TDC (CBCS) Odd Semester Exam., 2023

CHEMISTRY

(Honours)

(5th Semester)

Course No. : CHMHCC–501T

(Biomolecules)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

SECTION—A

Answer *ten* questions, selecting any *two* from each Unit :   2×10=20

UNIT—I

1. Draw the structure of purine bases present in DNA and RNA.   1+1=2

2. Guanine and cytosine are complementary to each other. Explain.

(*Turn Over*)

3. What are the heterocyclic base and sugar present in ATP? Draw their structures. 1+1=2

UNIT—II

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

5. What is isoelectric point of amino acid? What role does it play in electrophoresis?

1+1=2

6. Define pK_a and write their significance in the context of amino acids. 1+1=2

UNIT—III

7. What are enzymes? How are they classified based on the type of reaction they catalyze?

1+1=2

8. Why is maintaining the right condition of temperature and pressure crucial for enzyme to function properly?

9. Discuss allosteric inhibition with example.

UNIT—IV

10. What are compound and derived lipids? Give examples. 1+1=2

11. Write the names and structures of two saturated and two unsaturated fatty acids which are present in oils and fats. $\frac{1}{2} \times 4 = 2$

12. What are *trans*-fats? Why are they considered harmful? $1+1=2$

UNIT—V

13. What are the therapeutic uses of azadirachtin (neem) in traditional and modern medicine? $1+1=2$

14. Describe the role of vitamin C in human body.

15. What are bacteriostatic and bacteriocidal antibiotics? $1+1=2$

SECTION—B

Answer *five* questions, selecting *one* from each Unit : $6 \times 5 = 30$

UNIT—I

16. (a) Carry out the synthesis of adenine. 2

    (b) How is deoxythymidine formed? Give chemical reaction. $1+1=2$

    (c) What is Chargaff's rule of base pairing? 2

17. *(a)* Explain the key differences between nucleosides and nucleotides.   2

(b) Describe the structures of adenine and guanine, highlighting their distinctive features.   2

(c) Carry out the synthesis of uracil from urea.   2

UNIT—II

18. *(a)* Carry out the synthesis of phenyl alanine by Strecker synthesis method.   2

(b) Glycine has isoelectric point at pH 6. Draw its probable structure at pH 4 and pH 8.   2

(c) How will you synthesize alanine from ethyl chloride?   2

19. *(a)* Describe one method each for C-terminal and N-terminal residual analyses of peptide. $1\frac{1}{2}+1\frac{1}{2}=3$

(b) Discuss the steps involved in solid-phase peptide synthesis. What are the advantages and limitations of these methods? $2+\frac{1}{2}+\frac{1}{2}=3$

(Continued)

UNIT—III

20. (a) Discuss the effect of substrate concentration and pH on enzyme activity. 2

(b) Discuss the induce fit model in connection to the mechanism of enzyme catalyzed reaction. 2

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

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

(b) What are coenzymes? Discuss the metabolic function of FAD. 1+1=2

(c) What do you mean by temperature quotient? 1

UNIT—IV

22. (a) Saturated fatty acids have higher melting point than unsaturated fatty acids. Explain why. 2

(b) What is iodine value of oil or fat? How can you determine iodine value of an oil or a fat using Wijs' solution? 1+3=4

(*Turn Over*)

23. (a) What are lipids? What are their primary functions in living organism?   1+1=2

   (b) Why does butter become unpalatable if not stored properly? Explain with chemical reaction.   2

   (c) Write the mechanism of drying of oils.   2

UNIT—V

24. (a) Discuss the synthesis and therapeutic use of paracetamol.   2+1=3

   (b) What are penicillin used for? Discuss its mode of action.   1+2=3

25. (a) What are antibiotics? Why are they essential medicines?   1+1=2

   (b) Describe the synthesis of chloroquine. What are its therapeutic uses?   3+1=4

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