

[89]

SEAT No. _____ SARDAR PATEL UNIVERSITY

M. Sc. (Ist Semester) (under CBCS) ExaminationMonday, 29th October 2018

Time: 10.00 a.m to 1.00 p.m.

Paper: PS 01EBIC22 (Biomolecules and Bioenergetics)

No. of Printed Pages : 2

Max marks: 70

Q-1. Choose the most appropriate answer for multiple choice questions.

(8 Marks)

- Which of the following mucopolysaccharides is non sulfated and most abundant in tissues?
 (a) Hyaluronic acid (b) keratin sulphate (c) Heparin (d) Dermatan sulphate
- Chitin is
 (a) Homopolymer of ($\beta 1 \rightarrow 4$) GlcNAc (c) Homopolymer of ($\beta 1 \rightarrow 6$) GlcNAc
 (b) Heteropolymer of ($\beta 1 \rightarrow 4$) GlcNAc (d) Heteropolymer of ($\beta 1 \rightarrow 6$) GlcNAc
- Chymotrypsin cleave polypeptide chain at point of
 (a) Phe, Trp, Try (C) (c) Asp, Glu (N)
 (b) Asp, Glu (C) (d) Both b & c
- Which of the following options show all the matching of amino acids correct (at pH=7)?
 (a) (i) Nonpolar – Glycine, Isoleucine (c) (i) Nonpolar – Glycine, Isoleucine
 (ii) Polar – Proline, threonine (ii) Polar – Cysteine, threonine
 (iii) Aromatic – Tyrosine, Tryptophan (iii) Aromatic – Tyrosine, Tryptophan
 (iv) Negatively charged – Aspartate, lysine (iv) Negatively charged – Aspartate, Glutamate
 (b) (i) Nonpolar – Glycine, Isoleucine (d) (i) Nonpolar – Glycine, Serine
 (ii) Polar – Cysteine, proline (ii) Polar – Cysteine, threonine
 (iii) Aromatic – Tyrosine, Tryptophan (iii) Aromatic – Tyrosine, Tryptophan
 (iv) Negatively charged – Asparagine, lysine (iv) Negatively charged – Aspartate, lysine
- What is the isoelectric point of glycine, when the pK_1 value is 2.34 and pK_2 value is 9.60?
 (a) 4.10 (b) 7.26 (c) 5.97 (d) 11.94
- The electrons flows from complex 3 to complex 4 is through
 (a) Cytochrome C (c) Succinate Dehydrogenase
 (b) Ubiquinone (d) Both A & C
- Although according to laws of thermodynamics, entropy of the all reactions should increase, we do not normally observe increase in entropy or disorder in the biological cells because
 (a) living cells produce heat and entropy outside the system (cells) to preserve their internal order
 (b) chemical reactions in the living cells are an exception to thermodynamic laws
 (c) all energy related reactions takes place only in mitochondria
 (d) bioenergetics allows reactions to occur without increase in entropy
- Which of the following is a component of Succinate dehydrogenase in Electron transport chain?
 (a) Niacin (b) FMN (c) FAD (d) Lipoic acid

(P.T.O.)

①

Q-2 Answer any seven from the following

(14 Marks)

1. Explain by suitable example that biological free-energy changes are additive.
2. Explain in brief: Glycoconjugates.
3. Explain epimeric compounds with suitable examples.
4. Describe the biological importance of leukotrienes.
5. Calculate the ratio of conjugate base to acid for an acetic acid of pKa of 6.0 and pH of 5.0.
6. List out amino acids that frequently get modified in post translational modification of protein.
7. Draw a labelled diagram of the Electron transport chain of mitochondria.
8. Explain in brief with example: Oxygenases.
9. Write the role of Prostaglandins as signaling compound.

Q.3 (a) Describe: Carbohydrate as informational molecules. (06)

- (b) Draw structure of each & describe the common structural features and the differences in each pair: (06)
- (i) Cellulose and glycogen
 - (ii) D-glucose and D-fructose
 - (iii) Maltose and sucrose

OR

(b) Narrate the industrial importance of any two polysaccharides. (06)

Q.4 (a) Explain in detail: Phospholipid and glycolipids (06)

- (b) (i) Describe the structural characteristics of mRNA (03)
(ii) Comment on role of miRNA in regulation of gene. (03)

OR

(b) Explain in detail - "Lipids as signaling molecules" (06)

Q.5 (a) Explain important characteristics of peptide bond; and describe Ramachandran plot. (06)

(b) What is buffer? How do they resist change in pH? Derive Henderson and Hasselbalch equation. (06)

OR

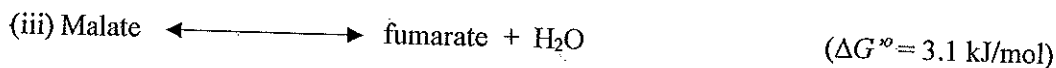
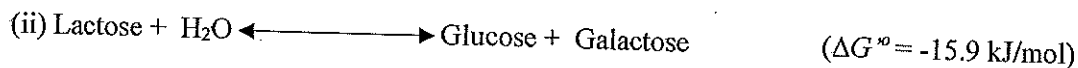
(b) What is pI value? Describe titration curve for either glycine or histidine. (06)

Q.6 (a) Explain structure and function of ATP synthase (complex V) with suitable diagram. (06)

(b) Explain chemiosmotic model proposed by Peter Mitchell. (06)

OR

(b) Calculate the equilibrium constant K'_{eq} for each of the following reactions at pH 7.0 and 25° C, using the $\Delta G'^{\circ}$ values. At 25° C, $RT = 2.48$ kJ/mol. (06)



----- X -----