

This question paper contains 6 printed pages]

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S. No. of Question Paper : 5296

Unique Paper Code : 2174001002

Name of the Paper : GE-Basic Concepts of Organic Chemistry

Name of the Course : B.Sc. (Hons.)

Semester : II/IV/VI/VIII

Duration : 2 Hours

Maximum Marks : 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt four questions in all.

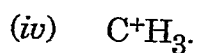
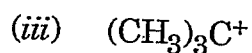
Question No. 1 is compulsory.

All parts of a question should be attempted together.

All questions carry equal marks.

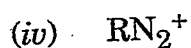
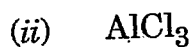
1. Answer the following :

(a) Define Carbocations. Arrange the following carbocations in order of stability and justify your answer :

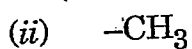
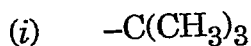


P.T.O.

(b) Classify the following as electrophiles and nucleophiles :

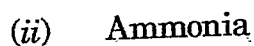
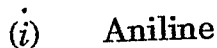


(c) Arrange the following substituents in order of +I (Inductive) effect :

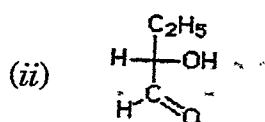
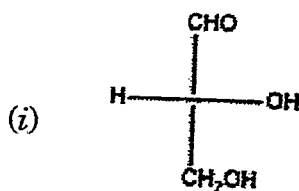


(d) Write the formula for specific rotation and calculate its value for a compound having observed rotation of $+1.8^\circ$, concentration 0.3 g/mL and path length 1 dm.

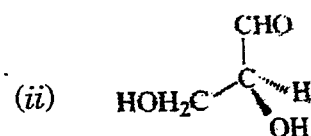
(e) Arrange the following in order of increasing basic strength and justify :



2. (a) Draw Fischer projections for enantiomers of erythro-hexane-1, 2, 3-triol.
- (b) Halogens are deactivating yet ortho, para-directing in electrophilic aromatic substitution. Explain this behaviour with reference to inductive and resonance effects.
- (c) Draw all the possible isomers of 3-bromo-2-butanol. Mention how they are related to each other (enantiomers/diastereomers) and which of them are optically active.
- 5×3
3. (a) Give the major product formed when Ph-CH=CH-CH_3 reacts with HBr in presence of peroxides. Explain the mechanism of the reaction.
- (b) Assign R/S designations to the optically active centers in the following compounds :

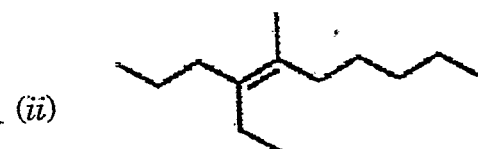
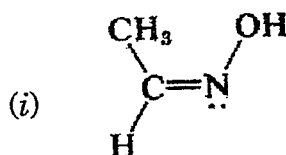


- (c) Convert the following Dash and Wedge formulae to Fischer Formulae :

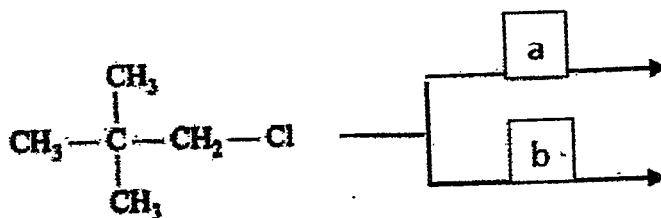


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4. (a) Assign E/Z configurations to the following compounds :



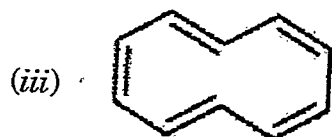
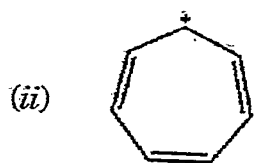
- (b) Calculate the percentage of isomers expected from monochlorination of *n*-butane. The relative reactivities for 2° and 1°H atoms are 3.8 and 1.0 respectively.
- (c) Write the structures of product/s obtained in the following reactions with the mechanisms involved :



where $a = \text{C}_2\text{H}_5\text{OH}$ and $b = \text{C}_2\text{H}_5\text{ONa}$.

5×3

5. (a) Explain the bromination of benzene, specifying the reagents used and the stepwise mechanism of the reaction.
- (b) Define resolution of racemic mixtures and describe one method for its resolution.
- (c) Define aromaticity. Using Huckel's Rule, mention the aromatic, non-aromatic and anti-aromatic character of the following :



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6. Write short notes on any *three* of the following :

- (a) Oxymercuration-Demercuration Reaction
- (b) Difference between E1 and E2 reaction mechanism
- (c) Hydroboration-oxidation reaction
- (d) Free-radical reactions in biological systems
- (e) Ozonolysis.

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