2019 Scheme

Q.P. Code: 115001 **Reg. no.: ……**

First Professional MBBS Degree Regular/Supplementary Examinations July 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

i. A person has a meal at 8 pm at night and records blood glucose at 7 am on the next day which came to 180 mg/dl. What's the source of this glucose.
   a) Dietary glucose
   b) Hepatic gluconeogenesis
   c) Hepatic glycogenolysis
   d) Protein breakdown

ii. A patient with tendon xanthoma, high LDL and high serum cholesterol. What is the diagnosis
   a) LPL deficiency
   b) Tangier's disease
   c) Familial hypercholesterolemia
   d) Familial Hyperchylomicronemia

iii. In a patient on maize diet with diarrhoea, dementia and dermatitis, which vitamin is deficient
   a) Vitamin B_1 b) Vitamin B_2 c) Vitamin B_3 d) Vitamin B_5

iv. Which of the following to be supplied in the diet in patients with Cystathionine beta synthase defect
   a) Cysteine b) Methionine c) Serine d) Homocysteine

v. A diabetic diet should contain
   a) Refined carbohydrates
   b) Foods with high glycemic index
   c) Foods with low glycemic index
   d) Large quantities of roots and tubers

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

vi. Regarding transport mechanisms choose the correct statement.
   1) Oxygen and nutrients transport through simple diffusion
   2) Facilitated diffusion does not require energy directly
   3) Vesicular transport does not require ATP
   4) Ion channels are transmembrane proteins
   a) 1, 2 and 3 b) 2, 3 and 4 c) 3 and 4 d) 1, 2 and 4

vii. The false statements about citric acid cycle are
   1) Enzymes of cycle are in mitochondrial matrix
   2) Substrate level phosphorylation occurs through conversion of succinate to fumarate
   3) Krebs cycle is both catabolic as well as anabolic, hence called as anaplerotic
   4) Fluoroacetate blocks Krebs cycle by inhibiting aconitase
   a) 1 & 2 b) 2 & 4 c) 2 & 3 d) 2, 3 & 4

viii. True about Iron metabolism
   1) Vitamin C and cysteine promote Fe absorption
   2) Iron elimination does not occur via urine
   3) Examples of heme iron-containing proteins are Transferrin and Hemosiderin
   4) Iron deposition causing yellow brown pigmentation called as hemochromatosis
   a) 1 ,2, 3 & 4 b) 1 & 2 c) 1, 2 & 4 d) 2, 3 & 4

ix. Choose the correct statements about aromatic amino acids.
   1) Defective enzyme in alkaptonuria is homogentisate oxidase
   2) Diet restricted in phenylalanine is given for Phenylketonuria
   3) Melatonin is synthesised from Tyrosine
   4) Phenyl alanine hydroxylase is an iron-containing protein
   a) All of the above b) 1 & 2 c) 1, 2 & 4 d) None of the above

x. True about ketone body metabolism
   1) Insulin inhibit formation of ketone bodies
   2) Sweet smell in DKA patients is due to acetoacetate
   3) Liver cannot utilise ketone bodies due to lack of thiolase
   4) Regulatory enzyme for ketogenesis is HMG CoA synthase
   a) 1 & 3 b) 2 & 4 c) 1 & 4 d) 2 & 3

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

xi. Assertion(A): Hyperammonemia Type I is due to enzyme defect in urea cycle
   Reason (R): Defective enzyme is Carbamoyl phosphate synthetase II
   a) Both A and R are correct but R is not the reason for A
   b) Both A and R are incorrect
   c) A correct R incorrect
   d) Both A and R are correct R is reason for A

xii. Assertion (A): Copper is accumulated in liver in Wilson's disease
   Reason (R): Disease occurs due to mutation in copper-binding ATPase
   a) Both A and R are correct but R is not the reason for A
   b) Both A and R are incorrect
   c) A correct R incorrect
   d) Both A and R are correct R is reason for A

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xiii. Assertion(A): Humans and monkeys can synthesise ascorbic acid
Reason (R): Due to presence of enzyme L-gulonolactone hydroxylase
a) Both A and R are correct but R is not the reason for A c) A Correct R incorrect
b) Both A and R are incorrect d) Both A and R are correct R is reason for A

xiv. Assertion(A): When a person moves from bright light to an area of dim light, there is difficulty in seeing
Reason (R): Rods are responsible for vision in dim light
a) Both A and R are correct but R is not the reason for A c) A Correct R incorrect
b) Both A and R are incorrect d) Both A and R are correct R is reason for A

xv. Assertion(A): Polyneuritis is commonly seen in chronic alcoholics
Reason (R): Alcohol metabolism requires thiamine leading to thiamine depletion
a) Both A and R are correct but R is not the reason for A c) Both A and R incorrect
b) A incorrect R correct d) Both A and R are correct R is reason for A

Question numbers xvi-xx are case scenario-based questions

A child of a farming family has accidentally ingested pest control agent which contains cyanide as one of the major component. He was immediately rushed to the hospital.

xvi. Which of the following enzymes will be inhibited
a) Aconitase. b) Cytochrome oxidase c) Cytochrome reductase d) Cytochrome C

xvii. What kind of inhibition will occur in this case
a) Competitive inhibition c) Allosteric inhibition
b) Non-competitive inhibition d) Suicide inhibition

xviii. What will happen to the Vmax
a) Unchanged b) Increases c) Decreases d) Initially increases then decreases

xix. Following are the examples with same process of inhibition EXCEPT
a) Heavy metals b) Fluoride c) Iodoacetate d) Allopurinol

xx. Which of the following about the given inhibition is true
a) Increasing substrate concentration will abolish the inhibition
b) Increasing substrate concentration will not abolish the inhibition
c) Inhibitor binds to same domain as the substrate binding site
d) Both a and c

Long essays **(2x10=20)**

2. A patient aged 35 years complains of pain, cramps, tingling sensation in the hands and feet, recurrent carpopedal spasms. Her past history revealed history of thyroidectomy for goiter. Her blood investigation report is as follows: Serum Creatinine - 1.0 mg %, Serum Calcium -- 4.1mg%, serum Phosphorous -- 5.4 mg %, Albumin – 4.0 gm%, Alkaline phosphatase --- 60 IU
   a) What could be your probable diagnosis
   b) What is the Biochemical Basis for this disorder
   c) Explain the regulation of plasma levels of Calcium
   d) Write the normal Reference ranges for Serum Calcium, Serum Phosphorus, serum Creatinine and serum Albumin. (1+2+5+2)
3. Mention the normal glucose levels in fasting, post prandial and random samples and HbA1c levels. Explain the homeostasis of Blood glucose levels in well fed condition and during starvation. (2+4+4)

Short Essays: **(6x6=36)**

4. A child was brought to the Pediatric OPD of the hospital, mother gave history of convulsions, delayed milestones and mental retardation. On examination child was dull and had a blank look, there was mousy odour of the body and urine.
   a) What could be your probable diagnosis
   b) Mention the enzyme defect
   c) Explain the Biochemical basis for the clinical manifestations mentioned in the above case.
   d) Mention any two Diagnostic tests done in this case (1+1+3+1)
5. Enumerate three important Isoenzymes having clinical significance
6. Define Beta Oxidation. Explain the steps, regulation & energetics. (1+3+1+1).
7. Define and classify Polysaccharides with examples. Write clinical applications of any three polysaccharides (1+2+3)
8. Deficiency of folate and Vitamin B_{12} leads to megaloblastic anaemia, substantiate the statement.
9. Protein energy malnutrition.

Short Answers **(6x4=24)**

10. Mitochondria.
11. Role of Liver in integration of metabolism
12. Chemiosmotic Hypothesis
13. Give reason:
    a) Premature infants have higher incidence of Respiratory Distress Syndrome
    b) Dicumarol.
14. Describe the Biochemical basis of:
    a) Ammonia Toxicity b) Dietary fibre has Hypocholesterolemic effect
15. Briefly explain the Role of a Physician in Health care system.

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