2019

(October)

BIO-CHEMISTRY

(Honours)

(BCHEM–101)

(Biomolecules and Biophysical Techniques)

Marks : 56

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **four** questions, taking **one** from each Part.

PART—A

1. *(a)* Define pH. How is it controlled in living systems? 2+3=5

   (b) For a solution whose pH is 6·0, what is $[H^+]$? If $[H^+]$ is $5\times10^{-7}M$, what is pH? 4

   (c) What are buffer systems? Mention their usefulness in laboratory investigations and biological systems. 2+3=5

2. Answer any *four* of the following giving suitable examples : 3½×4=14

   (a) How do epimers differ from anomers?

   (b) How does 'chair' form of glucopyranose differ from its 'boat' form?

   (c) What do you mean by 'envelope' form of furanose ring?

   (d) Draw a schematic diagram of cellulose showing its conformation.

   (e) How does sucrose differ from lactose?

3. (a) What are amino acids? Justify that the distinctive physical, chemical and biological properties associated with amino acids are the result of the R-groups. Classify these amino acids according to their R-groups, giving one structural formula from each group. 2+4+4=10

   (b) What properties do the peptide bonds have? How do you define the primary structure of proteins? 2+2=4

4. What are fatty acids? How are they classified? Explain the chemical properties of fatty acids. 2+4+8=14

5. Describe the major types of DNA. How does DNA differ from RNA? Why is RNA not a stable molecule compared to DNA? 8+2+4=14

(Continued)

PART—B

6. (a) What is the principle behind the separation of proteins of different mass in gel filtration chromatography? 7

   (b) What would be the bonding pattern when an oligomeric protein of two dissimilar molecular masses, is subjected to SDS-PAGE? Compare it with that of native-PAGE. 7

7. (a) What are isotopes? State the differences between α(alpha) and β(beta) rays. 2+4=6

   (b) Describe scintillation counting method for detection of radioactivity. 8

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