

# Rajiv Gandhi University of Health Sciences, Karnataka

**MBBS Phase – I (CBME) Degree Examination - 17-Feb-2021**

**Time: Three Hours**

**Max. Marks: 100 Marks**

## **BIOCHEMISTRY – PAPER I (RS-4)**

**QP Code: 1024**

**(QP contains two pages)**

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

### **LONG ESSAYS**

**2 x 10 = 20 Marks**

1. Define lipoproteins? Mention the different lipoproteins involved in transport of lipids. Explain metabolism of dietary lipids under the following heading.
  - a. Assembly of dietary lipids
  - b. Transport
  - c. Utilization in peripheral tissues
  - d. Metabolic fate

[1+1+2+2+2+2]
2. A 12 year old girl presented with stiffness and tingling of hands and feet, carpopedal spasm. On examination trousseau's sign was positive, chvostek's sign was positive. On laboratory evaluation, serum calcium was significantly reduced.
  - a. Interpret the findings and suggest the probable diagnosis?
  - b. Mention the reference range and dietary sources of the nutrient.
  - c. Explain the role of hormones in regulating the blood levels of this nutrient.
  - d. Mention any 6 biochemical functions of this nutrient

(1+2+4+3)

### **SHORT ESSAYS**

**10 x 5 = 50 Marks**

3. What are mucopolysaccharides?
  - a. Name the mucopolysaccharide present in the glomerular basement membrane. What is its significance?
  - b. Explain the biochemical basis of heparin as anticoagulant.
  - c. Write the composition and importance of chondroitin sulphate?
  - d. Which mucopolysaccharide maintains the transparency of cornea?

(1+1+1+1+1)
4. Define oxidative phosphorylation? Explain chemiosmotic hypothesis with a neat labelled diagram.

(1+2+2)
5. A 10 year old boy had difficulty in vision at night. However his vision was quite normal during daytime except when he entered a dimly lit room. On investigation, his plasma retinol levels were found to be low.
  - a. Suggest the probable diagnosis? Which nutrient deficiency causes this disease? (1)
  - b. Enumerate any four functions of the nutrient. (2)
  - c. Explain Waldeyer's visual cycle (2)
6. What is calorific value? Calculate the energy requirement of a 50 year old moderate worker.

(1+4)
7. Explain the effect of temperature and substrate concentration on enzyme activity with a graph.

(2+3)
8. Explain Fluid mosaic model of cell membrane with a neat labelled diagram.

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9. A 5 year old girl was brought to the hospital with enlarged abdomen. History revealed that her childhood development was comparatively slow, frequently hungry, lethargic and irritable. Clinical examination showed enlarged liver. Biochemical investigations of blood sample revealed reduced fasting blood glucose levels and elevated levels of serum lactate, triglyceride and uric acid
- Suggest the probable diagnosis?
  - Name the enzyme defect?
  - What is the biochemical basis for fasting hypoglycemia, lactic acidosis and hyperuricemia in this condition? (1+1+3)
10. What is metabolic alkalosis? Mention four causes of metabolic alkalosis. Explain the Compensatory mechanism. (1+2+2)
11. Explain the metabolic adaptations occurring in the liver and adipose tissue in a well-fed state.
12. What are isoenzymes? Write the isoenzymes of CPK with tissue distribution. Which isoenzyme is cardiac specific and write its pattern of rise in patients with myocardial infarction. (1+2+1+2)

### SHORT ANSWERS

10 x 3 = 30 Marks

13. Explain the rationale behind using glycated hemoglobin (HbA1c) as an indicator of glycemic control in diabetes mellitus. What is the reference range for HbA1c
14. Deficiency of lung surfactant causes Respiratory Distress Syndrome.
- What is the composition of lung surfactant? (1)
  - What is the biochemical basis for Respiratory distress syndrome? (1)
  - What is the significance of L/S ratio (1)
15. Explain the structure of collagen. (5)
16. What is the coenzyme form of pyridoxine? Write two pyridoxine dependent reactions. (1+2)
17. Mutual supplementation of cereals and pulses is beneficial. Justify. (3)
18. Give reason for the following:
- Requirement of Thiamine is increased in Alcoholics (2)
  - Prescription of folic acid during early pregnancy (1)
19. Name the most effective physiological buffer in the plasma. Explain the role of carbonic anhydrase in acid base homeostasis. (1+2)
20. Barbiturates should be given with caution in chronic alcoholics. Justify (3)
21. List routinely measured serum electrolytes. Mention their reference range. (1+2)
22. Write the type of inhibitions seen in the following :
- Inhibition of Vitamin K by Dicoumarol - an anticoagulant (1)
  - Inhibition of Cyclo-oxygenase by Aspirin. (1)
  - Inhibition of Placental Alkaline Phosphatase by Phenylalanine. (1)

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