

Total Pages : 12

**End Semester Examination of Semester-II, 2016**

**Subject : CHEMISTRY (PG)**

**Paper : CEMPG-201**

**Full Marks : 40**

**Time : 2 Hrs**

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

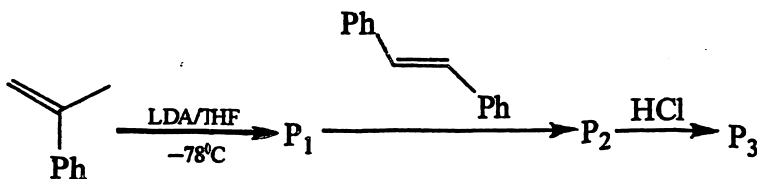
*Candidates are requested to give their answers in their own word as far as practicable.*

*Illustrate the answers wheeever necessary.*

**Unit I**

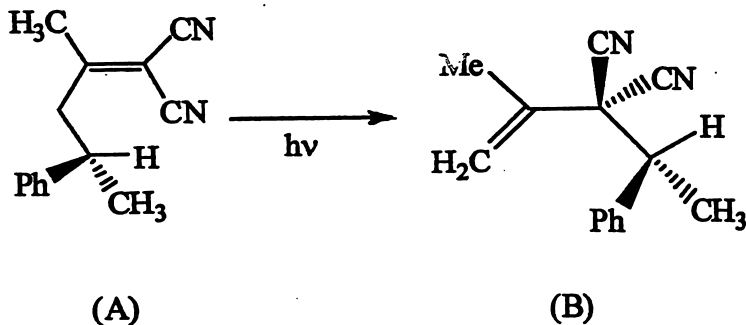
Answer any one questions . 10x1=10

1. a) Predict the product with mechanistic details and mention the stereochemistry wherever it is applicable 4



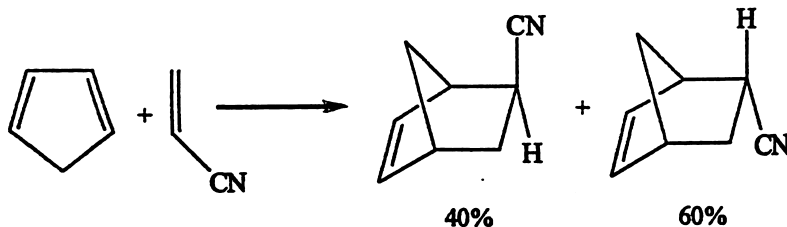
- b) The photoisomerization of optically active compound (A) to compound (B) in the following reaction proceeds with ~85% retention and 15% inversion of configuration at the migrating centre.

( 2 )

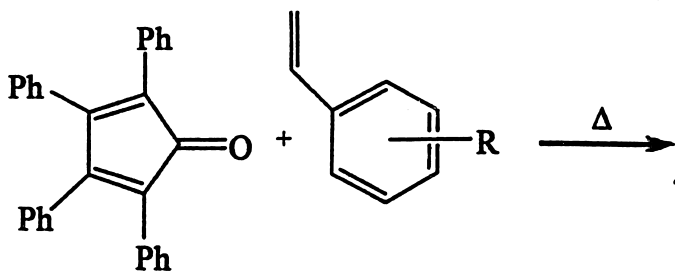


However the thermal reversion of the reaction (i.e.  $B \xrightarrow{\Delta} A$ ) occurs with 90% retention of configuration at migrating centre. Suggest concerted symmetry allowed pathways for each reaction and comment on feasibility by energetically and sterically. 4

c) Explain the reaction by applying F.M.O. approach: 2

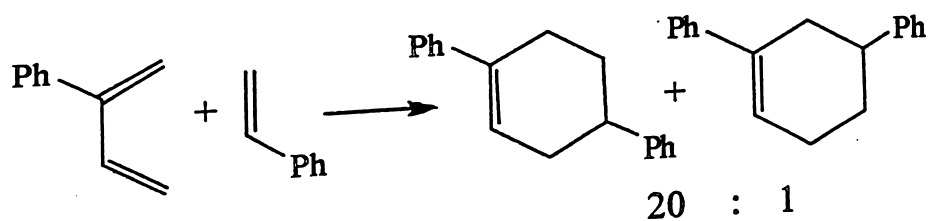


2. a) How would you explain the following observation 3

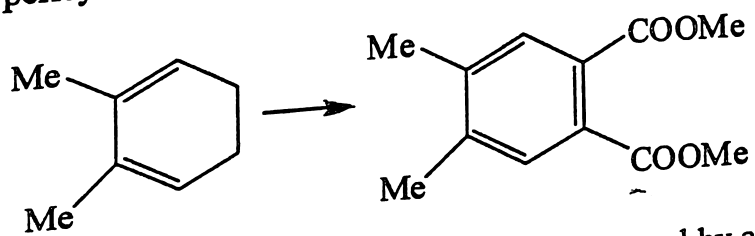




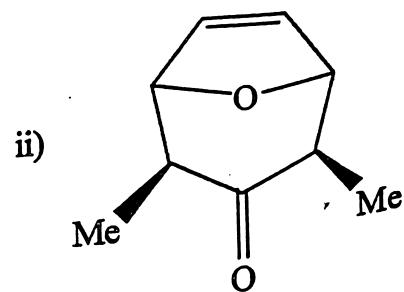
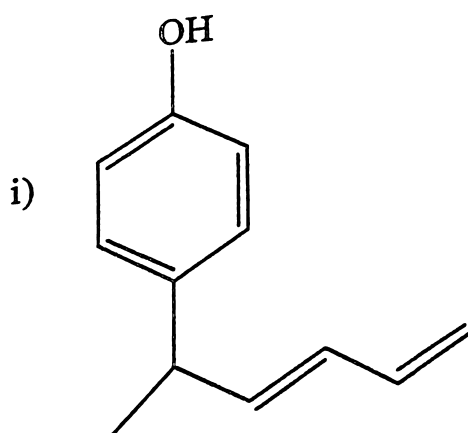
( 4 )



c) Carry out the following conversion by using at least one pericyclic reaction: <sup>2</sup>



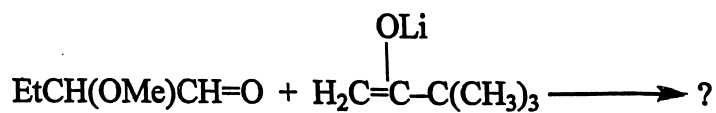
d) Synthesize any one of the following compound by applying pericyclic reaction <sup>2</sup>



Unit II

Answer any one questions 10x1=10

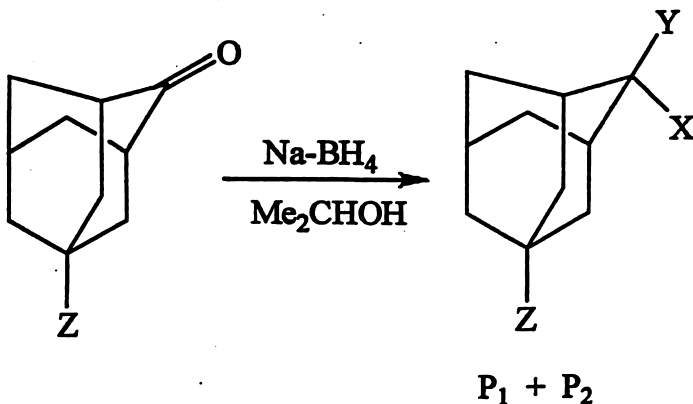
3. a) Write all the stereoisomers of 1, 2, 3, 4, 5, 6-hexachlorocyclohexane. Identify the chiral and achiral ones. Upon base treatment under bimolecular conditions all the isomers undergo -1, 2-elimination at rates within a factor of 200 but the one, called  $\beta$ -isomer, does not react at all practically. Identify the  $\beta$ -isomer giving reasons. 1+2+2
- b) When cis-2-bromo-trans-4-phenyl cyclohexan-r-1-ol is separately treated with moist silver oxide or alkali same product (4-phenyl cyclohexane) is formed but when cis-2-bromo-cis-4-phenylcyclohexan-r-1-ol is so treated with those two reagents different products are obtained. Explain these results. 2+3
4. a) Show the major product of the following reaction and explain with the help of Felkin-Anh model.



How the anti-Cram product can be obtained as major in the same reaction. Explain your answer. 4

- b) Explain with the help of Cieplak model, giving orbital interpretation, the diastereomeric composition of the products in the following reactions when substituent (Z) is varied as shown:

( 6 )



<u>Z</u>	<u>Percentage of alcohol</u>	
	<u>P<sub>1</sub>(E-isomer)</u>	<u>P<sub>2</sub>(Z-isomers)</u>
-Cl	59	41
4-Cl-C <sub>2</sub> H <sub>4</sub>	60	40
4-OH-C <sub>5</sub> H <sub>4</sub>	44	56

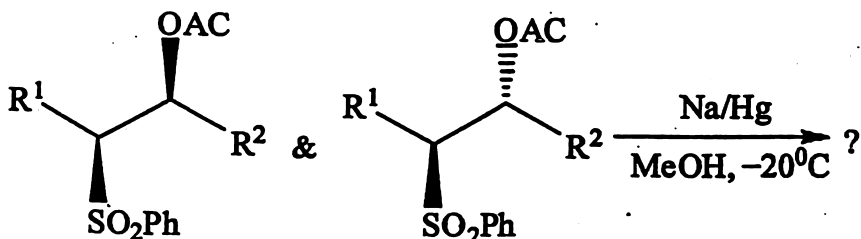
- c) What happens when trans-2-chloro cyclohexanol is treated with a base? 2

### Unit III

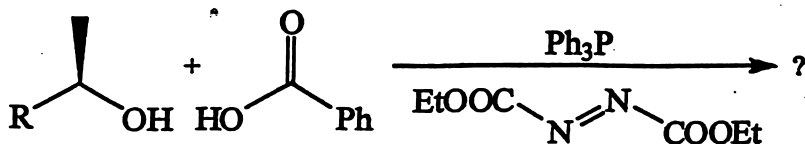
Answer any one questions 10x1=10

5. a) From the following two starting materials same alkene is obtained. Identify the alkene and explain its formation mechanistically. 4

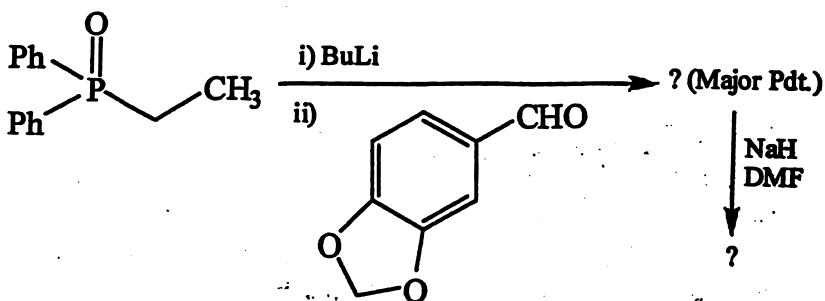
( 7 )



- b) Predict the product of the following reaction and explain mechanistically its formation. 3

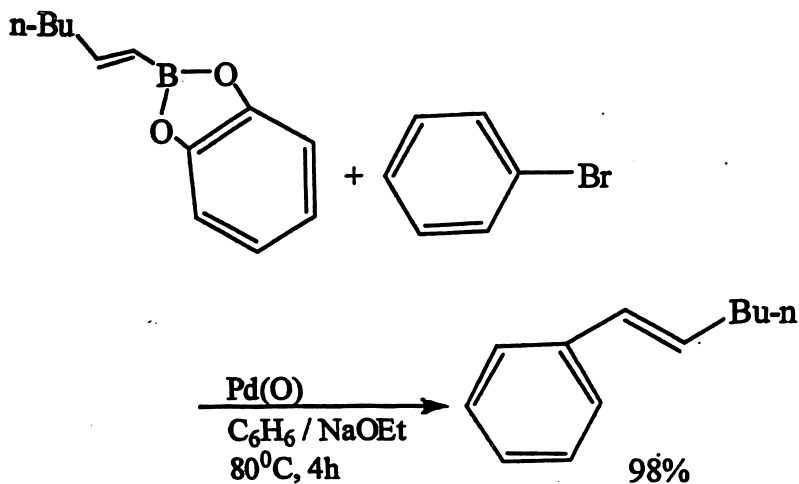


- c) Complete the following reaction sequences and show that the mechanism in each step 3

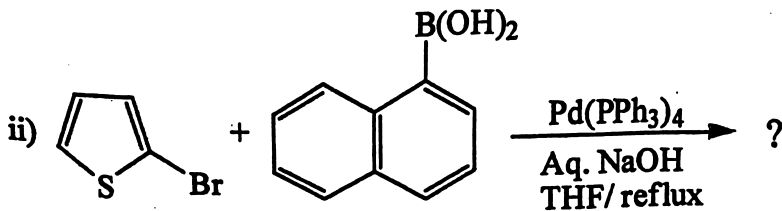
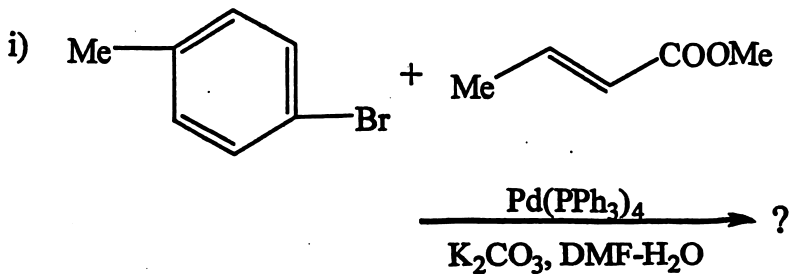


6. a) Draw the catalytic cycle for the following cross coupling reaction and hence explain the role of organoboron and solvents. 4

( 8 )

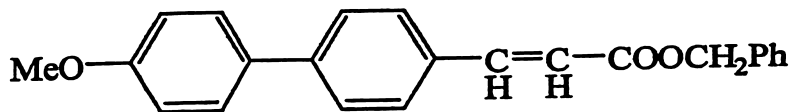


b) Write down the product(s) with proper mechanistic details: 2+2





- c) Synthesize the following compound using Pd-catalyzed cross coupling reaction. 2

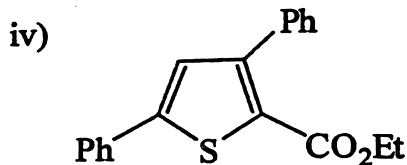
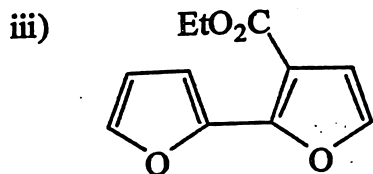
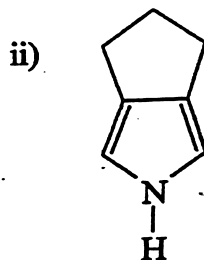
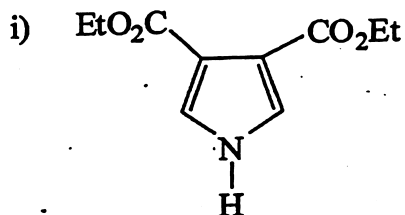


### Unit IV

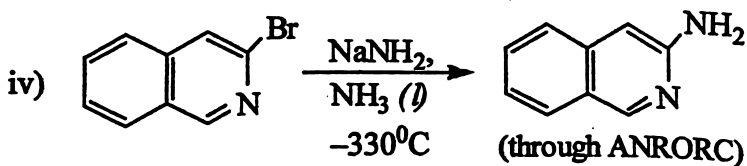
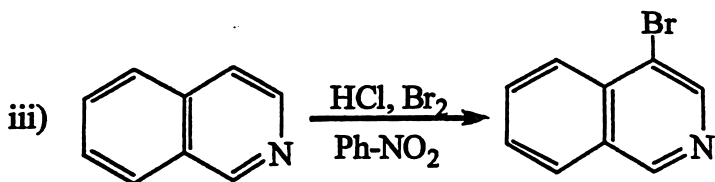
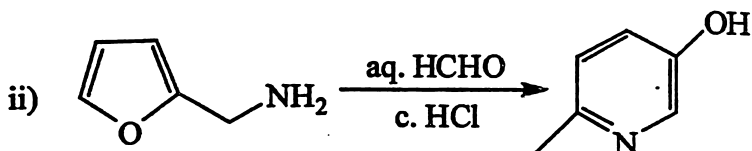
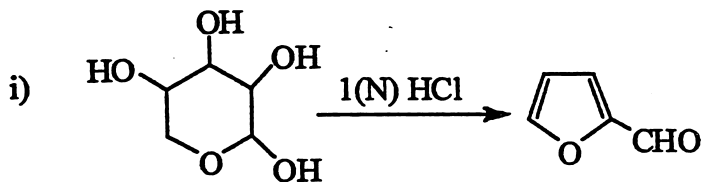
Answer any one questions

10x1=10

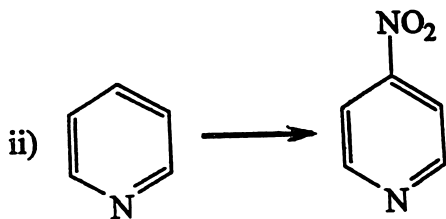
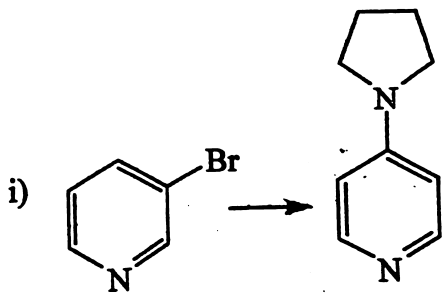
7. a) Carryout the following synthesis using retrosynthetic analysis (any two):  $2\frac{1}{2} \times 2 = 5$



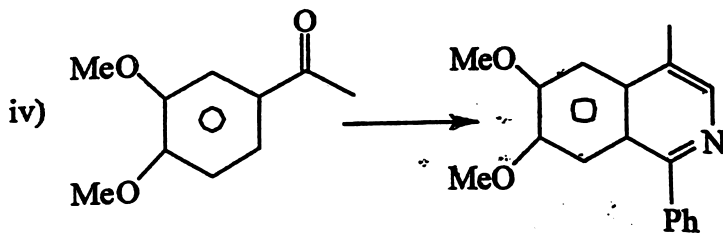
b) Explain the formation of the following conversions (any two):  $2\frac{1}{2} \times 2$



8. a) How do you convert the following (any two) :  $2 \times 2 \frac{1}{2}$



iii) Indole  $\longrightarrow$  Tryptophan



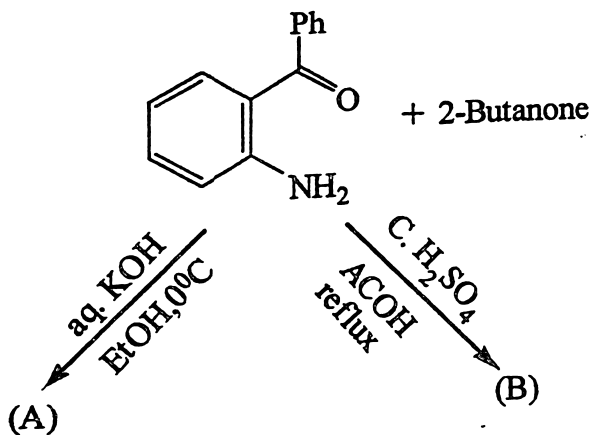
b) Outline the synthesis of following (any one) : 3

i)  $\gamma$ -Fagarine

ii) Pyridoxine

( 12 )

c)



Identify (A) and (B) with reasons.

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