

Enrollment No.....



Faculty of Science
End Sem Examination Dec-2023
BT3CO03 Biochemistry & Metabolism

Programme: B.Sc.

Branch/Specialisation: Biotechnology

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. When more and more water is diluted with acids its H^+ ion concentration will _____. **1**
 (a) Increase
 (b) Decrease
 (c) Remains the same
 (d) Depends on the type of acids
- ii. Which of the following amino sugar are present in the bacterial cell wall? **1**
 (a) N-acetylmuramic acid (b) Sialic acid
 (c) Aminoglycoside (d) Azide
- iii. The melting point of fatty acids depends upon chain length and _____. **1**
 (a) The shape of the fatty acids
 (b) The position of the double bond
 (c) Charge on the carbon
 (d) Degree of unsaturation
- iv. Which of the following are not the components of RNA? **1**
 (a) Guanine (b) Cytosine (c) Thymine (d) Adenine
- v. Which among the following is both glucogenic and ketogenic? **1**
 (a) Isoleucine (b) Leucine (c) Lysine (d) Histidine
- vi. The first protein sequenced by Fedrick Sanger is- **1**
 (a) Haemoglobin (b) Myoglobin (c) Insulin (d) Myosin

vii. Name the enzyme secreted by pancreas- 1 (a) Pepsin (b) Chymotrypsin (c) Trypsin (d) Alcohol dehydrogenase		(c) Enzyme activity (d) Enzyme specificity (e) Oligomeric enzyme
viii. What is the nature of an enzyme? 1 (a) Vitamin (b) Lipid (c) Carbohydrate (d) Protein		ii. Give a brief description of Koshland's induced fit theory of enzyme substrate interaction. 5
ix. How many molecules of ATP are formed per molecule of oxidation of glucose? 1 (a) 12 (b) 24 (c) 36 (d) 48		iii. Explain the classification of enzymes with suitable examples. 5
x. Glycolysis begins with which of the following reactions- 1 (a) Reduction (b) Oxidation (c) Phosphorylation (d) Acidification		Q.6 i. Define the term glycogenolysis. 2 ii. Illustrate the structure and function of ATP with a diagram. 3 iii. Explain TCA cycle. 5
Q.2 i. What is the role of water in Biomolecules structure? 2 ii. Write applications of the Handerson-Hasselbalch equation. 3 iii. Explain the structure and function of Monosaccharides. 5		OR iv. Discuss the oxidation of glucose via pentose phosphate pathway and give its significance. 5 *****
OR iv. Define glycoproteins. Explain their biological functions. 5		
Q.3 i. Define Iodine number of lipids. What is its significance? 2 ii. Write the differences between DNA and RNA. 3 iii. Explain double helical model of DNA structure with diagram. 5		
OR iv. Write detailed notes on glycolipids and cholesterol. 5		
Q.4 i. Define Zwitterions. 2 ii. What are the methods of protein purification? 3 iii. Explain alpha helix and beta pleated structure of proteins with diagram. 5		
OR iv. Describe fibrous and globular proteins. 5		
Q.5 Attempt any two: i. Define the following terms: 5 (a) Holoenzyme (b) Cofactors		

Scheme of Marking

Biochemistry & Metabolism (T) - BT3CO03 (T)

Q.1	i.	When more and more water is diluted with acids its H ⁺ ion concentration will_____.	1
	(b)	Decrease	
	ii.	Which of the following amino sugar are present in the bacterial cell wall?	1
	(a)	N-acetylmuramic acid	
	iii.	The melting point of fatty acids depends upon chain length and _____.	1
	(d)	Degree of unsaturation	
	iv.	Which of the following are not the components of RNA?	1
	(c)	Thymine	
	v.	Which among the following is both glucogenic and ketogenic	1
	(a)	Isoleucine	
	vi.	The first protein sequenced by Fedrick Sanger is-	1
	(c)	Insulin	
	vii.	Name the enzyme secreted by pancreas-	1
	(c)	Trypsin	
	viii.	What is the nature of an enzyme?	1
	(d)	Protein	
	ix.	How many molecules of ATP are formed per molecule of oxidation of glucose?	1
	(c)	36	
	x.	Glycolysis begins with which of the following reactions-	1
	(c)	Phosphorylation	
Q.2	i.	Role of water in Biomolecules structure	2
	ii.	Two applications of the Handerson-Hasselbalch equation.	3
		1.5 marks for each application (1.5 marks *2)	

	iii.	Structure of Monosaccharides.	3 marks	5
		Function of Monosaccharides	2 marks	
OR	iv.	Definition glycoproteins	2 marks	5
		Their biological functions	3 marks	
Q.3	i.	Definition of Iodine number of lipids	1 mark	2
		Its significance	1 mark	
	ii.	Differences between DNA and RNA.		3
		0.5 mark for each difference	(0.5 mark * 6)	
	iii.	Double helical model of DNA structure		5
		Diagram	2 marks	
		Explanation	3 marks	
OR	iv.	Glycolipids	2.5 marks	5
		Cholesterol.	2.5 marks	
Q.4	i.	Definition Zwitterions.		2
	ii.	Three methods of protein purification		3
		1 mark for each method	(1 mark * 3)	
	iii.	Alpha helix structure of proteins	1 mark	5
		Detail	1.5 mark	
		Beta pleated structure of proteins	1 mark	
		Detail	1.5 mark	
OR	iv.	Fibrous proteins	2.5 marks	5
		Globular proteins.	2.5 marks	
Q.5		Attempt any two:		
	i.	Define the following terms: 1 mark for each term)	(1 mark * 5)	5
	ii.	Koshland's induced fit theory of enzyme substrate interaction.		5
		Structural explanation	2 marks	
		Detail	3 marks	

	iii.	Classification of enzymes	3 marks	5
		Examples	2 marks	
Q.6	i.	Definition of glycogenolysis.		2
	ii.	Structure of ATP	2 marks	3
		Detail	1 mark	
	iii.	TCA cycle diagram	3 marks	5
		Explanation	2 marks	
OR	iv.	Oxidation of glucose via pentose phosphate pathway		5
		Diagram	3 marks	
		Significance	2 marks	