

BCHEM—101 (Syllabus-2015)

2015

(October)

BIOCHEMISTRY

(Honours)

(**Biomolecules and Biophysical Techniques**)

Marks : 56

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Answer **four** questions, taking at least **one**
from each Section

SECTION—A

(**Biomolecules**)

1. (a) What is pH? State why the pH scale ranges up to 14. 4
- (b) The dissociation constant of an acid is 1.6×10^{-5} M. Calculate the pK_a value. 3
- (c) Derive Henderson-Hasselbalch equation and discuss its significance. 7

2. (a) Explain the following terms with examples : $2+2+2=6$

(i) Chiral carbon

(ii) Epimers

(iii) Anomers

- (b) How is a glycosidic bond formed? Write the structures of lactose and sucrose. What type of glycosidic linkage is present in both sugars? $2+3+3=8$

3. (a) Why are α -amino acids so called? Explain with the help of general structure. 3

- (b) Why is rotation around the peptide bond restricted? 5

- (c) Give a brief account of the different levels of structural organization in protein structure. 6

4. (a) What are fatty acids? How are they classified? $2+4=6$

- (b) Discuss the general structure and functions of acylglycerol and prostaglandins. 8

5. (a) Give the structures of the following : $1+1+1+1=4$

(i) GMP

(ii) Deoxyadenosine

(iii) Thymine

(iv) Uracil

- (b) Describe the characteristics of Watson and Crick model of DNA. 7

- (c) How does B-DNA differ from Z-DNA? 3

SECTION—B

(Biophysical Techniques)

6. (a) Briefly describe the principle and applications of gel-filtration chromatography. 8

- (b) Outline the principle of X-ray crystallography. 6

7. Write the principles of the following : $7+7=14$

(a) SDS-PAGE

(b) UV/Visible spectrophotometry

8. (a) Discuss the usefulness of TEM and SEM. $3\frac{1}{2}+3\frac{1}{2}=7$
- (b) Discuss the various applications of radioisotopes in Biochemistry. 7

★ ★ ★