Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I (CBME) Degree Examination - 07-Feb-2024

Time: Three Hours **Max. Marks: 100 Marks**

BIOCHEMISTRY – PAPER I (RS-4)

QP Code: 1024

(QP contains three pages)

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS **2 x 10 = 20 Marks**

1. A 40-year-old navy officer contacted his physician for development of spongy and bleeding gums. He also had loosening of teeth, pain in the joints and complained of poor wound healing. History revealed that he was in submarine tour for 40 days and was only on staple diet.
   (a) Name the vitamin deficiency associated with symptoms in the above case.
   (b) Name the disorder caused due to deficiency of above vitamin.
   (c) List two dietary sources of above vitamin.
   (d) Mention any four biochemical functions of above vitamin.
   (e) Explain the biochemical basis of spongy and bleeding gums.

2. Explain the hormonal regulation of glucose homeostasis. Mention the biological reference interval of fasting and post-prandial plasma glucose levels. Substantiate the role of glycated hemoglobin (HbA1c) in monitoring blood glucose levels.

SHORT ESSAYS **8 x 5 = 40 Marks**

3. A 50-year-old man was diagnosed with hemorrhoids and underwent operation in relation to it. He had several bleeding episodes in the past and was found to have microcytic hypochromic anaemia.
   (a) Which mineral deficiency is associated with anaemia in the above case?
   (b) Mention two good dietary sources of above mineral.
   (c) Explain the process of absorption, transport and storage of the above mineral.

4. The following are the values obtained in an Arterial Blood Gas (ABG) analysis.

Parameter	pH	Plasma bicarbonate (HCO_3^-)	pCO_2	O_2 Saturation	Base Excess
Values	7.55	35 mEq/L	36 mmHg	99%	10.5

   (a) Name the acid-base disorder based on the findings in the above report.
   (b) Mention the possible causes for the above acid-base disorder.
   (c) Explain the compensatory mechanism in the above acid-base disorder.

5. What are dietary fibres? Give four examples of dietary fibres. Mention four advantages of consuming dietary fibres.
6. What is carnitine? Explain its role in transport of fatty acids for oxidation process.
7. Compare and contrast between passive and active transport with two examples.
8. Explain competitive inhibition with two examples.
9. Explain the steps in the synthesis and breakdown of ketone bodies.
10. Define isoenzymes. Name two enzymes and their isoenzyme forms with their significance.

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SHORT ANSWERS **10 x 3 = 30 Marks**

11. Write the amino acid composition of collagen. Mention two clinical disorders associated with defective collagen.
12. Give three examples of glycosaminoglycans with their functions.
13. What are phospholipids? Mention the biochemical importance of lecithin and cephalin.
14. Write the components of Complex I of electron transport chain and mention one inhibitor of this complex.
15. Compare and contrast between kwashiorkor and marasmus.
16. Name serum electrolytes. Mention two causes associated with hypokalemia.
17. Write the features of bicarbonate buffer system.
18. Write three features to differentiate type I and type II diabetes mellitus.
19. Mention the role of oxidized LDL in atherogenesis.
20. Write the clinical features associated with skeletal and dental fluorosis.

Multiple Choice Questions **10 x 1 = 10 Marks**

21 i) Which one of the following is rich in saturated fatty acid?
- A. Coconut oil
- B. Groundnut oil
- C. Corn oil
- D. Sesame oil

21 ii) Optimum pH for alkaline phosphatase activity is
- A. 2-3
- B. 4-5
- C. 6-7
- D. 9-10

21 iii) Which of the following is an epimer of glucose?
- A. Galactose
- B. Ribose
- C. Erythrose
- D. Glyceraldehyde

21 iv) Which one of the following lipids is stored in adipose tissue?
- A. Triglyceride
- B. Phospholipid
- C. Cholesterol ester
- D. Free fatty acids

21 v) Which one of the following enzymes is specific to gluconeogenesis?
- A. Phosphohexose isomerase
- B. Pyruvate carboxylase
- C. Aldolase
- D. Enolase

22 i) The rate limiting enzyme in denovo cholesterol synthesis is
- A. Acetoacetyl-CoA synthase
- B. HMG CoA synthase
- C. HMG CoA reductase
- D. Mevalonate kinase

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22 ii) Specific dynamic action for protein is
- A. 5
- B. 13
- C. 18
- D. 30

22 iii) Which one of the following is a good source of vitamin E?
- A. Cod liver oil
- B. Wheat germ oil
- C. Green leafy vegetables
- D. Egg yolk

22 iv) The condition Acrodermatitis enteropathica is due to deficiency of
- A. Selenium
- B. Iodine
- C. Zinc
- D. Manganese

22 v) Which one of the following is an important urinary buffer?
- A. Bicarbonate
- B. Ammonia
- C. Phosphate
- D. Proteins

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