Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I (CBME) Degree Examination - 11-Dec-2024

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

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 12-year-old, with history of type 1 diabetes was brought to the emergency in a semi-comatose state with rapid breathing and fruity odour of breath. Investigations showed Random blood glucose of 450 mg/dL and positive test for the presence of ketone bodies. Arterial Blood Gas (ABG) analysis suggested features of metabolic acidosis.

    a) Write the reference interval for Fasting and Random plasma glucose.
    b) Mention the ketone bodies that answered the test in this case.
    c) Explain the synthesis and utilization of ketone bodies.

2. Write the sources, coenzyme form, biochemical functions and deficiency manifestations of Thiamine.

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

3. An elderly male visited orthopedic department with history of chronic pain in the knee joint. After examination, he was prescribed medication containing some of the heteropolysaccharides and advised to follow up after two months.

    a) What are heteropolysaccharides?
    b) Name the heteropolysaccharides that are present in cartilage and synovial fluid and mention their importance.
    c) Write the composition and biological importance of Heparin.

4. A mother and 12 year her old son was brought with history of fever and headache. All investigations including Liver Function Test (LFT) were within normal limits for both and symptomatic treatment was advised. However, the mother was worried about higher Alkaline phosphatase (ALP) observed in the LFT of her son compared to her. The physician explained the physiological reason for the raised enzyme in the child.

    a) Mention the physiological reason for higher ALP in the above child.
    b) Name two pathological conditions for increase in serum ALP.
    c) Explain the role of isoenzymes in the diagnosis Myocardial infarction.

5. Write two biological functions and a disorder associated with the metabolism of
    a) Iron b) Copper.

6. Describe the electron transport chain.

7. Name the carbohydrate shunt pathways in RBC. Explain their biological importance.

8. Explain the regulation of blood glucose in starvation.

9. What is the normal pH of blood? Name the buffer systems that maintain blood pH. What is the effect of pH on enzyme activity?

10. Explain how calcium is regulated in the body. Mention its deficiency disorders.

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

11. What are Dietary fibres? Why is it important to include them in the diet?
12. Muscle glycogen does not contribute to blood glucose - Justify. Mention two glycogen storage disorders
13. Name the essential fatty acids. Mention three biological importance poly unsaturated fatty acids
14. What is glycated haemoglobin? Mention its diagnostic applications
15. Write the function of the following lipases
    a) Lipoprotein lipase
    b) Hormone sensitive lipase
    c) Phospholipase A2
16. Write two mechanisms of transport of large molecules across membrane. What is Hartnup's disease?
17. What is hyponatremia? Write two causes for the same.
18. What is anion Gap? Write the reference range for normal anion gap.
19. Write the features of competitive inhibition of enzymes.
20. Write three differences between Marasmus and Kwashiorkar.

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

21 i) The enzyme used in diagnosis of prostate cancer is
   A. Acid phosphatase
   B. Alkaline phosphatase
   C. Lactate dehydrogenase
   D. Alanine transaminase

21 ii) The cholesterol lowering effect of statins is by inhibiting
   A. HMG CoA reductase
   B. HMG CoA lyase
   C. HMG CoA Synthase
   D. Cholesterol esterase

21 iii) Which of the following is a glycoside?
   A. Digitonin
   B. Mannitol
   C. Glucuronic acid
   D. Glucosamine

21 iv) Which of the following is a derivative of cholesterol
   A. Vitamin A
   B. Vitamin E
   C. Vitamin D
   D. Vitamin K

21 v) Transport of water through Aquaporins is an example of
   A. Simple diffusion
   B. Facilitated diffusion
   C. Primary active transport
   D. Secondary active transport

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22 i) Anemia can be caused by the deficiency of all **EXCEPT**

A. Pyridoxine
B. Vitamin B12
C. Vitamin C
D. Riboflavin

22 ii) Which of the following contains iron?

A. Ceruloplasmin
B. Myoglobin
C. Albumin
D. Collagen

22 iii) The following organs can utilize ketone bodies during starvation **EXCEPT**

A. Liver
B. Brain
C. Heart
D. Skeletal muscle

22 iv) Which of the following amino acid in collagen is hydroxylated

A. Glycine
B. Tyrosine
C. Threonine
D. Lysine

22 v) Which of the following is a feature of respiratory acidosis?

A. Decrease in Bicarbonate
B. Increase in pCO2
C. Decreased hydrogen ion concentration
D. Increase in rate and depth of respiration

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