

S. No. of Question Paper

2272

Unique Paper Code

: 2531201

F-4

Name of the Paper

: Biochemistry (DCI-201)

Name of the Course

: Bachelor with Honours in Microbiology

Semester

: II

Duration: 3 Hours

Maximum Marks: 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all.

Question no. 1 is compulsory.

All questions carry equal marks.

Attempt all parts of a question together.

1. (a) Give an example of **any twelve** of the following:

(1x12= 12)

- i. Isozyme
- ii. Lyase enzyme
- iii. Bacterial heteropolysaccharide
- iv. Non-protein amino acid
- v. Non-phosphorous energy rich compound
- vi. Acidic Glycosphingolipid
- vii. An amino acid that absorbs at 280nm.
- viii. A polyunsaturated fatty acid
- ix. A reagent used to stain amino acids
- x. Allosteric enzyme
- xi. Lipid as cell signal
- xii. A five carbon ketose sugar
- xiii. Storage lipid

(b) Define Gibb's free energy, enthalpy and entropy. Give the mathematical expression describing relationship among them.

(3)

2. Write short notes on **any three** of the following:

(5x3=15)

- i. Haemoglobin: structure and function
- ii. Titration curve of an amino acid and its significance
- iii. Phosphoglycerides

iv. Multienzyme complex

3. (a) Differentiate between any three of the following: (4x3=12)

- i. Cellulose and Starch
- ii. Coenzyme and Prosthetic group
- iii. Lipid-Micelles and Bilayers
- iv. Competitive and Non-competitive enzyme inhibition

(b) Write the contributions of any two of the following: (1.5 x2 =3)

- i. Linus Pauling
- ii. Max F. Perutz
- iii. Michelis and Menten

4. (a) Define standard free energy change. (1+4=5)

Calculate $\Delta G^{\circ'}$ and K'_{eq} for the following reaction:



from the data given below:



$$(\Delta G^{\circ'} = 15.0 \text{ kJ/mol.}; K'_{eq} = 3.9 \times 10^{-3} \text{ M}^{-1})$$



$$(\Delta G^{\circ'} = - 30 \text{ kJ/mol.}; K'_{eq} = 2.0 \times 10^5 \text{ M})$$

(b) Compare and contrast the features of α -helix and β -pleated sheets. (5)

(c) Discuss the Induced Fit Hypothesis of enzyme action. (5)

5. (a) Describe the various interactions that stabilize protein structure. (5)

(b) Define any five of the following giving suitable examples. (2x5 =10)

- i. Enzyme unit
- ii. Epimer
- iii. Cofactor
- iv. Essential fatty acids
- v. Reducing sugar
- vi. Saponification

6. (a) Describe the properties of fatty acids. Draw the structure of Phosphatidylethanolamine or phosphatidylcholine. (3+3= 6)
- (b) Discuss the Lineweaver-Burke plot and its significance. (3+2=5)
- (c) Draw a detailed structure of bacterial cell wall polysaccharide. (4)

OR

Discuss the effect of temperature on enzyme activity.