

2022
B.A./B.Sc.
Second Semester
 GENERIC ELECTIVE – 2
CHEMISTRY
Course Code: CHG 2.11
 (Biochemistry, Bio-inorganic & Environmental Chemistry)

Total Mark: 70

Pass Mark: 28

Time: 3 hours

Answer five questions, taking one from each unit.

UNIT-I

1. (a) What are carbohydrates? How are they classified? Give an example of each class. 5
- (b) What are reducing and non-reducing sugars? Give their examples. Sucrose is a non-reducing sugar, justify it. 5
- (c) Give any four evidences to support open chain structure of glucose. 4
2. (a) Draw the typical and Haworth structures of sucrose and maltose. 4
- (b) Draw the Haworth structures of starch and cellulose and indicate the type of linkage between any two units of their monosaccharides. 4
- (c) Explain mutarotation with an example. 3
- (d) What is the difference between epimers and anomers? Explain with their examples. 3

UNIT-II

3. (a) What are amino acids? Give their detailed classification with examples. 6
- (b) Define the following terms with suitable examples: 2×2=4
 - (i) Zwitter ion
 - (ii) Isoelectric point
- (c) Describe the α -helical structure of proteins. 4

4. (a) Discuss and draw the primary structure of proteins. 3
 (b) Determine the primary structure of peptides. (*Any one method.*) 5
 (c) How will you synthesize a dipeptide by N-protection and C-activation? 6

UNIT-III

5. (a) What are lipids? How are they classified? 6
 (b) What are fats and oils? Differentiate between them. 4
 (c) Name any four fatty acids present in fats/oils. 4
6. (a) What is hydrogenation of oils? Explain with an example. 3
 (b) What is saponification and saponification value? Calculate saponification value of the fat, having molecular formula: $C_{51}H_{98}O_6$. 5
 (c) What are omega fatty acids? Give two examples. Discuss its benefits on human health. 3
 (d) What are trans fats? Give two examples and also mention its adverse effect on human health. 3

UNIT-IV

7. (a) What are essential and non-essential elements in biological system? Give their names. 4
 (b) What do you mean by macro and micro elements in biological system? Give their names. 4
 (c) What are metalloporphyrins? Draw and discuss the structure of chlorophyll. Also, mention its importance. 6
8. (a) Discuss the role of cobalt in vitamin- B_{12} . 4
 (b) What are metalloenzymes? Give their characteristics and function in human body. 6
 (c) Discuss the biological role of calcium ion. 4

UNIT-V

9. (a) Discuss the various composition of atmosphere. 4
(b) What is photochemical smog and photochemical reaction? 3
(c) Discuss the significance of ozone in atmosphere. 3
(d) What do you mean by ozone hole? Give its adverse effect on living beings. 4
10. (a) Discuss the parameters to control air and water pollutions. 6
(b) Mention about common water pollutants. 4
(c) How do heavy metals cause pollution? Discuss their toxic effects. 4
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