TDC (CBCS) Odd Semester Exam., 2025

CHEMISTRY

(5th Semester)

Course No. : CHMHCC–501T

(Biomolecules)

$$\frac{Full\ Marks\ :\ 50}{Pass\ Marks\ :\ 20}$$

Time : 3 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any *two* of the following questions :

2×2=4

(a) What are the heterocyclic bases present in DNA and RNA? 1+1=2

(b) Guanine and cytosine are complementary to each other. Explain. 2

(c) What are nucleosides and nucleotides? Give one example of each. 1+1=2

2. Answer any *one* of the following questions : 6

(a) (i) Carry out the synthesis of uracil from urea. 3

(ii) Write the salient features of double helix structure of DNA. 3

(b) (i) Carry out the synthesis of adenine. 2

(ii) Discuss the biological functions of nucleic acids. 2

(iii) How will you synthesize thymine from urea? 2

UNIT—II

3. Answer any *two* of the following questions :

$2 \times 2 = 4$

(a) How will you prepare alanine by Gabriel synthesis? 2

(b) What is meant by essential and non-essential amino acids? Give one example of each. $1 + 1 = 2$

(c) What is isoelectric point of amino acid? What role does it play in electrophoresis? $1 + 1 = 2$

4. Answer any *one* of the following questions : 6

   (a)   *(i)* Describe one method each for C-terminal and N-terminal residual analyses of peptide.   1½+1½=3

       (ii) Describe the Merrifield solid-phase synthesis of a dipeptide.   3

   (b)   *(i)* Discuss the Strecker synthesis of α-amino acid taking a suitable example.   2½

       (ii) What is peptide linkage?   1

      (iii) Explain the secondary structure of protein.   2½

UNIT—III

5. Answer any *two* of the following questions :   2×2=4

   (a) Write the salient features of active site of an enzyme.   2

   (b) Define the terms co-enzyme and turn-over number of an enzyme.   1+1=2

   (c) What are competitive inhibitors? How does the sulpha drug act as a competitive inhibitor?   1+1=2

6. Answer any *one* of the following questions : 6

    (a)   (i) Discuss the concept of substrate specificity and stereospecificity in enzyme action with appropriate examples.   1½+1½=3

        (ii) Describe briefly the steps involved in an enzyme catalyzed reaction.   3

    (b)   (i) Discuss the allosteric inhibition with appropriate example.   2

        (ii) Why is maintaining the right condition of temperature and pressure crucial for enzyme to function properly?   2

        (iii) Describe the metabolic function of NAD.   2

UNIT—IV

7. Answer any *two* of the following questions :
        2×2=4

    (a) Write the names and structures of two saturated and two unsaturated fatty acids which are present in oils and fats.   1+1=2

    (b) What are trans-fats? Why are they considered harmful?   1+1=2

(c) What is the acid value of oil or fat? What does this value indicate?   1+1=2

8. Answer any *one* of the following questions :   6

(a) (i) What is saponification value? What does it signify? How is saponification value of an oil determined?   1+1+2=4

(ii) Define iodine value. What is its significance?   1+1=2

(b) (i) What are lipids? What are their primary functions in living organism?   1+2=3

(ii) Write short notes on (1) drying and (2) hardening of oil.   1½+1½=3

UNIT—V

9. Answer any *two* of the following questions :   2×2=4

(a) What are analgesic and antipyretic drugs? Give examples.   1+1=2

(b) What are bacteriostatic and bacteriocidal antibiotics? Give one example of each.   1+1=2

(c) Write the medicinal uses of curcumin and azadirachtin.   1+1=2

10. Answer any *one* of the following questions : 6

(a) (i) Describe the synthesis of chloro-quine. What are its therapeutic uses? 3+1=4

(ii) What are gram-positive and gram-negative bacteria? 1+1=2

(b) (i) Discuss the synthesis and thera-peutic uses of paracetamol. 2+1=3

(ii) What are antacids? Discuss the medicinal uses of renitidine and vitamin C. 1+1+1=3

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