

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 8468

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Roll No.....

Unique Paper Code : 217503

Name of the Paper : CHHT-512 : Organic Chemistry – IV

Name of the Course : B.Sc. (Hons.) Chemistry, Part III

Semester : V

Duration : 3 Hours

Maximum Marks : 75

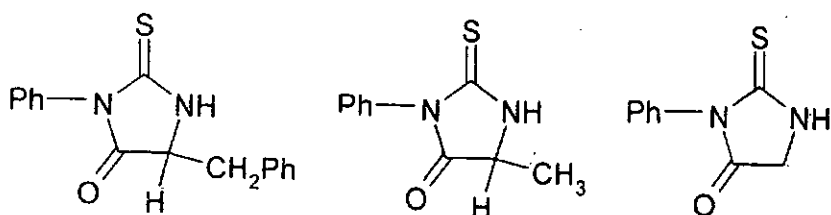
Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **six** questions in all.
3. Question No. 1 is compulsory.

1. (a) Essential oils are different from cooking oils. Explain by giving examples.
(b) What do you understand by the term ω -3 fatty acids and ω -6 fatty acids ? Give examples.
(c) Define Saponification value.
(d) What are antipyretics ? Give an example with structure.
(e) What are broad spectrum and narrow spectrum antibiotics ?
(f) Differentiate between nucleotide and nucleoside.
(g) Draw the structure of predominant form of valine at pH-11 and of glutamic acid at pH-7.
(h) Draw the most stable conformer of α -D-galactopyranose.
(i) Reactions of monosaccharides are preferentially carried out in acidic medium. Comment.

P.T.O.

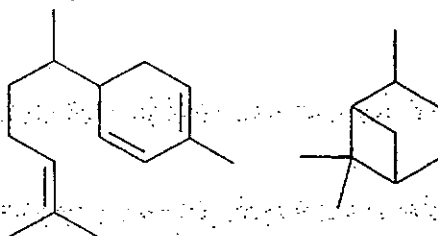
- (j) Explain electrophoresis. (1.5×10)
2. (a) What do you understand by the term invert sugar. Calculate its specific rotation. ($[\alpha]_D$ for glucose is $+52.7^\circ$ and $[\alpha]_D$ for fructose is -92.4°)
- (b) What is Amadori rearrangement? Explain with reference to glucose.
- (c) Rate of mutarotation of glucose is faster, in 2-hydroxypyridine than in a mixture of pyridine and Phenol. Discuss.
- (d) An unknown carbohydrate, $C_{12}H_{22}O_{11}$ reacts with Tollen's reagent to form a silver mirror. The enzyme α -glucosidase has no effect on the carbohydrate but β -galactosidase hydrolyse it to D-galactose and D-mannose. When the carbohydrate is completely methylated (CH_3OH/HCl followed by $(CH_3)_2SO_4/NaOH$) and then hydrolysed with dil.HCl, the products are 2,3,4,6-tetra-O-methylgalactose and 2,3,6-tri-O-methylmannose. Propose structure/structures of the carbohydrate. (3,3,2,4)
3. (a) Give the synthesis of adenine by Traube's method.
- (b) Give the structure of the segment of RNA molecule containing the following bases guanine, uracil, adenine and cytosine.
- (c) Synthesize phenylalanine by azalactone method.
- (d) $SOCl_2$ is not used when benzyloxycarbonyl is used as protecting group in peptide synthesis. (4,4,2,2)
4. (a) An unknown pentapeptide on amino acid analysis shows that it contains the following residues Gly, 2Ala, Met and Phe. Treatment of original peptide with carboxypeptidase gives alanine as the first free amino acid residue. Sequential treatment of the pentapeptide with phenylisothiocyanate followed by mild hydrolysis gives the following derivatives



Propose a structure of the unknown pentapeptide.

- (b) Show the steps in the synthesis of a tripeptide Val-Leu-Phe by the solid phase process.
- (c) What is ninhydrin reagent? How is it used for the identification of amino acid? Explain with reactions. (4×3)
5. (a) What is rancidity? Discuss.
- (b) What is meant by the term hardening as applied to vegetable oil.
- (c) An oil obtained from coconut with molecular formula $C_{45}H_{86}O_6$ has all three fatty acid components identical. What is the molecular formula of carboxylate ion obtained after its saponification.
- (d) A triglyceride with molecular weight 890 contains four double bonds. Calculate its iodine number. (3×4)
6. (a) Give the name and synthesis of a drug used for the treatment of typhoid. What are the unusual structural features of the drug.
- (b) Curcumin, an important ingredient of Indian cooking, has immense medicinal values. Give the structure of its main constituent and discuss its uses as medicine.
- (c) Convert D-glucose into its next higher homologue. (6,4,2)
7. (a) How will you establish the existence of α,β -unsaturated carbonyl group in citral.

- (b) Give the synthesis of α -terpeneol from isoprene.
- (c) Show the isoprene units in each of the following terpenes and classify them as mono, di and Sesquiterpenes etc.



(4×3)

8. Write short notes on the following :

- (a) Essential amino acids
- (b) Amylose and amylopectin
- (c) Dansyl method for N-terminal analysis of a peptide
- (d) Epimerisation

(3×4)