

AU-239

M.Sc.—I (Semester—I) (C.B.C.S. Scheme) Examination

CHEMISTRY (New)

(Organic Chemistry—I)

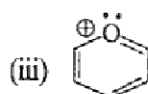
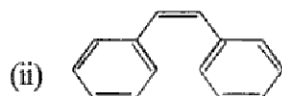
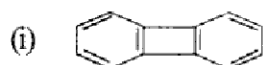
Paper—II

Time : Three Hours]

[Maximum Marks : 80

Note :— All questions are compulsory and carry equal marks.

1. (a) Discuss the aromaticity of following compounds :



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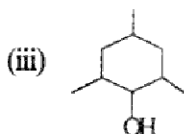
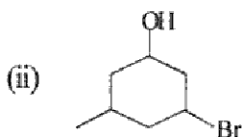
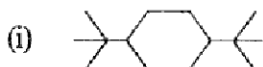
- (b) Explain the following term in brief :

(i) Conjugation

(ii) Bonding in fullerenes.

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- (c) Draw the most stable conformations of following molecules :



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OR

(p) Discuss :

(i) Effect of conformation on reactivity

(ii) Resonance.

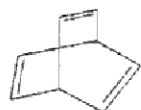
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(q) Classify the following molecules as aromatic, anti-aromatic or non-aromatic :

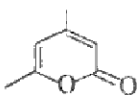
(i)



(ii)



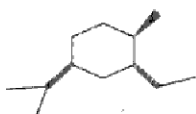
(iii)



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(r)

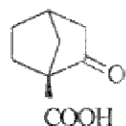
(i)



(ii)



(iii)



Draw the most stable chair conformation for above given molecules. Discuss their stability.

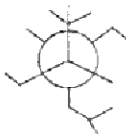
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2. (a) Explain axis, plane, center and alternating axis of symmetry in brief.

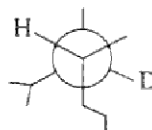
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(b) Convert the following Newmon conformation into Sawhorse and Fischer conformation :

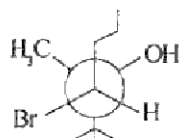
(i)



(ii)



(iii)



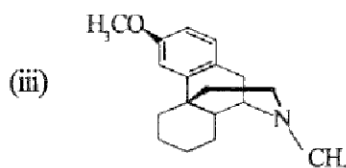
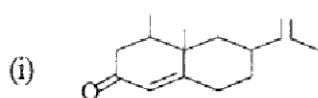
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- (c) Explain Cahn-Ingold-Prelog rules for nomenclature of chiral molecules with suitable examples.

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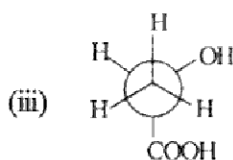
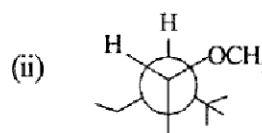
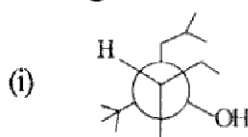
OR

- (p) Give the R and S nomenclature for all possible chiral centre in the following molecules :



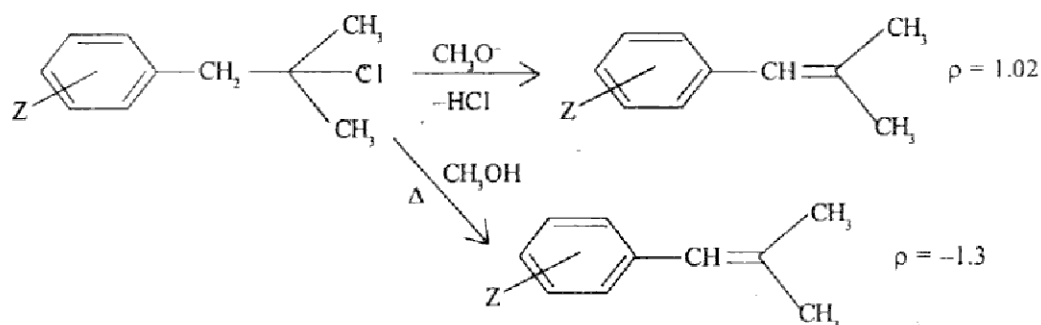
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- (q) Describe various methods for resolution of racemic mixture. 4
 (r) Convert following Newman conformation into Sawhorse confirmation. Comment on chirality of the given molecules :



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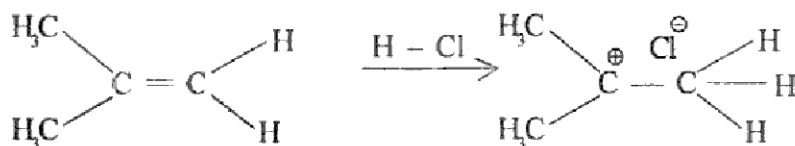
3. (a) Explain the mechanistic significance of the 'ρ' values for the elimination of 1 under the two different sets of conditions :



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(b) What is primary kinetic isotopic effect ? Explain significance of primary kinetic isotopic effect in determining the rate and mechanism of reaction. 5

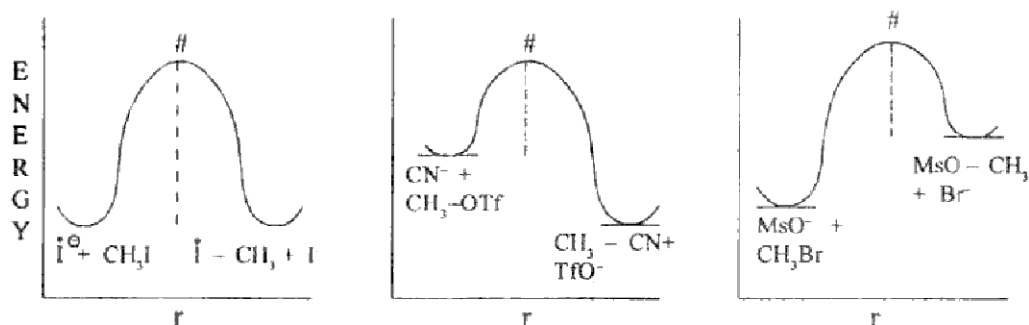
(c) Describe transition state of following reaction in light of Hammond Postulates :



OR

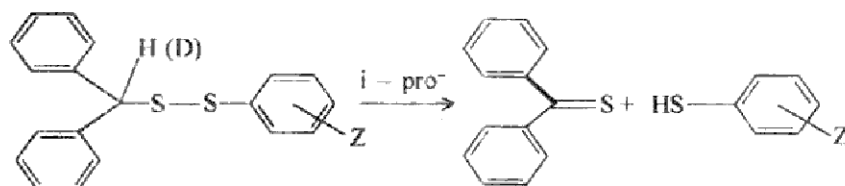
(p) Explain in brief-kinetic and thermodynamic controlled reactions. 5

(q)



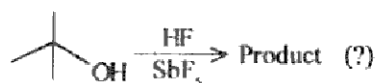
Comment on given energy profile diagram and give the structure of activated complex in each reaction. 6

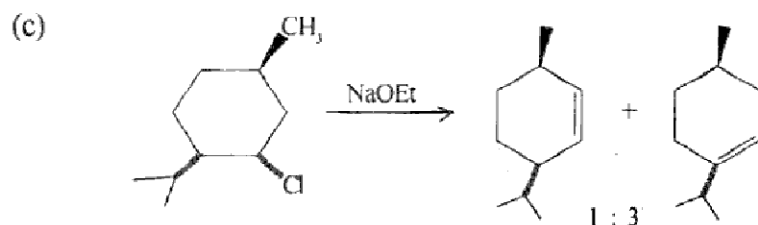
(r) Propose a mechanism for the following reaction given that $K_H/K_D = 6.1$ and $\rho = 2.02$:



4. (a) Discuss the various factors controlling unimolecular substitution reaction. 5

(b) Predict the product and mechanistic pathway for following $\text{S}_\text{N}1$ reaction :

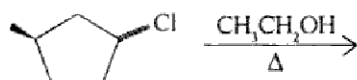




Explain the mechanism for the formation of given eliminated product. Discuss about product formation ratio. 6

OR

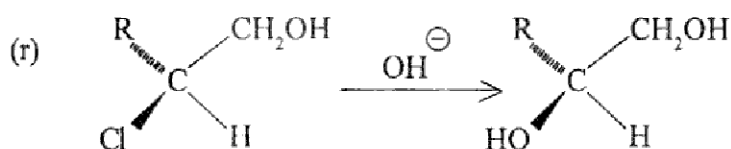
- (p) Provide the structure of the product which result in the reaction below. Also depict the mechanism of reaction :



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- (q) What is pyrolytic elimination ? Discuss the mechanism and orientation in pyrolytic elimination.

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Explain the concept of Neighbouring Group Participation in given reaction.

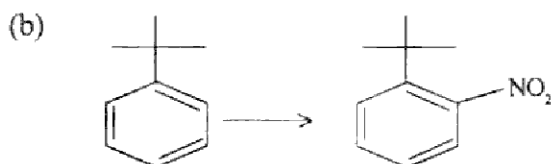
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5. (a) Comment on :

(i) Diazonium coupling

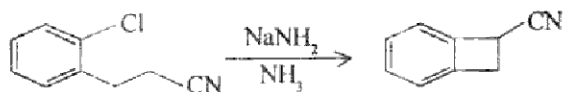
(ii) Pechman Reaction

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Explain the concept of aromatic electrophilic substitution in given reaction. Describe the mechanism. 5

- (c) The reaction involved in the following conversion is Benzyne Mechanism. Explain the progress of reaction with proper mechanism :



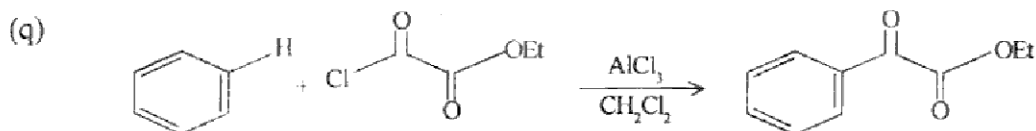
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OR

- (p) Discuss in brief :

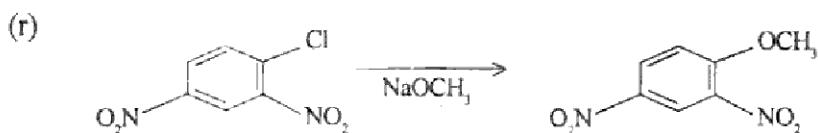
- (i) Von Richter Rearrangement
- (ii) Smiles Rearrangement.

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Describe the name and mechanism of given reaction.

5



Explain the concept of IPSO attack in the given reaction. Give the mechanism for given reaction. Comment on effect of presence of electron withdrawing group on the ring. 5