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Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R9301

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

Chemical Engineering

R21CHV301 – BIOCHEMISTRY FOR CHEMICAL ENGINEERS

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. _____ The following elements is the backbone of all organic compounds. CO1-U

   (a) Nitrogen (b) Carbon (c) Oxygen (d) Hydrogen

2. _____ is the primary function of glycogen in the human body. CO1-U

   (a) Glucose (b) Fructose (c) Sucrose (d) Ribose

3. In a globular protein, _____ following structures are stabilized by hydrogen bonding CO1-U

   (a) Primary (b) Secondary (c) Tertiary (d) quaternary

4. _____ is the following is not a function of proteins in the body CO1-U

   (a) Catalysis (b) Transport

   (c) Genetic storage (d) Structural support

5. Among the following lipids contains a phosphate group in its structure_____ CO1-U

   (a) Triglyceride (b) Phospholipid (c) Cholesterol (d) Prostaglandin

6. _____metabolic pathway produces NADPH and ribose sugars. CO1-U

   (a) TCA cycle (b) Glycolysis

   (c) Gluconeogenesis (d) Pentose phosphate pathway

7. A protein loses its function when exposed to high temperature. This is due to disruption of_____. CO1-U

(a) Peptide bonds (b) Hydrogen bonds and hydrophobic interactions

(c) Covalent bonds only (d) Primary structure only

8. The following is the first committed _____step in fatty acid synthesis. CO1-U

(a) Conversion of acetyl-CoA to malonyl-CoA

(b) Transport of fatty acids into mitochondria

(c) Oxidation of palmitate

(d) Formation of citrate

9. Signal sequences that direct proteins to the endoplasmic reticulum (ER) are typically Known's CO1-U

(a) Short hydrophobic N-terminal sequences.

(b) Rich in lysine and arginine residues

(c) Located in the C-terminal region only

(d) Absent in ER-targeted proteins

10. _____ organelle plays a central role in protein secretion. CO1-U

(a) Nucleus (b) Golgi apparatus

(c) Mitochondria (d) Peroxisome

PART – B (5 x 2= 10 Marks)

11. What is meant by glycosidic linkage? CO1-U

12. State the structural difference between saturated and unsaturated fatty acids CO1-U

13. State two major functions of proteins in living systems. CO1-U

14. Distinguish between oxidative deamination and transamination. CO1-U

15. What is meant by protein turnover? CO1-U

PART – C (5 x 16= 80Marks)

16. (a) Explain the role of carbon in organic compounds and why it is central to biomolecules. CO1-U (16)

Or

(b) Classify carbohydrates into monosaccharides, disaccharides, oligosaccharides, and polysaccharides with examples. CO1-U (16)

17.	(a)	Describe the structure, classification, and biological importance of fatty acids.	CO1-U	(16)
		Or		
	(b)	Discuss the structure and functions of phospholipids and glycolipids.	CO1-U	(16)
18.	(a)	Explain the functions of proteins in living systems with suitable examples.	CO1-U	(16)
		Or		
	(b)	Describe the classification, properties, and general functions of enzymes as biocatalysts.	CO1-U	(16)
19.	(a)	Explain the steps of fatty acid synthesis in the cytosol. How is this process regulated by nutritional and hormonal factors?	CO1-U	(16)
		Or		
	(b)	Compare and contrast fatty acid synthesis and β-oxidation in terms of site, cofactors, enzymes, and regulation	CO1-U	(16)
20.	(a)	Explain the role of signal sequences in protein targeting. How are proteins directed to the endoplasmic reticulum (ER)?	CO2- App	(16)
		Or		
	(b)	Explain how glycosylation in the ER and Golgi modifies secretory proteins and affects their function.	CO2- App	(16)