



## BRAINWARE UNIVERSITY

**Term End Examination 2022**  
**Programme – M.Sc.(BT)-2022**  
**Course Name – Biochemistry**  
**Course Code - MBTC101**  
**( Semester I )**

**Full Marks : 60**

**Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### **Group-A**

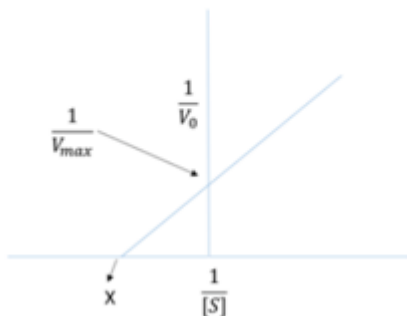
(Multiple Choice Type Question)

1 x 15=15

1. *Choose the correct alternative from the following :*

- (i) Roughly how many amino acids are there in one turn of an alpha helix?
  - a) 1
  - b) 2.8
  - c) 3.6
  - d) 4
- (ii) What is the maximum wavelength that Tryptophan and tyrosine absorb?
  - a) 250nm
  - b) 260nm
  - c) 280nm
  - d) 290nm
- (iii) Select the monosacchrides which constitute sucrose.
  - a) Glucose and Glucose
  - b) Glucose and Fructose
  - c) Glucose and Galactose
  - d) Fructose and Galactose
- (iv) Determine the basic amino acid among the provided options
  - a) Glutamic acid
  - b) Aspartic acid
  - c) Arginine,
  - d) Glycine
- (v) Indicate the purpose of using Benedict Test in a biochemistry lab.
  - a) Reducing sugar
  - b) Sucrose molecule
  - c) oxidising property
  - d) Extraction of metallic copper
- (vi)

In the following plot, what does X represent?



- a)  $V_{max}$   
 b)  $K_m/V_{max}$   
 c)  $-1/K_m$   
 d)  $S_{max}$
- (vii) Anticipate what kind of structure that has hydrogen bonds between polypeptide chains arranged side by side will attain?  
 a) Primary structure  
 b) alpha-helix  
 c) beta-pleated sheets  
 d) Tertiary structure
- (viii) Identify the amino acids containing nonpolar, aliphatic R groups  
 a) Phenylalanine, tyrosine, and tryptophan  
 b) Lysine, arginine, histidine  
 c) Glycine, alanine, leucine  
 d) Serine, threonine, cysteine
- (ix) Analyze which of the following are known as helix breakers?  
 a) Proline  
 b) Alanine  
 c) Methionin  
 d) Valine
- (x) Classify in which of the amino acid Imidazole group, an aromatic ring found  
 a) Lysine  
 b) Glutamate  
 c) Histidine  
 d) Arginine
- (xi) Speculate that at isoelectric pH, an amino acids has \_\_\_\_\_  
 a) positive charge  
 b) negative charge  
 c) no net charge  
 d) all of these
- (xii) Choose an example of reducing sugar from the given options  
 a) Glucose  
 b) Fructose  
 c) Mannose  
 d) all of these
- (xiii) Assess the statement: All are non -essential fatty acids except  
 a) Oleic acid  
 b) Linolenic  
 c) Palmitic acid  
 d) Stearic acid
- (xiv) Assess the correct function of enzyme, Peptidase?  
 a) Cleave phosphodiester bond  
 b) Cleave amino bonds  
 c) Remove phosphate from a substrate  
 d) Removal of H<sub>2</sub>O
- (xv) Complete the sentence "The pH at which the net charge on the enzyme molecule is zero is called \_\_\_\_\_"  
 a) pKa  
 b) Half-life  
 c) Isoelectric point  
 d)  $K_m$

### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain the key points that must be fulfilled by a molecule to become optically active. (3)
3. Explain why sucrose is dextrorotatory but the mixture obtained after hydrolysis is laevorotatory. (3)
4. Justify: Fructose is a reducing sugar (3)

5. Differentiate between epimer and anomer? (3)

OR

Distinguish between reducing and non-reducing sugar? (3)

6. Classify carbohydrates on the basis of number of sugar moieties connected with suitable examples and their structures. (3)

OR

Illustrate  $sp^3$  and  $sp^2$  hybridization with suitable examples. (3)

### Group-C

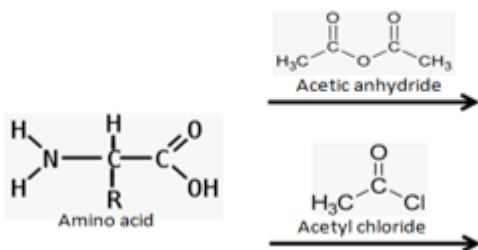
(Long Answer Type Questions)

5 x 6=30

7. a) Calculate the pH of a 0.500 L buffer solution composed of 0.700 M formic acid ( $HCOOH$ ,  $pK_a = 3.752$ ) and 0.500 M sodium formate ( $HCOONa$ ). (5)

Â b) Calculate the pH after adding 50.0 mL of a 1.00 M NaOH solution.

8. Deduce the products that will be formed in the reactions mentioned below and what would be the preferred reaction among them in a laboratory. (5)



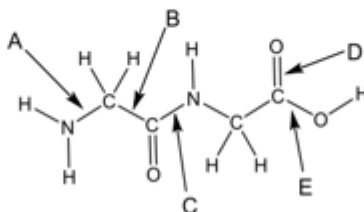
9. Derive the equation that used to express the relationship between substrate concentration and reaction rate quantitatively. (5)

10. What do you mean by optically active compounds? Differentiate between enantiomer and diastereomers? (5)

11. Diagrammatic representation of the entry of glycogen, lactose and fructose into the preparatory stage of glycolysis. (5)

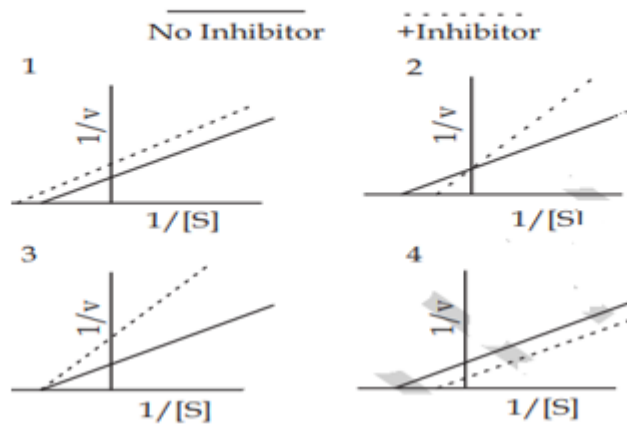
OR

Consider the following dipeptide. Which letter indicates a peptide bond? Explain the reason behind the rigidity of peptide bond schematically. (5)



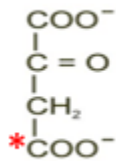
12. (5)

For a competitive inhibition of an enzyme choose the plot that you would use to determine  $K_m$  and interpret your selection.



OR

(5)



\* Indicates radiolabeled C-atom. Identify this molecule and speculate the fate of this radiolabeled carbon during the course of TCA cycle by marking the radiolabeled 'C' in all the intermediates.

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