



BRAINWARE UNIVERSITY

Term End Examination 2022
Programme – M.Sc.(MB)-2022
Course Name – Microbial Biochemistry
Course Code - MMBC102
(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) Coupling of the reaction centres of the oxidative phosphorylation is achieved by which one of the following

- | | |
|--|--|
| a) Making a complex of all four reaction centres | b) locating all four complexes in the inner membrane |
| c) Ubiquinones and Cytochrome C | d) Pumping of protons |

(ii) Following are three single stranded DNA sequences that form secondary structures.

P. ATTGAGCGATCAAT

Q. ATTGAGCGATATCAAT

R. AGGGAGCGATCCCT

Based on their stability, which one is correct?

- | | |
|----------|----------|
| a) P=Q=R | b) R>P>Q |
| c) Q>R=P | d) Q>R>P |

(iii) Roughly how many amino acids are there in one turn of an alpha helix?

- | | |
|--------|--------|
| a) 1 | b) 2.8 |
| c) 3.6 | d) 4 |

(iv) Which of the following Mucopolysaccharides is non sulfated and most abundant in tissues?

- | | |
|---------------------|----------------------|
| a) Keratan sulphate | b) Hyaluronic acid |
| c) Heparin | d) Dermatan sulphate |

(v) Select the monosacchrides which constitute sucrose.

- | | |
|--------------------------|---------------------------|
| a) Glucose and Glucose | b) Glucose and Fructose |
| c) Glucose and Galactose | d) Fructose and Galactose |

(vi) Choose which of the amino acid participate in O glycosylation

- a) Serine
c) Alanine
- b) Glycine
d) All of these
- (vii) Predict primary structure of Protein involved
- a) Right hand twisted rotation
c) beta sheet formation
- b) Peptide bond formation
d) metal ion involvement
- (viii) Indicate the purpose of using Benedict Test in a biochemistry lab.
- a) Reducing sugar
c) oxidising property
- b) Sucrose molecule
d) Extraction of metallic copper
- (ix) Which of the following is not true about secondary protein structure?
- a) The hydrophilic/hydrophobic character of amino acid residues is important to secondary structure.
c) The alpha helix, beta pleated sheet and beta turns are examples of protein secondary structure.
- b) The ability of peptide bonds to form intramolecular hydrogen bonds is important to secondary structure
d) The steric influence of amino acid residues is important to secondary structure.
- (x) Analyze which of the following are known as helix breakers?
- a) Proline
c) Methionin
- b) Alanine
d) Valine
- (xi) Calculate the number of chiral centers in threonine is
- a) 1
c) 3
- b) 2
d) 4
- (xii) In naturally occurring unsaturated fatty acids, the double bonds are in _____ conformation.
- a) Cis conformation
c) A mixture of cis and trans conformation
- b) Trans conformation
d) A mixture of cis and trans alternatives
- (xiii) Choose an example of reducing sugar from the given options
- a) Glucose
c) Mannose
- b) Fructose
d) all of these
- (xiv) Evaluate the statement "In competitive inhibition, what happens to V_{max} and K_m if $[I] = K_i$?"
- a) Lowers to 0.5 V_{max} and 0.5 K_m
c) Lowers to 0.5 V_{max} and K_m remains unchanged
- b) V_{max} is unchanged and K_m increases 2 K_m
d) Lowers to 0.67 V_{max} and K_m increases to 2 K_m
- (xv) Evaluate the statement "Osazone formation results in loss of all the chiral centre of glucose"
- a) 1
c) only loss of chiral centre at C2
- b) only loss of chiral centre at C1
d) none of these

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Differentiate between purine and pyrimidines. (3)
3. Analyze the utility of "sugar pucker" in DNA and which sugar pucker RNA prefers? (3)
4. An enzyme hydrolyzed a substrate concentration of 0.03 mmol/L, the initial velocity was 1.5×10^{-3} mmol/L.min⁻¹ and the maximum velocity was 4.5×10^{-3} mmol/L.min⁻¹. Calculate the K_m value. (3)
5. Explain the key points that must be fulfilled by a molecule to become optically active. (3)
6. Evaluate the statement "Glycogen is the compact version of amylopectin" and explain using graphical representation. (3)

OR

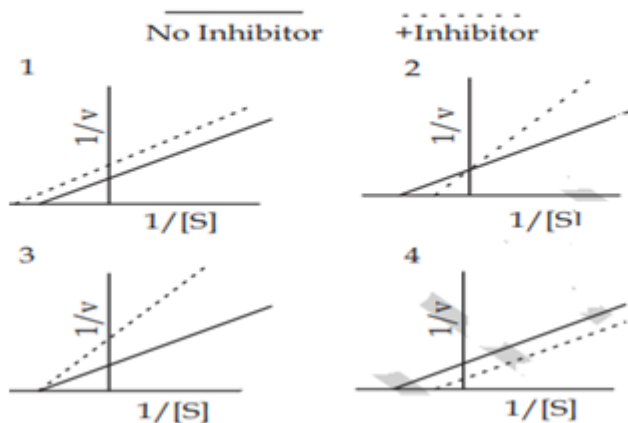
Justify the statement that base stacking determine the stability of DNA double helical structure (3)

as compared to H-bonding.

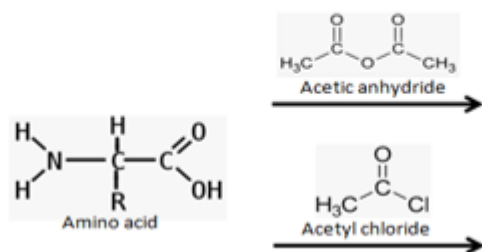
Group-C
(Long Answer Type Questions)

5 x 6=30

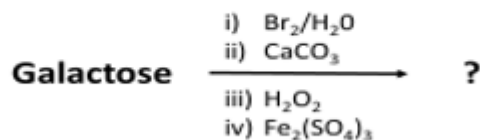
7. (5)
For a competitive inhibition of an enzyme choose the plot that you would use to determine K_m and interpret your selection.



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



9. (5) Explain enantiomer in monosaccharides with the help of pictorial representation.
10. (5) Complete reaction mechanism for the below mentioned equation.



11. (5) Illustrate schematically the classification of storage and membrane lipids. Why some archeobacteria can survive under extremely harsh environmental conditions such as high temperature, low pH and high ionic strength?
12. (5) What is the need to store glucose in polymeric forms, why the storage form of glucose cannot be its monomeric form?

OR

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

(5)
