

Total number of printed pages-7

3 (Sem-5/CBCS) CHE HC 1

2024

**CHEMISTRY**

(Honours Core)

Paper : CHE-HC-5016

**(Organic Chemistry - IV)**

Full Marks : 60

Time : Three hours

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

1. Answer the following questions :  $1 \times 7 = 7$
- (a) Adenosine is a \_\_\_\_\_.
- (b) Adenosine 5' - monophosphate is a \_\_\_\_\_.
- (c) Why  $\alpha$  - amino acids (except glycine) are optically active ?
- (d) Give an example of Dipolar ion.

Contd.



- (e) Give an example of metalloenzyme.
- (f) Give an example of triacylglycerol.
- (g) Lauric acid is a \_\_\_\_ acid.

2. Answer the following questions :  $2 \times 4 = 8$

- (a) What are the *four* different bases present in DNA ?
- (b) Draw the structures of adenosine and 2'-deoxyadenosine.
- (c) Write down the equations for the reaction of glycine with  $\text{NaOH}_{(aq)}$  and  $\text{HCl}_{(aq)}$ .
- (d) What do you mean by functional group interchange (FGI) and functional group addition ?

3. Answer **any three** of the following :

$5 \times 3 = 15$

- (a) Explain the statement –  
“ATP is the carrier of Chemical Energy”.

- (b) Indicate whether each functional group of the five heterocyclic bases in nucleic acids can function as a hydrogen bond acceptor, (A), a hydrogen bond donor (D), or both (D/A).

- (c) What do you mean by pI value of an amino acid ? Which amino acid has the lowest pI value and which amino acid has the highest pI value ? Give reasons.

- (d) What are the enzymes and co-enzymes ? Give examples. (*one for each*)

- (e) Define Saponification number and Iodine number. In what way these have proved useful in the analysis of oils and fats.

- (f) (i) Why are the carboxylic acid groups of the amino acids much more acidic ( $pK_a \sim 2$ ) than a carboxylic acid ( $pK_a \sim 4.76$ ) such as acetic acid.

- (ii) Draw the form in which each of the following amino acids predominantly exists at physiological pH. (pH = 7.3)  
aspartic acid, glutamine, arginine, lysine, histidine, tyrosine

4. Answer **any three** of the following :

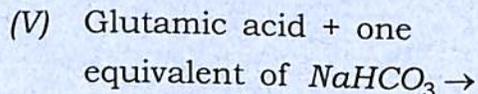
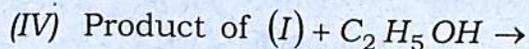
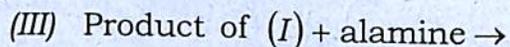
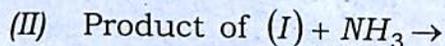
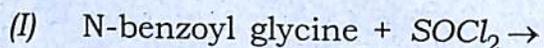
10×3=30

- (i) (a) What do you mean by a peptide bond ? Draw a structure of dipeptide by depicting the N-terminal and C-terminal amino acids.

2+3=5

- (b) Predict the products of the following reactions :

1×5=5



- (ii) (a) Write *one* method of each of synthesis of adenine and thymine.

- (b) Describe a method how the C-terminal residue of a polypeptide chain can be analysed.

- (c) Name *one* amino acid which is not found in  $\alpha$ -helix.

5+4+1=10

- (iii) Write short notes on the following :

3+3+4=10

- (a) Oxidation of food stuffs and cellular energy

- (b) Catabolism and anabolism

- (c) Metabolic pathways of carbohydrates

- (iv) (a) Write a method of synthesis of paracetamol

- (b) Mention *four* qualities that an antibiotic must possess.

- (c) Mention *one* medicinal value of turmeric and neem.
- (d) Name *two* useful drugs which are employed as antimalerials.
- (e) Give a synthetic method for chloramphenicol.

2×5=10

- (v) (a) Draw the structures of DNA and RNA.
- (b) If one of the strands of DNA has the following sequence of bases running in the 5'→3' direction

5'-G-G-A-C-A-A-T-C-T-G-C-3'

What is the sequence of bases in the complementary strand? What are the forces that keep the *two* strands of DNA together?

5+5=10

- (vi) Write short notes on :  $2\frac{1}{2}\times 4=10$

(a) Lipids

(b) Enzymes

(c) Nuclie Acids

(d) Polypeptides