

2019 and 2024 Scheme

Q.P. Code: 115001

Reg. no.:

First Professional MBBS Degree Regular/Supplementary Examinations August 2025

Biochemistry Paper - I

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers
- Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together • Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary

1. Multiple Choice Questions

(20x1=20)

The responses for MCQ questions (Q.No. i to Q.No. xx) shall be written in the space provided for answering MCQ questions at page No. 51 of the answer book (the inner portion of the back cover page (PART III)). Responses for MCQs marked in any other part/page of the answer book will not be valued

Questions i-v are single response type questions

- Glycolysis is the only source of energy for the following organ
a) Brain b) RBC c) Heart d) Skeletal muscle
- The rate limiting step in cholesterol biosynthesis is
a) Squalene synthetase c) Mevalonate kinase
b) HMG-CoA reductase d) Ketoacyl reductase
- The lipoprotein which donates the apoproteins apo CII and apo E to other lipoproteins is
a) LDL b) VLDL c) HDL d) Lp(a)
- A patient presented with large yellow tonsils, hepatosplenomegaly, corneal opacity and neuropathy. He most probably suffers from
a) Abetalipoproteinemia c) Primary Familial hypercholesterolemia
b) Tangier's disease d) Wolman's disease
- The liver cannot utilize ketone bodies due to lack of the enzyme
a) Thiolase b) Thiophorase c) Thioesterase d) All of the above

Question numbers vi-x are multiple response type questions. Read the statements and mark the answers appropriately.

- The following statements regarding urea cycle are true
1) Urea cycle occurs both in mitochondria and cytosol
2) The non-protein amino acid involved in urea cycle is arginosuccinate
3) The compound linking urea cycle to citric acid cycle is ornithine
4) N- Acetyl glutamate is allosteric activator of Carbamoyl phosphate synthetase I
a) 1 & 2 b) 2 & 3 c) 1 & 4 d) 3 & 4
- Regarding the products formed from tryptophan, the following is true
1) Melanin, epinephrine & nor-epinephrine are formed from tryptophan
2) Serotonin is 5- Hydroxy tryptamine and is an antidepressant
3) Melatonin is produced by the argentaffin cells of the GIT
4) 60 mg of tryptophan is used to synthesize 1 mg of nicotinic acid
a) 1 & 3 b) 3 & 4 c) 2 & 4 d) 1 & 2
- Glycine is involved in the following metabolic pathways
1) Glycine, glutamate and cysteine together form glutathione
2) It is used in the salvage pathway of synthesis of pyrimidines
3) Combines with succinyl CoA resulting in formation of heme
4) Used for conjugation of bile acids to produce bile salts
a) 1, 2, 3 b) 1, 3, 4 c) 2, 3, 4 d) 1, 2, 4
- Which of the following statements about vitamin E are correct
1) Vitamin E is a chain breaking antioxidant
2) Selenium has sparing effect on the dietary requirement of Vitamin E
3) It favours lipid peroxidation in biological membranes 4) It causes hemolysis of RBCs
a) 1 & 2 b) 1 & 3 c) 2 & 4 d) 3 & 4
- Pyridoxal phosphate is a coenzyme for the following reactions
1) Transamination 2) Decarboxylation 3) Hydroxylation 4) Redox reactions
a) 1 & 2 b) 1 & 3 c) 1 & 4 d) 3 & 4

For Questions xi-xv there are two statements marked as-Assertion (A) and Reason (R). Mark your answer as per the options provided

- a) Both A and R are correct & R is the reason for A** **c) A incorrect R Correct**
b) A correct R incorrect **d) Both A and R are incorrect**
- Assertion:** Our diet should contain a mixture of cereals and pulses
Reason: Cereals (rice) lack lysine and threonine, pulses (Bengal gram) lack cysteine, methionine

(PTO)

- xii. **Assertion:** In pregnancy there is negative nitrogen balance
Reason: Growth of foetus results in increased utilization of amino acids
- xiii. **Assertion:** Cell has low intracellular sodium
Reason: Intracellular sodium concentration is maintained by Na⁺K⁺ATPase
- xiv. **Assertion:** Methotrexate is a competitive inhibitor of folate reductase enzyme
Reason: Methotrexate is a structural analogue of folic acid
- xv. **Assertion:** Aspartate aminotransferase is a non-functional plasma enzyme
Reason: It is actively secreted into plasma

Question numbers xvi-xx are case scenario-based questions

A 24 year old student presents with complaints of muscle pain and cramps, stiffness, tingling of hands and feet and recurrent carpopedal spasms.

- xvi. The most likely diagnosis in the above condition will be
a) Hypercalcemia b) Tetany c) Hyperparathyroidism d) Rickets
- xvii. All the statements regarding calcitonin are correct **EXCEPT**
a) Increases serum calcium level c) Decreases intestinal absorption of calcium
b) Decreases serum calcium level d) Increases calcium excretion from renal tubules
- xviii. Calcium is responsible for all of the following functions **EXCEPT**
a) Neuromuscular transmission c) Intracellular messenger
b) Blood coagulation d) Activation of vitamin D
- xix. Parathyroid hormone is involved in
a) Activation of vitamin D c) Decreases intestinal absorption of calcium
b) Increases phosphate reabsorption in kidneys d) None of the above
- xx. All of the following promote calcium absorption **EXCEPT**
a) Vitamin D c) Lysine and arginine
b) Parathyroid hormone d) Phytates

Long essays

(2x10=20)

2. A 51 year male came to medical OPD with complaints of feeling weak and tired for past 2 months. He had polyuria, polydipsia and felt hungry in between meals. He also has family history of Diabetes. His lab reports are:
• Fasting blood glucose: 176 mg/dl, Postprandial blood glucose: 410 mg/dl,
• Blood urea- 27mg/dl, HbA1c - 14% • Urine: Albumin - nil, Sugar +++, Ketone bodies - nil,
a) What is the probable diagnosis
b) Enumerate the diagnostic criteria for Diabetes Mellitus as per American Diabetes Association (ADA)
c) Discuss lab investigations done to diagnose Diabetes Mellitus with their normal levels (1+3+6)
3. Write in detail about sources, RDA, coenzyme forms, causes and deficiency manifestations of folic acid.

Short Essays:

(6x6=36)

4. A 49-year-old women was admitted to hospital. She had polyuria, lost weight, had a fruity odour in breath. The following were her lab reports.
• Blood glucose= 450 mg/dl, • Urine glucose= 4+, Urine Rothera's test= positive, Urine pH= 5.5
a) What is the probable diagnosis.
b) Explain the clinical features of the disorder.
c) Write briefly about ketogenesis. (1+2+3)
5. Give an account of formation of specialized products from glycine and their clinical importance.
6. Explain Homocystinurias in detail, with clinical presentations and lab tests.
7. Enumerate the causes, peripheral blood picture and laboratory findings in Iron deficiency anemia. (2+1+3)
8. What is BMR. How is it measured. What is its normal value. What are the factors affecting BMR. (1+1+1+3)
9. Enumerate the cardiac biomarkers and give an account of their pattern of elevation in myocardial infarction (1+5)

Short Answers

(6x4=24)

10. Enumerate the different types of Glucose transporters and their locations. Add a note on glucose absorption in GIT. (3+1)
11. Mention the causes of fatty liver and name the lipotropic factors. (2+2)
12. Uncouplers of oxidative phosphorylation.
13. Give reason-
a) 2,3 BPG concentration in RBCs increases in hypoxic conditions.
b) Presence of brown adipose tissue in newborns and hibernating animals.
14. Describe the Biochemical basis of –
a) Difluoro methyl ornithine (DFMO) is effective against trypanosomiasis.
b) Proteolytic enzymes of GIT are secreted as zymogens.
15. A primary health care physician regularly encounters patients suffering from different illnesses. Explain the role of physician as a communicator.