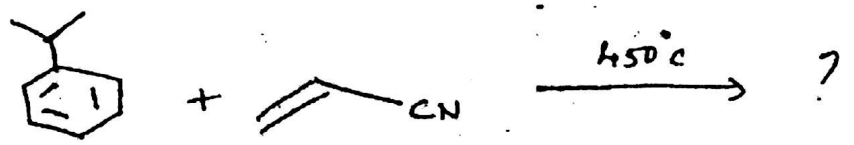
(2½ Hours) [Total Marks : 60

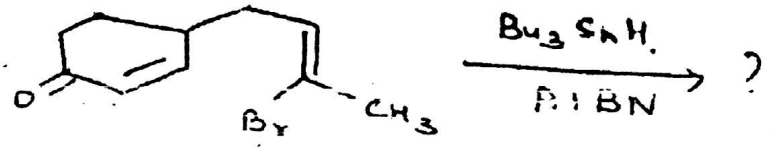
N.B. : (1) All questions are compulsory.
(2) Figures to the right indicate full marks.

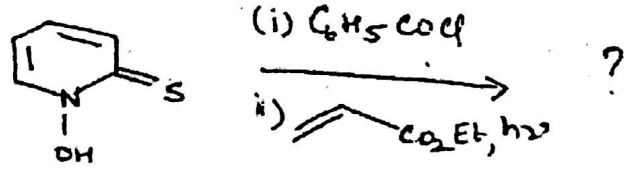
1. (a) Answer any two of the following :– 8

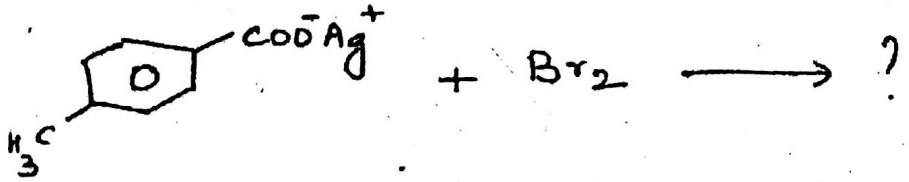
(i) Give an example of :–
(a) Dehydrodimerisation
(b) Reductive coupling
(c) Autooxidation
(d) Oxidative coupling.

(ii) Complete the following reactions :–

(a) 

(b) 

(c) 

(d) 

(iii) Discuss with examples the generation of radicals by C–Co bond cleavage.
(iv) Discuss with examples radical reactions on hetero aromatic compounds.

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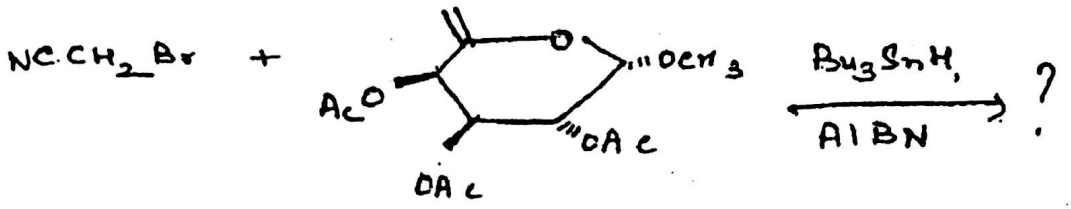
(b) Attempt any one of the following :–

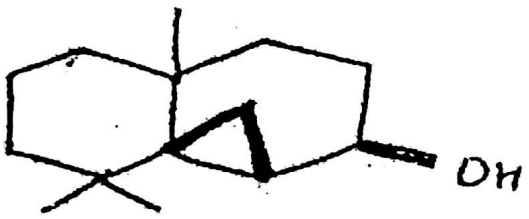
(i) Discuss with examples the generation of radicals by C–S bond cleavage.

(ii) Give the product and mechanism of the following reaction :–



2. (a) Attempt any two of the following :– 8

(i) What is meant by retrosynthesis ? Provide a retroanalysis of the following compound :–



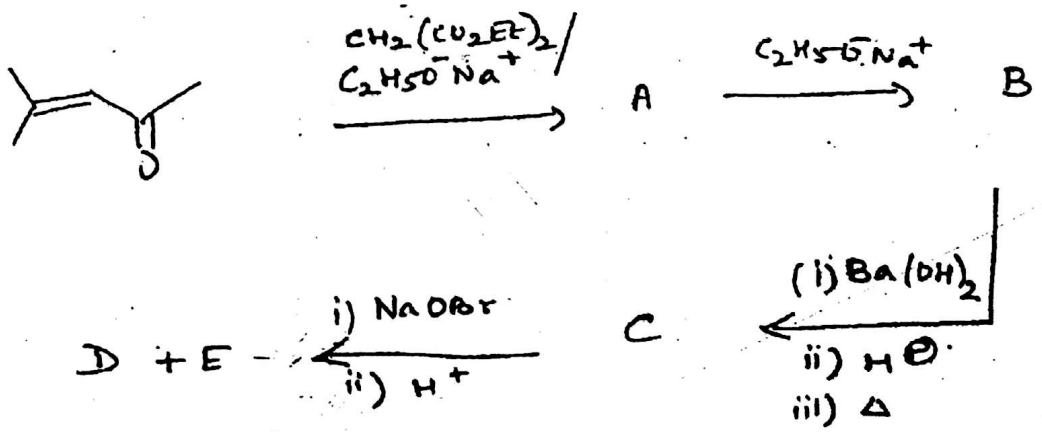
(ii) Define the following terms and give an example :–

(a) Target molecule

(b) Synthon

(c) Synthetic equivalent.

(iii) Complete the following reactions by identifying A–E :–



(iv) Provide a retrosynthesis for prostaglandin A_2.

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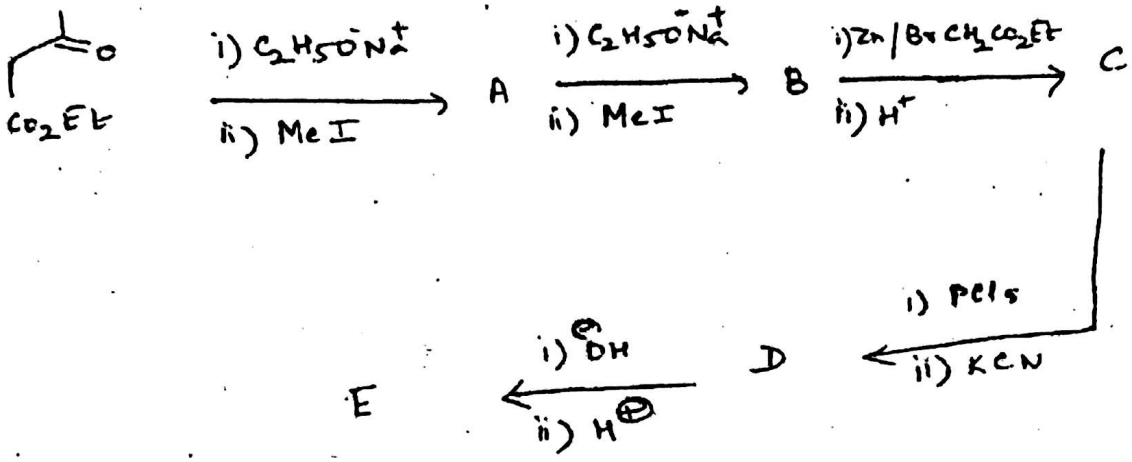
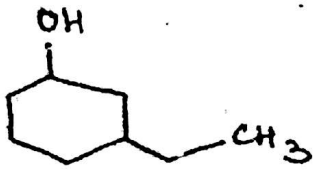
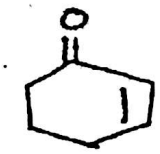
(b) Answer any **one** of the following :– 4

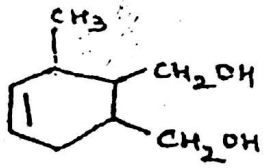
(i) Complete the following reactions by identifying A–E:–



(ii) Suggest a synthesis of :–

(a) 

from 

(b) 

from $CH_3CH=CH-CH=CH_2$

1. (a) Attempt any **two** of the following :– 8

(i) Give structure of α-cyclodextrin. Explain its role in increasing paraselective chlorination of anisole by HOCl reagent.

(ii) Write a brief note on polymer supported reagents.

(iii) Explain the advantages of microwave assisted reactions. Give its two applications.

(iv) Discuss uses of crown ethers in organic synthesis.

(b) Attempt any **one** :– 4

(i) Write a brief note on organocatalysts.

(ii) Give applications of clay as catalyst.

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4. (a) Attempt any two of the following :–

(i) What is the action of SmI_2 on the following compounds ? :–

(a) Nitro compounds

(b) Aldehydes

(c) Alkyl halides

(d) α-functionalised carbonyl compounds.

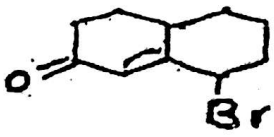
(ii) Explain with suitable examples :–

(a) 18 electron rule

(b) Reductive elimination.

(iii) Complete the following reactions :–

(a)  $\xrightarrow[H_2O]{PdCl_2/CuCl_2}$?

(b)  $\xrightarrow[NaCH(COOEt)_2]{PdCl_2, Et_3N}$?

(c)  $+ CH_2=CH_2 \xrightarrow{Pd,\ Et_3N}$?

(d)  $\xrightarrow[CH_3COOH]{Pd^{2+}/Cu^{2+}/O_2}$?

(iv) (a) Give conversion of 1, 3-cyclohexadiene to 5-chloro –1, 3-cyclohexadiene using iron carbonyl.

(b) Complete the following reactions :–

(I)  $\xrightarrow[DMF]{Ni(CO)_4}$?

(II)  $+ CO + H_2 \xrightarrow[pressure]{Co_2(CO)_8}$?

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(b) Attempt any one of the following :- 4

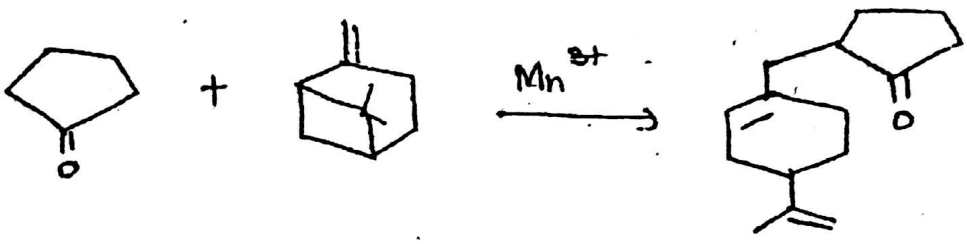
(i) Give applications of $Sc(OTf)_3$ as Lewis acid.

(ii) Explain migratory insertion with two suitable examples.

5. Attempt any four of the following :-

(i) Explain electrophilic and nucleophilic radicals with suitable examples. 3

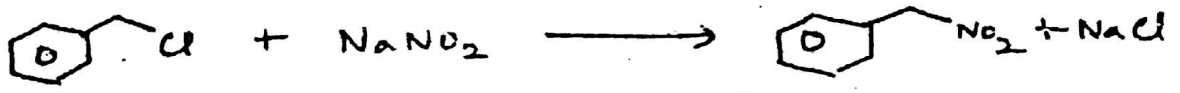
(ii) Provide a mechanism for the following reaction :- 3



(iii) Consider the disconnection shown below and draw the structure of the possible synthons and the corresponding synthetic equivalents :- 3

(iv) Discuss two methods of generation of six membered rings with examples. 3

(v) Discuss the role of phase transfer catalyst in the following reaction :- 3



(vi) What are micelles ? Explain their use in organic synthesis. 3

(vii) Give applications of cerium (IV) compounds :- 3

(a) in synthesis of quinoxaline derivatives

(b) as deprotecting agent.

(viii) Give the product and mechanism of the following reaction :- 3