

Q.P. Code: 115001

Reg. no.:

First Professional MBBS Degree Supplementary (SAY) Examinations October 2024 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

(1x20=20)

The Answers to MCQ questions (Q.No. i to Q.No. xx) shall be written continuously on the first two writing sheets (ie Page No. 3 & 4) only

Questions i-v are single response type questions

- Marker enzyme for golgi complex is
 a) Lactate dehydrogenase b) Galactosyl transferase c) 5' Nucleotidase d) Cathepsin
- Product of action of debranching enzyme on glycogen is
 a) Glucose b) Glucose 6 phosphate c) UDP glucose d) Glucose 1 phosphate
- Addition of an inhibitor to an enzyme catalyzed reaction reduced V_{max} without altering the K_m of the enzyme. The type of enzyme inhibition seen here is
 a) Noncompetitive inhibition b) Uncompetitive inhibition
 c) Competitive inhibition d) Mechanism based inhibition
- Triad of skin pigmentation, diabetes mellitus and liver cirrhosis is seen in
 a) Wilsons disease b) Keshan's disease c) Acrodermatitis d) Hemochromatosis
- Enzymes which break C-O, C-N and C-C bonds without addition of water are called
 a) Ligases b) Hydrolases c) Transferases d) Lyases

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

- Regarding organization of protein structure, which of the following statements are CORRECT?
 1) Presence of proline stabilizes secondary structure
 2) Quaternary structure is present for proteins with multiple subunits
 3) Denaturation of proteins disrupts secondary tertiary and quaternary structure
 4) Hydrogen bond is the main stabilizing force of tertiary structure
 a) 1, 2, 3, 4 b) 1, 3, 4 c) 2, 3 d) 1, 2, 3
- Which of the following are high energy compounds
 1) 1,3-bisphosphoglycerate 2) Creatine phosphate 3) Glucose 6-phosphate 4) Phosphoenol pyruvate
 a) 1, 2, 4 b) 1, 3 c) 1, 2, 3, 4 d) 2, 3
- The FALSE statements regarding apolipoproteins are
 1) Apolipoprotein C-II inhibits lipoprotein lipase enzyme
 2) Apolipoprotein E is a ligand for LDL receptor
 3) Apolipoprotein A-I inhibits lecithin cholesterol acyl transferase
 4) Apolipoprotein B48 and B100 are products of RNA editing
 a) 1, 2, 3 b) 2, 4 c) 1, 2, 3, 4 d) 1, 3
- TRUE about vitamins and their coenzyme functions are
 1) Thiamine participates in oxidative decarboxylation reactions
 2) Pyridoxine participates in nonoxidative decarboxylation reactions
 3) Vitamin C participates in one carbon transfer reaction
 4) Niacin participates in hydride ion transfer reactions
 a) 1, 2, 3, 4 b) 1, 2, 4 c) 1, 3, 4 d) 1, 2, 3
- TRUE statements regarding amino acid metabolism are
 1) Mousy odor in urine in phenylketonuria is due to excretion of phenylacetyl glutamine
 2) Cysteine needs to be supplied in diet in homocystinuria type 1 patients
 3) Creatine is synthesized from arginine, glycine and S-adenosyl methionine
 4) Leucine and lysine are both ketogenic and glucogenic amino acids
 a) 1, 2, 3, 4 b) 2, 3, 4 c) 1, 2, 3 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

- Assertion (A): Mannitol is used to treat head trauma
 Reason (R): Mannitol is an osmotic diuretic and reduces intracranial pressure
 a) Both A and R are correct but R is not the reason for A b) A incorrect R correct
 c) Both A and R incorrect d) Both A and R are correct R is reason for A
- Assertion (A): Pellagra like symptoms are seen in patients with carcinoid syndrome
 Reason (R): Niacin is utilised for serotonin synthesis
 a) Both A and R are correct but R is not the reason for A b) A correct R incorrect
 c) Both A and R incorrect d) Both A and R are correct R is reason for A

(PTO)

xiii. Assertion (A): In Von Gierke's disease hypoglycaemia is seen

Reason (R): Deficiency of Glucose 6 phosphatase

- a) Both A and R are correct and R is the reason for A
 b) Both A and R are correct but R is not the reason for A
 c) A is incorrect R is correct, d) A is correct R is incorrect

xiv. Assertion (A): Hydroxylases are also called dioxygenases

Reason (R): Hydroxylases catalyzes addition of a molecular oxygen to their substrates

- a) Both A and R are correct but R is not the reason for A
 b) A incorrect R correct
 c) Both A and R incorrect
 d) Both A and R are correct R is reason for A

xv. Assertion (A): Selenium has sparing effect on vitamin E

Reason (R): Because selenium participates in free radical scavenging

- a) Both A and R are correct but R is not the reason for A
 b) A incorrect R correct
 c) Both A and R incorrect
 d) Both A and R are correct R is reason for A

Question numbers xvi-xx are case scenario-based questions

A 30-year-old male a known diabetic on regular treatment was admitted in emergency in altered mental state and acidotic breath. His random plasma glucose was 870 mg/dL.

- xvi. On analysis of blood which of the following will be very high in this patient
 a) Acetone
 b) Beta hydroxy butyrate
 c) Acetoacetate
 d) Phenylketones
- xvii. Liver is the site of ketogenesis, but cannot utilize ketone bodies because of absence of which of the following enzymes
 a) HMG CoA reductase
 b) Thiolase
 c) HMG CoA synthase
 d) Thiophorase
- xviii. All the following endocrinopathies are associated with hyperglycemia EXCEPT
 a) Acromegaly
 b) Cushing disease
 c) Pheochromocytoma
 d) Insulinoma
- xix. WHO criteria for diagnosis of diabetes mellitus include all the following EXCEPT
 a) Fasting plasma glucose ≥ 126 mg/dL
 b) Random plasma glucose ≥ 200 mg/dL along with classical symptoms of DM
 c) Postprandial plasma glucose ≥ 140 mg/dL
 d) Glycated hemoglobin $\geq 6.5\%$
- xx. Early sign of renal involvement in patients with diabetes mellitus is increased urinary excretion of
 a) Hemoglobin
 b) Creatinine
 c) Glucose
 d) Albumin

Long essays

(2x10=20)

- Explain various ways by which enzyme activity is regulated in human body. Give suitable examples.
- A 11-month-old infant was brought to the out-patient department with complaints of vomiting, refusal to feeds, failure to gain weight and lethargy for past few weeks. He is born of non-consanguineous marriage and pregnancy was uneventful. Parents also complained of delayed milestones. His laboratory investigations is as follows
 Plasma glucose random: 84 mg/dL, Serum urea: 6 mg/dL, Plasma ammonia: Elevated, Plasma citrulline: Decreased
 - What is your probable diagnosis
 - Why ammonia is toxic to the body
 - Explain detoxification of ammonia and the regulation of the process
 - Enumerate any TWO ways of reducing plasma ammonia levels.

(1+2+4+3)

(6x6=36)

Short Essays:

- A 22-year-old women presented with progressive neuropathy for over a few months. She developed numbness and tingling of her hands and feet. Symptoms progressed to difficulty in walking and loss of position sense. For the past 6 years she has stopped eating all nonvegetarian diet including dairy products. Her laboratory results are as follows.
 Hemoglobin: 10. g/dL, Hematocrit: 47%, Mean corpuscular volume [MCV]: 114fl
 - What is the probable micronutrient deficiency the woman is suffering from
 - What is the RDA, sources, biochemical functions and lab diagnosis of this micronutrient
- Write down the steps involved in conversion of glycerol to glucose. (1+5)
- What are the reactions that form NADPH. List any FOUR reactions where NADPH is utilised. (2+4)
- Composition, location and functions of mucopolysaccharides
- Many metalloenzymes contains Copper. Write down the reactions catalyzed by copper metalloenzymes.
- A 2-year-old baby was brought to the pediatrics department by her mother with complaints of vision problems. On examination baby was jaundiced and had cataract in both eyes. Abdomen examination showed hepatomegaly. Blood investigation showed serum bilirubin: 6.4 mg/dL and plasma glucose: 45 mg/dL
 - What is your probable diagnosis
 - What are the types, biochemical defect, clinical features and their basis, diagnosis and treatment of this disorder

(1+5)

(6x4=24)

Short Answers

- Metabolic changes in the body during brief fasting
- Roles of a physician in health care
- Synthesis of biogenic amines and their biological role.
- Biochemical basis of
 - Adding KCl to insulin while treating DKA
 - Anemia in pyridoxine deficiency
- Adipose tissue is an endocrine organ. Explain
- Define BMR. What are the various factors that influence BMR.
