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SS/MBBS-I/1st IA/ BIO /02-25

2025

(February)

BIOCHEMISTRY

Full Marks: 100

Time: 3 hours

The figures in the margin indicate

full marks for the questions

Answer all questions

1. Discuss about the role of carbohydrates in the human biochemical system. What are the possible fates of glucose molecules after they are absorbed? Discuss glycolysis in brief.

[5+5+5=15]

2. What are coenzymes and cofactors? Discuss the factors that influence enzyme activity. Discuss in brief the use of enzymes in laboratory diagnosis.

[5+5+5=15]

3. A 13-year-old boy who had been residing in a boarding school for the last 3 years was admitted to the hospital. On taking his history, he was found to have a poor appetite. His diet did not include any fruits or salads. His gums were swollen and tender. He was anemic and had complaints of fatigue, listlessness, muscular weakness, and joint pain. Thorough examination of the patient revealed that he bruised easily and had edema and some subcutaneous hemorrhages on his limbs.

[1+1+3+2+3=10]

a) What is your probable diagnosis?

b) What is the cause of this disorder?

c) Explain the biochemical basis of your diagnosis. Why are his gums swollen and tender?

d) What treatment/diet plan will you advise and why?

4. Choose the correct option:

1x5=5

i. Regulation of Phosphofructokinase-1 by fructose 2,6 biphosphate is an example of

- a) competitive inhibition
- b) mixed inhibition
- c) non-competitive inhibition
- d) allosteric modulation

ii. Provitamin of vitamin A is

- a) retinol
- b) beta carotene
- c) ergocalciferol
- d) tocopherol

iii. Which vitamin deficiency may occur in vegetarians?

- a) Vitamin C
- b) Vitamin E
- c) Vitamin B1
- d) Vitamin B12

iv. Glucose and Galactose are

- a) diastereoisomers
- b) disaccharides

c) epimers

d) anomers

v. Which of the following is a sulphur-containing amino acid?

a) Glycine

b) Tryptophan

c) Histidine

d) Cysteine

5. Write short notes on:

5x8=40

a) Mucopolysaccharidosis.

b) Metabolic role of calcium.

c) Peptide bond.

d) Acute intermittent porphyria.

e) Renal regulation of pH.

f) Beer-Lambert law and its application.

g) Significance of Michaelis-Menten Equation.

h) Importance of GAGs in extracellular matrix.

6. Justify the following statements:

2x5=10

a) Fructose metabolism is faster than glucose metabolism in the liver.

b) Fetal hemoglobin has a higher affinity for oxygen than adult hemoglobin.

c) Excessive hemolysis causes jaundice.

d) Requirement of thiamine is increased with higher intake of carbohydrates.

e) Lead intoxication results in anemia.

7. Why are doctors expected to be life-long learners?

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