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**Question Paper Code: R3D04**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Biotechnology

R21UBT304 BIOCHEMISTRY

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. Draw the structure of Fluid mosaic model of Plasma membrane and label its parts CO1 U
2. Write about the mechanism of Acetate buffer. CO1 U
3. How the carbohydrates are classified based on the carbon number. Give example for each. CO1 U
4. Differentiate Glycoproteins and Proteoglycans CO1 U
5. A segment of DNA contains 120 Adenine nucleotides and 120 Cytosine nucleotides. By applying the Chargaff's rule find the total number of nucleotides present in the given segment. CO2 App
6. How will you determine the Isoelectric point (pI) of Leucine ( $pK_{a1}= 2.4$ ,  $pK_{a2}= 9.6$ ) CO2 App
7. An enzyme hydrolyzed a substrate concentration of 0.03mmol/L, the initial velocity was  $1.5 \times 10^{-3} \text{mmol/L min}^{-1}$  and the maximum velocity was  $4.5 \times 10^{-3} \text{mmol/L.min}^{-1}$ . Calculate the  $K_m$  value. CO3 App
8. A patient blood test shows the increase in level of gamma-glutamyltransferase. Analyze the causes of increase of the enzyme GGT in the blood stream. CO3 App
9. What is Kreb's cycle? CO1 U
10. Difference between glycolysis and citric acid cycle CO1 U

PART – B (5 x 16= 80Marks)

11. (a) Rewrite the Bronsted & Lowry's concept of acids and bases and Henderson- Hasselbalch equation. CO1 U (16)  
Or  
(b) Explain the processes of transport of biological molecules inside and outside the biological cell membrane CO1 U (16)
12. (a) A man X says "Carbohydrates are important in various biochemical reactions" Is that true? Justify with the various chemical reactions CO2 App (16)  
Or  
(b) Fats and lipids are an essential component of the homeostatic function of the human body. Lipids contribute to some of the body's most vital processes. Predict the important reactions of Lipids CO2 App (16)
13. (a) Write in brief about CO1 U (16)  
(i) Central dogma of the cell (4)  
(ii) Difference between DNA and RNA(8)  
(iii) Bonds stabilizing DNA double helical structure (4)  
Or  
(b) Comprehend the amino acid classification based on its polarity. CO1 U (16)
14. (a) Derive Michaelis- Menten equation. Explain double reciprocal plot with respect to Km and V max. CO1 U (16)  
Or  
(b) Enzymes play a vital role in majority of the industries. Justify the statement by discussing the application of specific enzymes in food industry. CO1 U (16)
15. (a) Summarize the important steps and the enzymes involved in the TCA Cycle CO1 U (16)  
Or  
(b) Discuss the importance of Gluconeogenesis and their reactions. CO1 U (16)