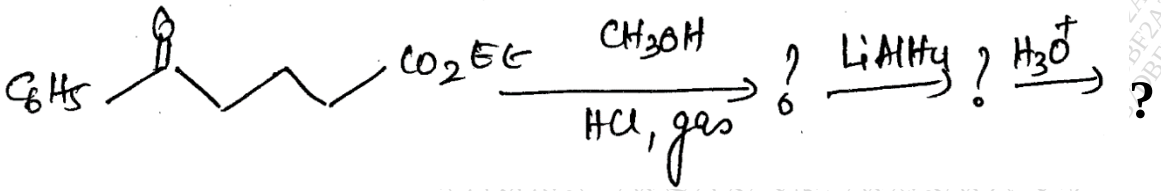
[Time: 2 ½ Hours] **[Marks : 60]**

Please check whether you have got the right question paper.

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

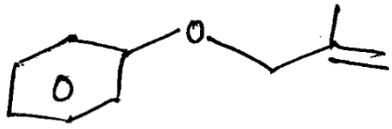
1. (a) Attempt any **two** of the following: **8**

(i) Give any one method for the protection of an alcohol group. Complete the following reaction.

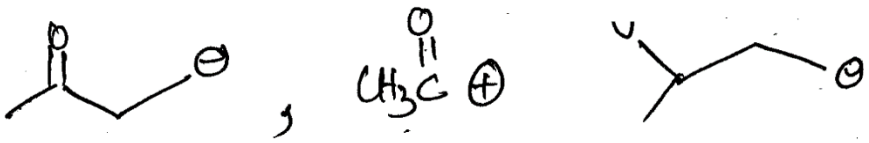


(ii) Using suitable examples discuss the use of any two species as acyl anion equivalents.

(iii) Plan a retrosynthetic analysis and a synthesis for the following molecule.



(iv) Describe the terms synthons and synthetic equivalents. What are the synthetic equivalents for the following



(b) Attempt any **one** of the following **4**

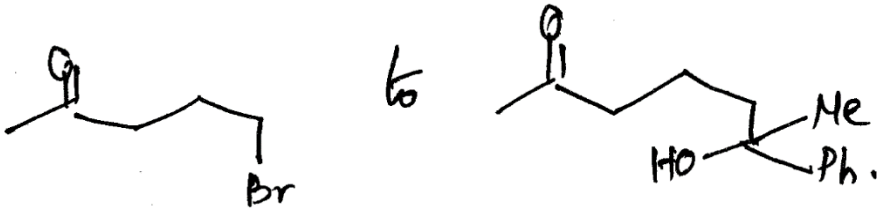
(i) Complete the following synthesis

$HC \equiv CH$ i) $\xrightarrow{NaNH_2\,(excess)}$? $\xrightarrow{Ni/H_2}$? $\xrightarrow[pyridine]{CrO_3}$

ii) CH_3CHO (excess)

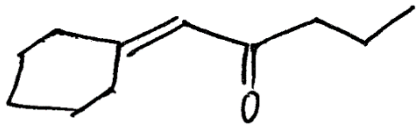
iii) H_3O^+

(ii) Using the protection – deprotection protocol convert.

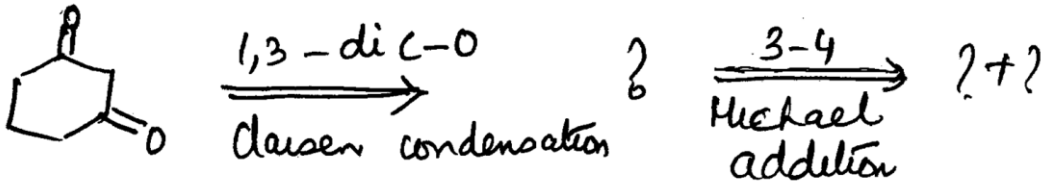


2. (a) Attempt any **two** of the following **8**

(i) Propose a retrosynthetic analysis for the following molecule such that cyclohexanone is one of the starting materials.

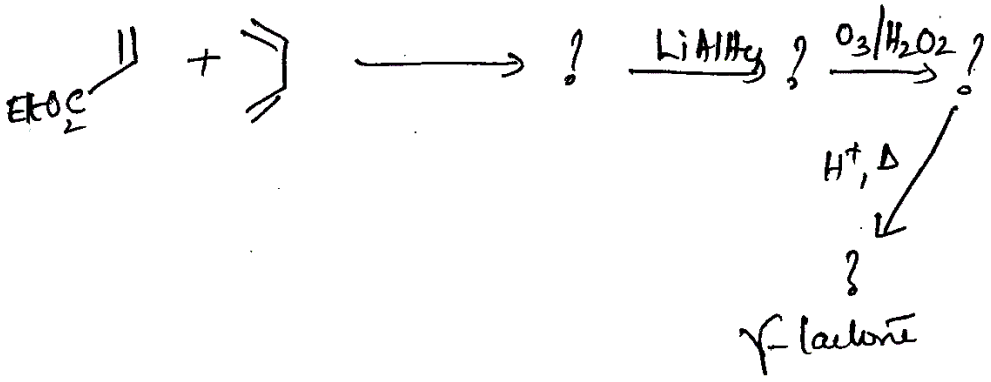


(ii) Complete the following retrosynthetic analysis.

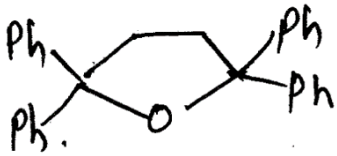


Using the above route, write a synthesis for the target.

(iii) Complete the following synthesis.



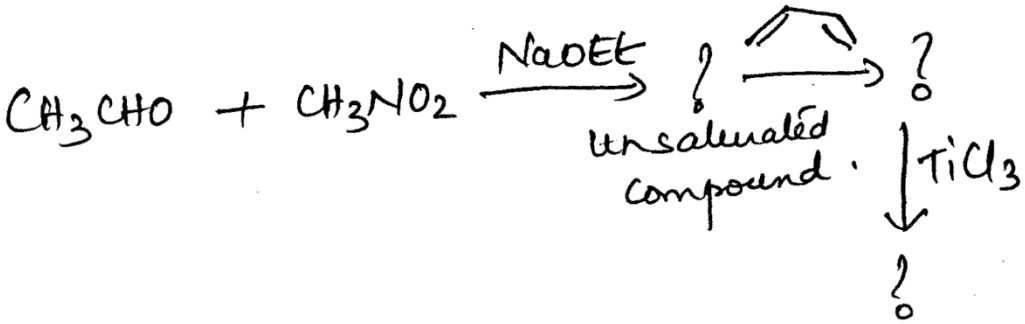
(iv) Using symmetry in the molecule identify the starting materials.



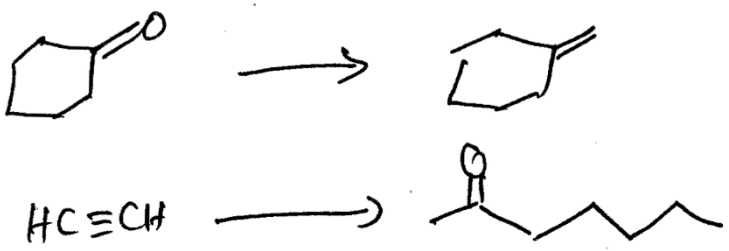
Write synthesis using the starting materials identified.

(b) Attempt any **one** of the following **4**

(i) Complete the following

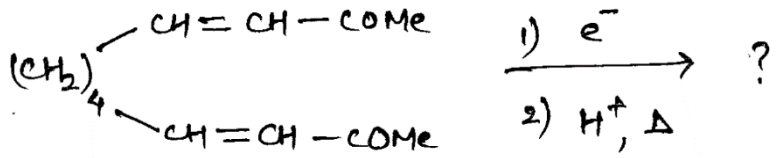


(ii) How will you convert

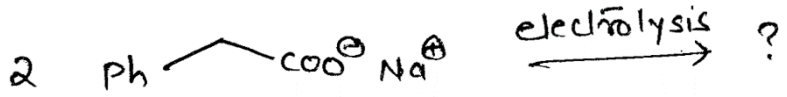


3.(a) Attempt any **two** of the following **8**

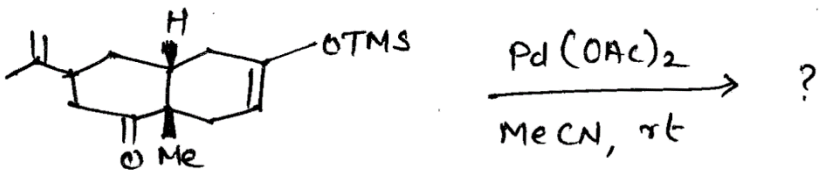
(i) Give name, product and mechanism of the following reaction



(ii) Give name, product and mechanism of the following reaction



(iii) Following reaction is a part of Danishefsky's synthesis of peribysins (cell adhesion inhibitors). Give name, product and mechanism of the following reaction.



(iv) What are micelles ? How are they formed? Explain their role in organic synthesis with suitable examples.

(b) Attempt any **one** of the following **4**

(i) What are organocatalysts? Explain the use of L-Proline as organocatalyst with suitable examples.

(ii) Illustrate with one example each, use of $Sc(OTf)_3$ as water tolerant Lewis acid catalyst in

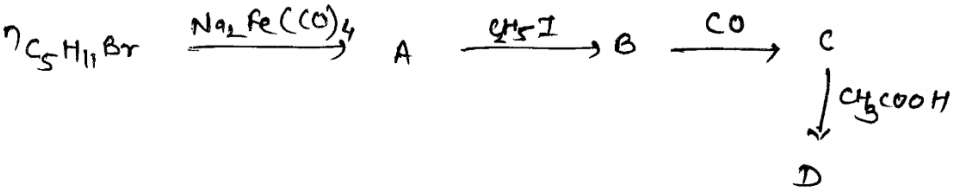
Diels – Alder reaction Aldol condensation

Michael reaction Fridal – Craft's reaction

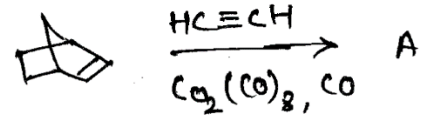
4.(a) Attempt any **two** of the following : **8**

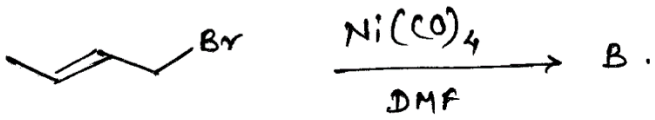
(i) Explain with suitable examples – migratory insertion and bonding in transition metal complexes.

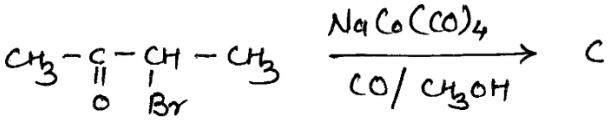
(ii) Identify A, B, C and D in the following reaction

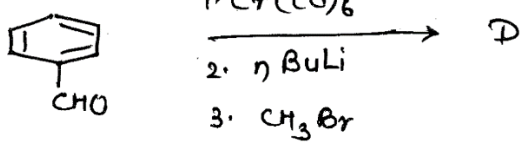


(iii) Complete the following reactions and identify A, B, C and D

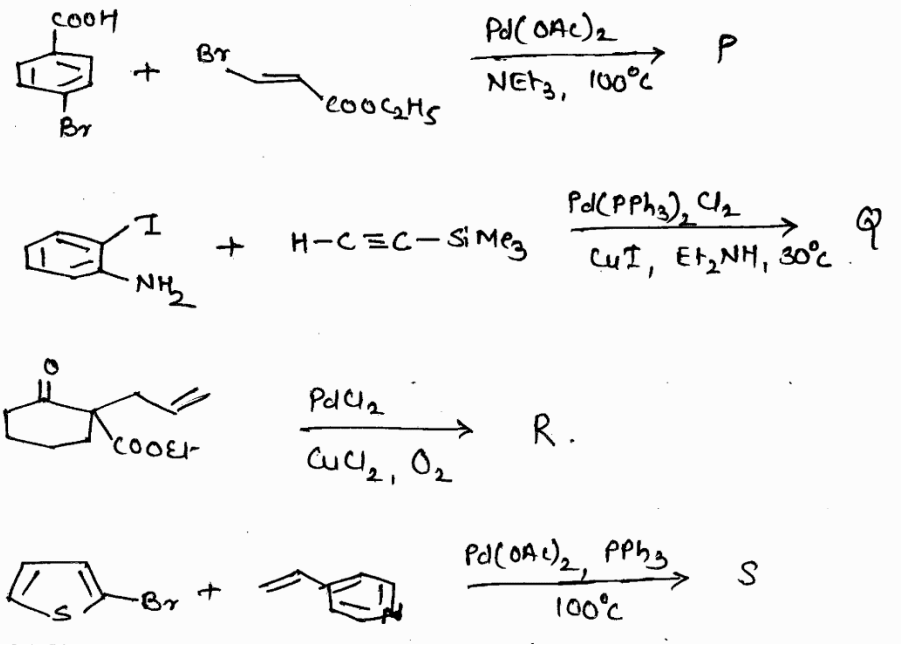






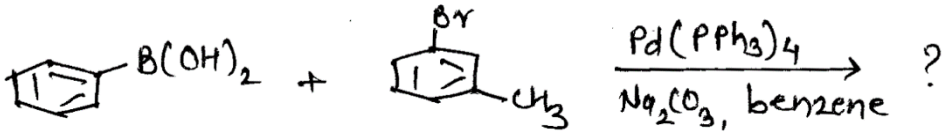


(iv) Identify P, Q, R and S in the following reactions.



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

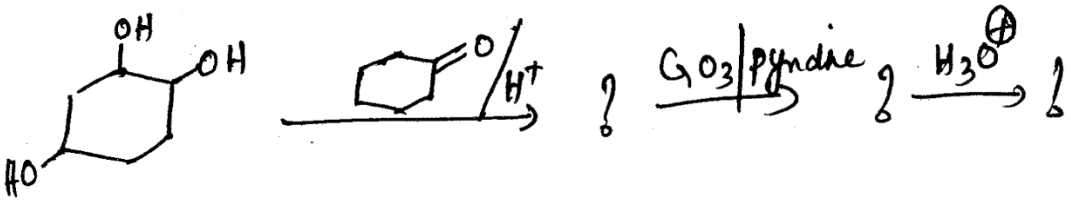
(i) Give name, product and mechanism of the following:



(ii) What is 18 – electron rule? Applying this determine the value of 'n' for $[Cr(CO)_n C_6H_6]$ and K $[Co(CO)_n]$. At 'no' of Cr = 24 and At . no. of 27.

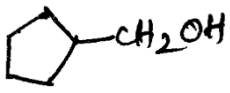
5. Attempt any **four** of the following:

(i) Complete the following synthesis.



(ii) Explain the term convergent synthesis with a suitable example.

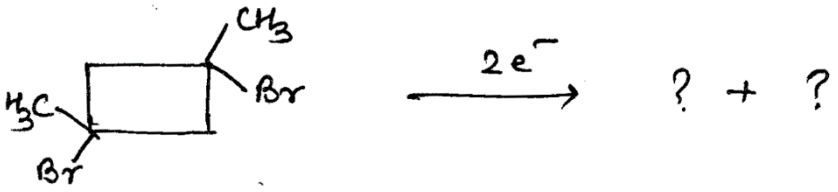
(iii) Suggest a retrosynthesis for



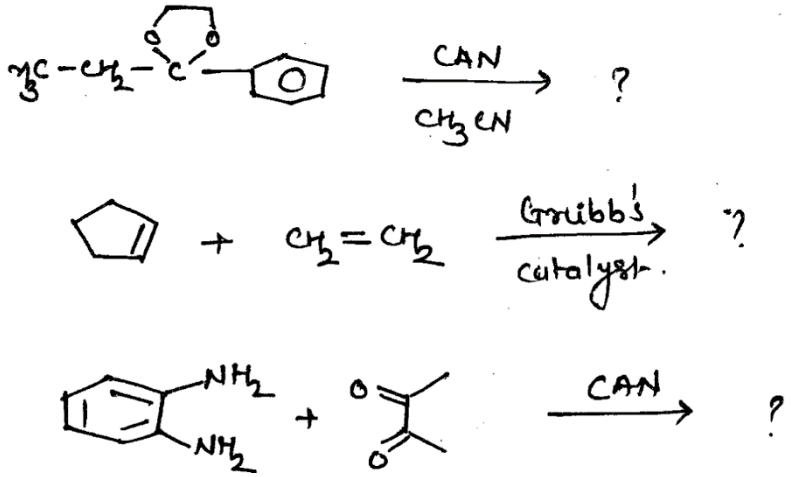
(iv) How will you convert

(v) Give brief account of applications of cryptands in organic synthesis.

(vi) Predict the product



(vii) Complete the following reactions.



(viii) What is action of SmI_2 on nitro compounds, aldehydes and halides?
