

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 : 1×7=7

(a) Adenosine is a ____.

(b) Adenosine 5'-monophosphate is a ____.

(c) Why α -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 :

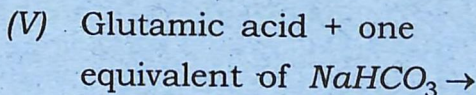
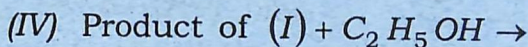
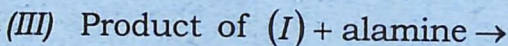
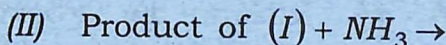
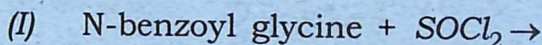
$$10 \times 3 = 30$$

- (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.

$$2 \times 3 = 6$$

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

$$1 \times 5 = 5$$



- (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 α - 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 antimalarials.

(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 : 2½×4=10

(a) Lipids

(b) Enzymes

(c) Nucleic Acids

(d) Polypeptides
