

# 2019 and 2024 Scheme

Q.P. Code: 115001

Reg. no.: .....

## First Professional MBBS Degree Supplementary (SAY) Examinations November 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 MCQ questions (Q.No. i to Q.No. xx) shall be answered **only in the OMR sheet provided 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. **For marking the correct responses use X mark only**

#### Questions i-v are single response type questions

- Which of the following subcellular organelle is involved in destroying invading viruses and bacteria  
a) Peroxisomes      b) Lysosomes      c) Ribosomes      d) Microsomes
- Deficiency of one of the following trace elements causes loss of taste sensation  
a) Copper      b) Selenium      c) Iron      d) Zinc
- Which of the following enzymes does not require Pyridoxal phosphate as co-enzyme  
a) Alanine Amino Transferase      c) ALA Synthase  
b) Glycogen Phosphorylase      d) Pyruvate Dehydrogenase
- Which of the electron carriers is soluble and mobile  
a) Co Q      b) Cytochrome c<sub>1</sub>      c) Cytochrome a      d) Cytochrome b
- All the following are **TRUE** about Wilson's disease **EXCEPT**  
a) Caused by ATP7B gene mutation      c) Zinc can be given as treatment  
b) Serum ceruloplasmin levels are increased      d) Kayser Fleischer rings can be seen

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

- Choose the metabolic pathways that take place only partly in the mitochondria  
1) Urea synthesis      2) Heme synthesis      3) Gluconeogenesis      4) Cholesterol synthesis  
a) 1, 2 & 3 are correct      c) 1, 3 & 4 are correct  
b) 1, 2 & 4 are correct      d) 2, 3 & 4 are correct
- The false statements about Lipoprotein metabolism  
1) Chylomicrons have the smallest diameter      3) HDL has maximum amount of proteins  
2) LDL carries cholesterol      4) VLDL carries exogenous dietary triacyl glycerol  
a) 1 & 3 are correct      b) 2 & 4 are correct      c) 1 & 4 are correct      d) 2 & 3 are correct
- Products formed from glycine are  
1) Heme      2) Creatine      3) Glutathione      4) Thyroxine  
a) 1, 2 & 3 are correct      c) 1, 3 & 4 are correct  
b) 1, 2 & 4 are correct      d) 2, 3 & 4 are correct
- True about HMP Shunt pathway  
1) Produces ATP      3) NADPH is produced in oxidative phase  
2) Produces uronic acid      4) Regulatory enzyme is Glucose 6 Phosphate dehydrogenase  
a) 1 & 3 are correct      b) 1 & 4 are correct      c) 3 & 4 are correct      d) 2 & 3 are correct
- Choose the metalloenzymes  
1) Pyruvate dehydrogenase      2) Carbonic anhydrase      3) Enolase      4) Cytochrome oxidase  
a) 1, 2 & 3 are correct      c) 1, 3 & 4 are correct  
b) 1, 2 & 4 are correct      d) 2, 3 & 4 are correct

#### 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 but R is not the reason for A      c) Both A and R are incorrect  
b) Both A and R are correct and R is the reason for A      d) A Correct R incorrect
- Assertion:** Ascorbic Acid deficiency leads to bleeding gums  
**Reason:** Due to its role in collagen cross linking
- Assertion:** Muscle will not release glucose to the blood stream  
**Reason:** Muscle tissue does not contain glucose -6- phosphatase
- Assertion:** Vitamin B<sub>12</sub> deficiency causes simultaneous folate deficiency  
**Reason:** Free THFA cannot be regenerated in the deficiency of Vitamin B<sub>12</sub>
- Assertion:** Phenyl alanine is a non-essential amino acid  
**Reason:** Phenyl alanine can be synthesized from tyrosine
- Assertion:** Liver is the only organ that can excrete cholesterol through bile  
**Reason:** Liver Synthesizes cholesterol

(PTO)

**Question numbers xvi-xx are case scenario-based questions**

A 53-year-old obese man, known to be a prediabetic got severe crushing retrosternal chest pain, radiating to his left shoulder. ECG showed ST elevation, T wave inversion and Q waves. He was diagnosed as having Myocardial Infarction. He did not exercise regularly, ate processed oily foods and was constipated often. An abdominal scan showed presence of fatty liver disease. Serum was sent for laboratory investigations

- xvi. All of the following are likely to be elevated in the serum of a patient with Myocardial Infarction, **EXCEPT**  
a) Creatine Kinase-MB                      b) Troponin I                      c) Amylase                      d) Myoglobin
- xvii. Which of the following is most likely to be the result of HbA1c of a pre-diabetic  
a) HbA1c of 5.7 - 6.5                      b) HbA1c of 5 - 7                      c) HbA1c of 5.2 - 6                      d) HbA1c of 6.5 - 7.5
- xviii. He was advised to increase his intake of dietary fiber. Which of the following is a dietary fiber  
a) Pectin                      b) Pyridoxine                      c) Peptone                      d) Palmitate
- xix. Which of the following factors will function as a lipotropic factor for the fatty liver  
a) Stearic acid                      b) Palmitic acid                      c) Butyric acid                      d) Linolenic acid
- xx. Renal threshold for glucose is  
a) 140mg/dL                      b) 170mg/dL                      c) 180mg/dL                      d) 160mg/dL

**Long essays**

**(2x10=20)**

2. A ten year old girl presented to the out-patient department of the hospital from a nearby village with excessive tiredness, weakness, abdominal pain with frequent alternate episodes of constipation and diarrhoea. She gave a history of frequently playing with mud, walking barefoot with poor personal hygiene and sanitation. On examination, the physician found pallor of the conjunctiva, angular stomatitis and koilonychia to be present. Laboratory examination revealed low haemoglobin level & hypochromic microcytic RBC. Microscopic examination of fresh stool samples showed presence of hook worm eggs.  
a) Name the nutrient whose deficiency can cause the above manifestations  
b) Mention any Two dietary sources of the nutrient.  
c) Name any Four proteins that contain this nutrient along with their functions.  
d) Describe the dietary absorption and transport of the nutrient. (1+1+4+4)
3. Enumerate the reactions of urea cycle and explain its regulation. Add a note on disorders of the urea cycle. (5+2+3)

**Short Essays:**

**(6x6=36)**

4. A ten year old boy presented with a history of fever since 3 days, disturbance of consciousness, accompanied by thirst, fruity odour of breath and deep laboured breathing. On examination pulse= 120/min, blood pressure= 90/50 mmHg, temperature= 38°C, respiratory rate =30 breaths/min, Blood glucose= 407mg/dL and ketone bodies were present in urine.  
a) What is the probable diagnosis  
b) Explain how ketone bodies are formed and utilised in the body (1+5)
5. What is gluconeogenesis. Name the substrates of this pathway. Describe the reactions catalysed by the key regulatory enzymes of gluconeogenesis. (1+1+4)
6. Define Basal Metabolic Rate (BMR), mention how it can be measured, what are the normal values. Describe the factors determining BMR. (1+1+1+3)
7. What is competitive enzyme inhibition. Mention the salient features and clinical relevance of competitive enzyme inhibition with the help of atleast Four examples. (1+1+4)
8. Describe the metabolic changes in fed state.
9. A five year old girl, from a rural area was brought to a Primary Health Care Centre with a history of frequent falls and bumping into objects after sunset. Her mother gave a history of repeated respiratory infections. On examination she was found to have Vitamin A deficiency.  
a) List the signs/ manifestations of vitamin A deficiency.  
b) Mention the dietary sources of Vitamin A.  
c) Explain the biochemical functions of Vitamin A. (1+1+4)

**Short Answers**

**(6x4=24)**

10. Inhibitors of oxidative phosphorylation.  
11. Mitochondria.  
12. What are glycosaminoglycans. Give Four examples and mention their functions.  
13. List any FOUR phospholipids with their significance.  
14. Name the enzymes that help in the diagnosis of a) Liver disease b) Pancreatic disease  
15. Write a note on why it is important for a physician to be committed to lifelong learning.

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