



BRAINWARE UNIVERSITY

Term End Examination 2019 – 20

Programme – Master of Science in Microbiology

Course Name – Microbial Biochemistry

Course Code – MMB104

(Semester – 1)

Time allotted: 2 Hours 30 Minutes

Full Marks: 60

[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)

20 x 1 = 20

1. Answer any *twenty* from the following
 - (i) Glucose is a monosaccharide and is a

| | |
|-------------|-----------------|
| a. Hexose | b. Pentose |
| c. Furanose | d. Both a and c |
 - (ii) When glucose molecules are joined by α 1-4 linkage, type of carbohydrate obtained is

| | |
|------------|-------------|
| a. lactose | b. glycogen |
| c. Lipids | d. starch |
 - (iii) Which of the following options is not a reducing sugar?

| | |
|-------------------|----------------------|
| a. $C_nH_{2n}O_n$ | b. $C_nH_{2n}O_{2n}$ |
| c. $C_nH_2O_n$ | d. $C_{2n}H_{2n}O_n$ |
 - (iv) Polysaccharides are

| | |
|-------------|-------------|
| a. Proteins | b. Polymers |
| c. Acids | d. Oils |
 - (v) D -Glucose and L- Glucose are _____.

| | |
|-------------------|-------------------------|
| a. Stereo isomers | b. Optical isomers |
| c. Anomers | d. Keto- Aldose Isomers |
 - (vi) Glycosidic bond in sucrose is _____.

| | |
|------------------|-------------------|
| a. β 1 – 2 | b. α 1 – 4 |
| c. β 1 – 4 | d. α 1 – 2 |

- (vii) pH of buffer solution depends upon concentration of
- acid ($-H^+$)
 - conjugate base ($-OH^-$)
 - salt
 - both A and B
- (viii) Buffers present in blood contain
- HCO_3^-
 - hemoglobin
 - $H_2PO_4^-$
 - all of them
- (ix) Unfolding of regular secondary protein structure causes
- Large increase in the entropy of the protein
 - No change in the entropy of the protein
 - Little increase in the entropy of protein
 - Large decrease in the entropy of the protein
- (x) What does first law of thermodynamics state?
- Energy can neither be destroyed nor created
 - Energy cannot be 100 percent efficiently transformed from one type to another
 - All living organisms are composed of cells
 - Input of heat energy increases the rate of movement of atoms and molecules
- (xi) Relation which relates enthalpy and entropy is
- $\Delta G = \Delta H - T\Delta S$
 - $\Delta G - \Delta H$
 - $\Delta G^\circ = -RT\ln K$
 - both A and C
- (xii) A positive Benedict's test is not given by
- Sucrose
 - Lactose
 - Maltose
 - Glucose
- (xiii) The optically inactive amino acid is
- Glycine
 - Serine
 - Threonine
 - Valine
- (xiv) The amino acid with a nonpolar side chain is
- Serine
 - Valine
 - Asparagine
 - Threonine
- (xv) Denaturation of proteins results in
- Disruption of primary structure
 - Breakdown of peptide bonds
 - Destruction of hydrogen bonds
 - Irreversible changes in the molecule
- (xvi) At a pH below the isoelectric point, an amino acid exists as
- Cation
 - Anion
 - Zwitterion
 - Undissociated molecule

- (xvii) An amino acid that does not take part in α helix formation is
- Histidine
 - Tyrosine
 - Proline
 - Tryptophan
- (xviii) Primary structure of a protein is formed by
- Hydrogen bonds
 - Peptide bonds
 - Disulphide bonds
 - All of these
- (xix) Isoelectric pH of an amino acid is that pH at which it has a
- Positive charge
 - Negative charge
 - No net charge
 - All of these
- (xx) From the Lineweaver-Burk plot of Michaelis-Menten equation, K_m and V_{max} can be determined when V is the reaction velocity at substrate concentration S , the X-axis experimental data are expressed as
- $1/V$
 - V
 - $1/S$
 - S
- (xxi) A sigmoidal plot of substrate concentration ($[S]$) verses reaction velocity (V) may indicate
- Michaelis-Menten kinetics
 - Co-operative binding
 - Competitive inhibition
 - Non-competitive inhibition
- (xxii) An inducer is absent in the type of enzyme:
- Allosteric enzyme
 - Constitutive enzyme
 - Co-operative enzyme
 - Isoenzymic enzyme
- (xxiii) Hydrolysis of fats by alkali is called
- Saponification number
 - Saponification
 - Both (a) and (b)
 - None of these
- (xxiv) Enzymes are different from catalysts in
- Being proteinaceous
 - Not used up in reaction
 - Functional at high temperature
 - Having high rate of diffusion
- (xxv) Prostaglandins have role in:
- Inflammation
 - blood clotting
 - Fever
 - all of these

Group – B

(Short Answer Type Questions)

4 x 5 = 20

Answer any *four* from the following

- | | | |
|----|--|-------|
| 2. | What are high energy compounds? Is ATP a high energy compound? | 2+3 |
| 3. | How do the laws of thermodynamics apply to living systems? What is Gibbs free energy? | 3+2 |
| 4. | What are the applications of first law of thermodynamics? Which is the most important high energy compound? Why? | 2+1+2 |
| 5. | Who has discovered pH scale? Why are pH and buffer important in biological systems? | 1+4 |
| 6. | What are epimers and anomers? How many Epimers of glucose are there? | 4+1 |
| 7. | What are nucleosides and the nucleotides? What is the difference between the nucleosides and the nucleotides? | 3+2 |

Group – C

(Long Answer Type Questions)

2 x 10 = 20

Answer any *two* from the following

- | | | |
|-----|--|---|
| 8. | (a) Write down the importance of pH in biological systems. | 5 |
| | (b) How do you calculate Henderson-Hasselbalch equation? | 5 |
| 9. | (a) How can a biological system be affected by a change in pH levels? | 5 |
| | (b) Write a short note on oxidative phosphorylation. | 5 |
| 10. | (a) What is the basic structure of a biological membrane? | 7 |
| | (b) What are the functions of biological membrane? | 3 |
| 11. | (a) What happens during electron transport chain? Explain that in detail with a diagram. | 8 |
| | (b) What are the end products of the electron transport chain? | 2 |
