carbamoyl phosphate synthetase Ic) Ornithine transcarbamylased) Argininosuccinate synthetase <p>Ans.</p>	<p>Q7. Vitamin K deficiency is most likely to occur in:</p> <ul style="list-style-type: none">a) Chronic alcoholismb) Biliary tract obstructionc) Chronic renal failured) Lack of citrus fruit in the diet <p>Ans.</p>
<p>Q3. Malonyl-CoA inhibits:</p> <ul style="list-style-type: none">a) Fatty acid synthaseb) Carnitine shuttlec) Lipoprotein lipased) Hormone sensitive lipase <p>Ans.</p>	<p>Q8. Oral polio vaccine (OPV) is a:</p> <ul style="list-style-type: none">a) Killed vaccineb) Toxoidc) Live attenuated vaccined) Subunit vaccine <p>Ans.</p>
<p>Q4. Cataract in child with reducing sugar in urine suggests</p> <ul style="list-style-type: none">a) Fructose intoleranceb) Diabetesc) Galactosemiad) Glycogen storage disease <p>Ans.</p>	<p>Q9. Which enzyme is typically elevated in patient with megaloblastic anemia due to ineffective erythropoiesis?</p> <ul style="list-style-type: none">a) Tartrate – resistant acid phosphataseb) Alanine aminotransferasec) Alkaline phosphatased) Lactate dehydrogenase <p>Ans.</p>
<p>Q5. The activity of Alkaline Phosphatase is higher in children as compared to healthy adults because:</p> <ul style="list-style-type: none">a) ALP leaks from osteoblasts during physiological bone growthb) Higher dietary intake of phosphatec) Hepatic cells produce excessive ALP during physiological growthd) Immature renal filtration of ALP <p>Ans.</p>	<p>Q10. The Bohr effect refers to:</p> <ul style="list-style-type: none">a) Increased affinity of hemoglobin for oxygen at low pHb) Decreased affinity of hemoglobin for oxygen at low pHc) Increased oxygen binding by myoglobind) Physiological pH only <p>Ans.</p>



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Q11. Which of the following inhibitors blocks Complex IV of the ETC?

- a) Rotenone
- b) Antimycin A
- c) Cyanide
- d) Oligomycin

Ans.

Q16. Which of the following acts as an uncoupler of oxidative phosphorylation?

- a) Rotenone
- b) Cyanide
- c) 2,4-dinitrophenol (DNP)
- d) Oligomycin

Ans.

Q12. Homocystinuria is most commonly associated with a deficiency of:

- a) Phenylalanine hydroxylase
- b) Cystathionine β -synthase
- c) Tyrosinase
- d) Branched-chain ketoacid dehydrogenase

Ans.

Q17. HDL cholesterol is mainly involved in:

- a) Lipid digestion
- b) Reverse cholesterol transport
- c) Triglyceride synthesis
- d) Lipolysis

Ans.

Q13. Which condition shows hypoketotic hypoglycemia?

- a) Diabetes mellitus
- b) Starvation
- c) MCAD Deficiency
- d) Obesity

Ans.

Q18. In uncontrolled diabetes all occur EXCEPT

- a) Hyperglycemia
- b) Glycosuria
- c) Increased Glycolysis
- d) Increased Gluconeogenesis

Ans.

Q14. Patient with fasting hypoglycemia likely has defect in:

- a) Glycolysis
- b) TCA cycle
- c) Gluconeogenesis
- d) HMP shunt

Ans.

Q19. The following plasma protein have intrinsic ferroxidase activity:

- a) Ceruloplasmin
- b) Hemopexin
- c) Haptoglobin
- d) Apoferritin

Ans.

Q15. Which amino acid serves as a precursor for both catecholamines and melanin?

- a) Tryptophan
- b) Tyrosine
- c) Histidine
- d) Glycine

Ans.

Q20. The diversity of antibodies enables the immune system to:

- a) Recognize limited antigens
- b) Recognize a vast variety of antigens
- c) Produce only IgM
- d) Avoid immune response

Ans.

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2nd Terminal Examination MBBS Phase 1 2025 Batch

Date: 25.04.2026

Time Allowed: 2 hr 40 min

Maximum Marks – 80

Note: Attempt all questions in serial order. Answer Section B and Section C in a separate answer books. All parts of a question should be answered together. Illustrate your answer with suitable diagrams where required. Figures in parenthesis indicate marks allotted to a question

SECTION B

Maximum Marks - 40

Q1. Explain the glycogen metabolism with hormonal regulation? Add a note on Type I glycogen storage disease, mentioning its biochemical defect and clinical features. (10 + 5)

Q2. A 6-month-old infant is brought to the pediatric clinic with a history of poor feeding, vomiting, lethargy, and developmental delay. The parents also report a characteristic "burnt sugar" odor in the child's urine. On examination, the infant shows hypotonia and intermittent seizures along with their corresponding ketoacids in urine.

- a) Identify the most likely metabolic disorder and explain the biochemical defect involved. (3).
- b) Describe the normal metabolic pathway of branched-chain amino acids including key enzymes and coenzymes involved. (3).
- c) Explain the biochemical basis of the clinical features observed in this patient. (2).
- d) Outline the principles of management and dietary modification for this condition. (2).

Q3. Short Answer Questions

(3x5 = 15)

- a) Explain the biochemical basis of anemia due to deficiency of Vitamin B6 and Vitamin B12.
- b) What is the nutritional role of Selenium? How do Vitamin E and selenium supplement each other?
- c) Draw a well labelled diagram of Electron Transport Chain along with inhibitors.

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SECTION C

Maximum Marks - 40

Q1. Describe lipolysis in adipose tissue. Discuss β -oxidation of fatty acids and its role in ketone body formation. Explain ketogenesis and the conditions that favour ketone body formation from acetyl-CoA. (3 + 7 + 5)

Q2. An 18-year-old boy was brought to the emergency department with complain of severe pain in upper abdomen which was radiating through his back. Pain was constant and slightly improves when he bends forward. He had 5 episodes of non-bilious vomiting. There was no history of trauma or similar previous episodes. He was treated for respiratory infection 10 days back. On examination: HR 120bpm, BP 100/60 mmHg, afebrile, RR 26/min. On palpation marked tenderness in epigastric region was present.

Lab findings:

Serum Amylase: 350 IU/L (Reference range: 28 – 100 IU/L)

Serum Lipase: 1200 IU/L (Reference range: 23 – 300 IU/L)

Based on given history, examination and lab findings answer following question:

- (i) What is the most probable diagnosis? [1]
- (ii) Which laboratory investigation is most specific for confirming the diagnosis in given case? [1]
- (iii) Which anticoagulant should be avoided while collecting blood sample for estimation of Serum Amylase because the enzyme requires calcium ions for activity? [1]
- (iv) Describe the rise, peak and normalization timeframe for Serum Amylase and Serum Lipase in given condition. [2]

Q2. Short Answer Questions

(4x5 = 20)

- a) Discuss the formation and function of the Membrane Attack Complex (MAC).
- b) Explain the role of MHC molecules in immune recognition and self–nonself discrimination.
- c) Compare hemoglobin and myoglobin with respect to structure, oxygen affinity, and physiological role. Also discuss the factors that shift the oxygen dissociation curve of hemoglobin curve to the right and left.
- d) Role of physician as lifelong learner.
