Total Pages : 8

End Semester Examination of Semester–III, 2015
Subject : CHEMISTRY (PG)
Paper : CEM–302 (Org. Spl) (Th)
Full Marks : 40
Time : 2 Hrs

The figures in the margin indicate the marks corresponding to the question

Candidates are requested to give their answers in their own word as far as practicable.

Illustrate the answers wherever necessary.

Answer one question from each unit

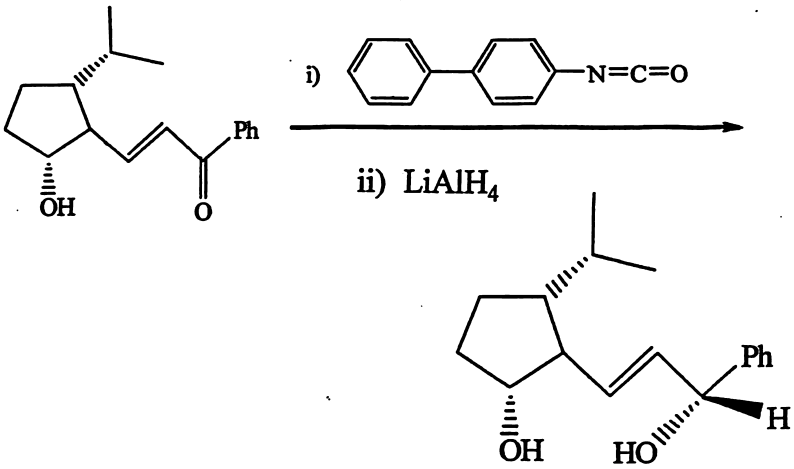
Unit–I

Answer **any one** question : 10x1=10

1. a) Show that ester derived from benzoyl formic acid and (R)-2-Octanol produces (R)-atrolactic acid as predominant product when the ester is treated with CH_3MgI followed by hydrolysis.
Would you anticipate any change in the nature of the product when ester of (R)-2-octanol and pyruvic acid is made to react with PhMgBr? 4

b) Compare between Cram and Felkin-Anh models regarding dependence of diastereo selectivity on the nature of R-group in nucleophilic addition to RCH(Ph)CH=O. 3

c)



Yield = 80%

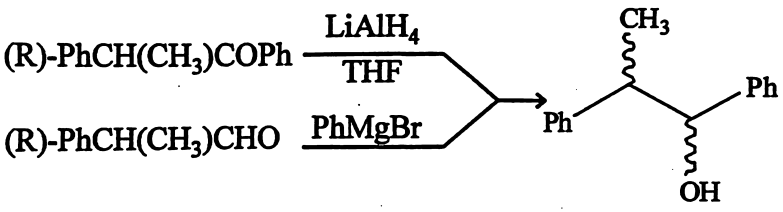
ee = 92%

Discuss mechanistically the role of p-diphenyl isocyanate for the stereoselective reduction. 3

2. a) What do you mean by "Stereoselective" and "Stereospecific" reaction? How is the term "asymmetric induction" related to these two reactions? Provide example. 2

b) (R)-$CH_3CH(OMe)CHO$ reacts with Me_2Zn to give syn-$CH_3CH(OH)CH(OMe)CH_3$ as major product. Justify or Criticize. 2

c) Explain how these reactions give different diastereromeric products. 3



d) Explain the observation : 3

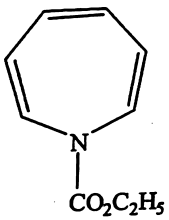
Reagents	% Yield (e, e)	% Yield (e, a)	R
$LiAlH_4$	88	12	H
Li–C≡CH	88	12	–C≡CH
MeMgBr	40	60	Me
$(Me_2CH)MgBr$	18	82	$CHMe_2$
$LiBH(S\text{–}Bu)_3$	3·5	96·5	H

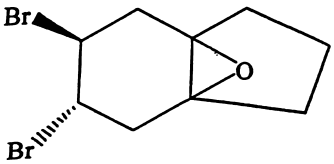
Unit II

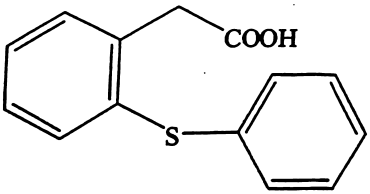
Answer **any one** question : 10X1=10

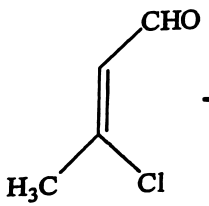
3. a) Arrange the stability order of 1H, 3H and 4H azepine. Show the hydrogen shift for the transformation 1H-azepine to 3H-azepine. 1+1=2

b) Predict the product of the following reactions : 4x2=8

i) 

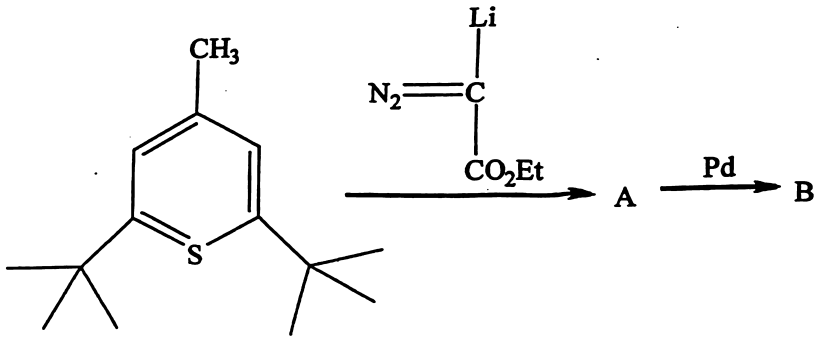
ii) 

iii) 

iv) 

4. a) Identify A, B, C, D, E and F : 6x1=6

i)



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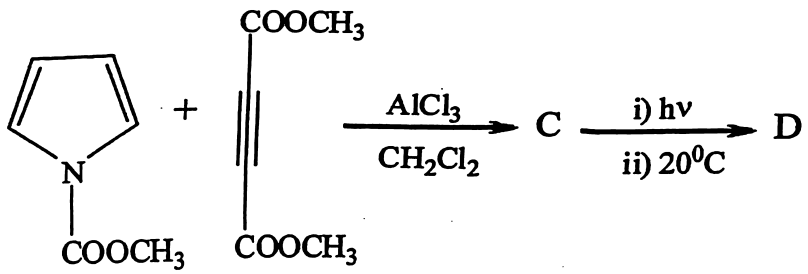

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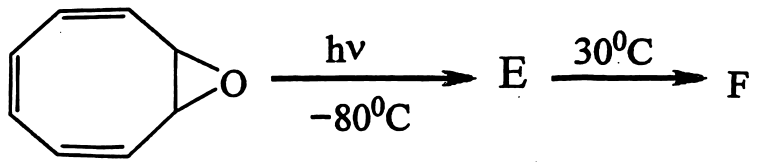
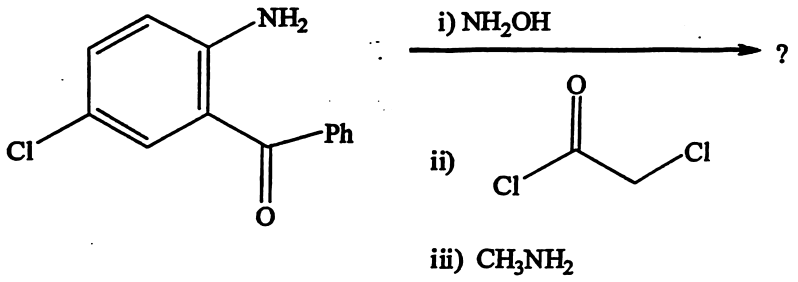


b) Write down the products of the following reactions with mechanism. 3+1=4

i)



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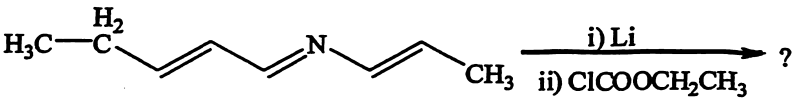


Unit III

Answer **any one** question : 10X1=10

5. a) State the 'biogenetic isoprene rule'. 1

b) Delimeate the following biogenetic conversion : $2\frac{1}{2}x2=5$

i) Acetyle coenzyme A to IPP.

ii) IPP to Limonene.

c) How can you proof the presence of α, β unsaturated carbonyl group in Citral. 2

d) Linalool $\xrightarrow{H_3O^+}$ Geraniol

How much information procured from the above conversion regarding the structure of linalool. 2

6. a) Outline the steps involved for the biosynthesis of nicotine. 2+2=4

   b) Give two chemical evidences and also reaction sequences in order to prove the presence n-propyl group in coniine. $1\frac{1}{2}$x2=3

   c) Write mechanism of each step involved in the synthesis of tropinone from succindialdehyde. 3

Unit–IV

7. a) What are vitamins? 1

   b) The following vitamin(A) shows the property as : 3+3+3=9

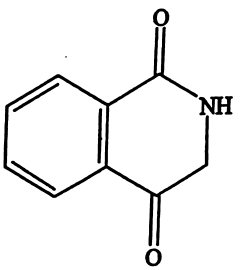
$$\underset{(A)}{C_{12}H_{18}Cl_2N_4OS} \xrightarrow[\text{saturated with } SO_2]{Na_2SO_3 \text{ Solution}} \underset{(B)}{C_6H_9OS} + \underset{(C)}{C_6H_9N_3O_3S} + NaCl$$

   Chemical and spectral evidence showed that compound (B) is a thiazole and compound (C) is a pyrimidine derivative.

   Identify B and C. Establish the structure of A.

8. a) What is antibiotics. Write down chemical structure of norfloxacin and tetracyclines. 1+1=2

b) Write all the steps for the following synthesis : 4+4=8

i) Penicillin V from 

ii) $PGF_{2\alpha}$ from