

Ph.D. IN BIOCHEMISTRY (PHDBC)

Term-End Examination

December, 2022

**RBC-005 : BIOLOGICAL MACROMOLECULES AND
METABOLISM**

Time : 3 hours

Maximum Marks : 100

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) Explain the following terms in one-two sentences each : $5 \times 2 = 10$
- (i) Substrate-level phosphorylation
 - (ii) Transamination
 - (iii) V_{\max}
 - (iv) Anomer
 - (v) Cofactor
- (b) Write the structures of the following : $5 \times 2 = 10$
- (i) 2-D-glucopyranose
 - (ii) Imino acid
 - (iii) Glycylalanine
 - (iv) 2-deoxyribose
 - (v) Glycerol

2. (a) Discuss the structure and function of any two disaccharides. 10
- (b) Name the types of phospholipids with suitable examples. Discuss the role of lipids in the formation of cell membrane. 5+5=10
3. (a) Explain the structural organization of proteins. 10
- (b) Define enzyme inhibition. Discuss the reversible and irreversible inhibition with suitable examples. 2+8=10
4. (a) Differentiate between the following pairs : 5+5=10
- (i) Starch and Glycogen
- (ii) Glycogenesis and Glycogenolysis
- (b) Explain the role of any **one** of the following : 10
- (i) Pyruvate dehydrogenase complex
- (ii) Fatty acid synthase
5. Write short notes on the following : (Any **four**) 4×5=20
- (a) Cori cycle
- (b) Amphibolic role of TCA cycle
- (c) Xenobiotics
- (d) Digestion and absorption of dietary lipids
- (e) Chemiosmotic theory

6. (a) With the help of a well-labelled diagram, explain β -oxidation of fatty acids. 10
- (b) Describe the major steps involved in the urea cycle. 10
7. (a) Explain the role of PRPP in assembling of the purine ring system. Illustrate with the help of suitable diagram, how a purine nucleotide is synthesized. 5+5=10
- (b) Write the causes and symptoms of the following diseases : 5×2=10
- (i) Lesch-Nyhan Syndrome
 - (ii) Gout
 - (iii) Ketosis
 - (iv) Type-2 Diabetes
 - (v) Hypercholesterolemia
8. Describe the integration of metabolic pathways. State the role of Gibbs free energy in metabolism. 10+10=20
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