

# Haldia Government College

PG Semester 2 Examination 2020

Semester: 2 Stream: M.Sc.

Subject: Organic Chemistry

Paper: CEM -202

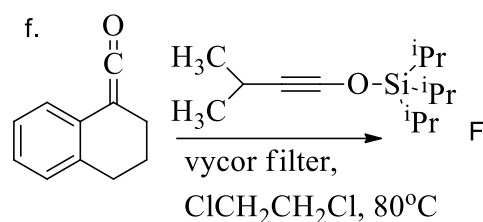
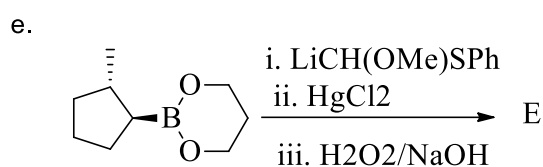
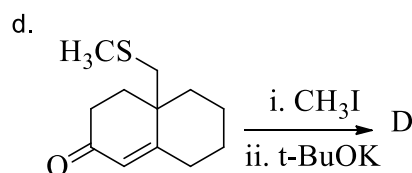
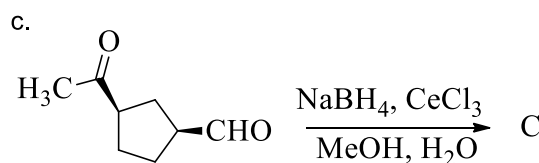
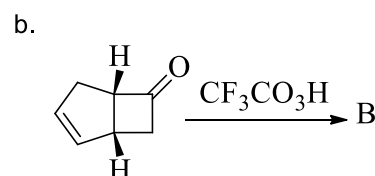
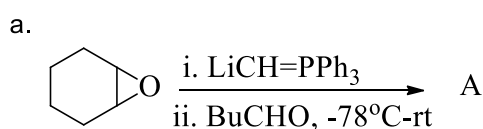
Full Marks:20

Time:1 hr.

E-mail id for answer script submission: [hgcchemistry2020@gmail.com](mailto:hgcchemistry2020@gmail.com)

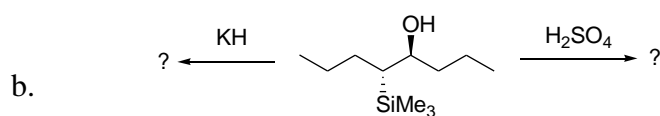
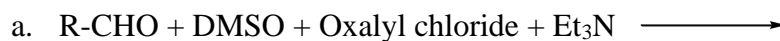
Answer any one

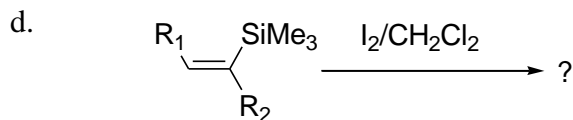
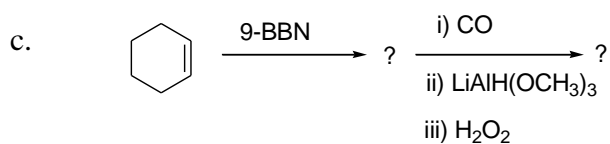
1. i) Predict the products of the following reaction and give plausible mechanism (any four). 4 x 2.5 = 10



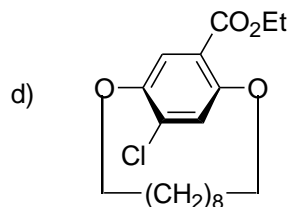
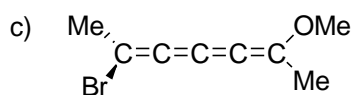
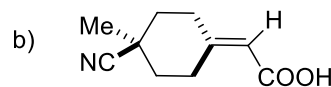
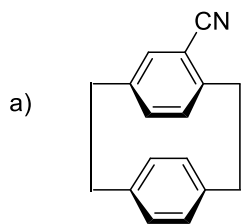
- ii) Predict the products of the following reaction and give plausible mechanism.

4 x 2.5 = 10

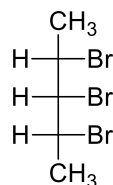




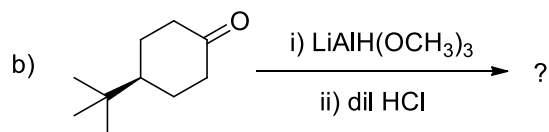
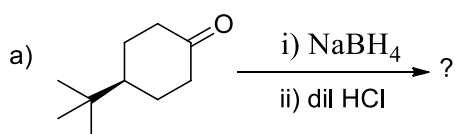
2. a. Find out the Absolute configuration (R/S) of the following compounds based on the axial chirality/chiral plane.



- b. Comment on the chirotopicity and stereogenicity of the chiral carbon of the following compound.



- c. Explain mechanistically.



- d. Explain—why trans 4-*t*-butylcyclohexyltosylate undergoes bimolecular elimination reaction with Br<sup>-</sup> rather than with strong base EtO<sup>-</sup> ion.  
 e. A molecule may have a chirotopic but stereogenic centre. Explain with an example.  
 f. What happens when cyclohexene was treated with Iodine, PhCO<sub>2</sub>Ag in presence of acetic acid in dry and wet condition separately?

4+3+4+3+3+3

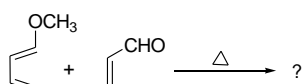
3. a. With the help of perturbation theory show that thermally  $\pi^4s + \pi^2s$  is allowed cycloaddition reaction whereas  $\pi^2s + \pi^2s$  is forbidden.

For butadiene;

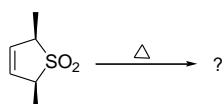
$$\psi_{\text{HOMO}} = 0.61\phi_1 + 0.37\phi_2 - 0.37\phi_3 - 0.61\phi_4 \quad \text{and} \quad \psi_{\text{LUMO}} = 0.61\phi_1 - 0.37\phi_2 - 0.37\phi_3 + 0.61\phi_4$$

For ethylene;  $\psi_{\text{HOMO}} = 0.71\phi_1 + 0.71\phi_2$  and  $\psi_{\text{LUMO}} = 0.71\phi_1 - 0.71\phi_2$

- b. With the help of perturbation theory show the regioselective major product for the following reaction when the energy of HOMO and LUMO for butadiene system is -8.2 eV and +2.5 eV respectively and that for acryldehyde is -10.9 eV and 0 eV.



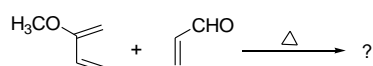
- c. What will be the product when the following substance is heated?



- d. With the help of perturbation theory state that whether the following thermal reaction will follow [6+4] cycloaddition or [6+2] cycloaddition reaction. (The required orbital co-efficients are provided below.)



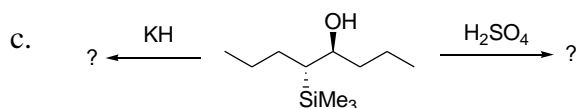
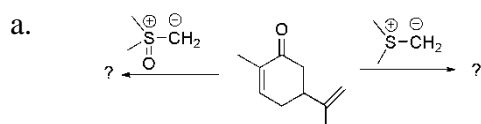
- e. With the help of perturbation theory show the regioselective major product for the following reaction when the energy of HOMO and LUMO for butadiene system is -9.3 eV and +0.3 eV respectively and that for acryldehyde is -10.9 eV and 0 eV.

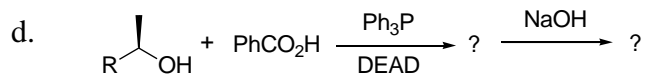


(5x 4 = 20)

4. i) Predict the products of the following reaction and give plausible mechanism.

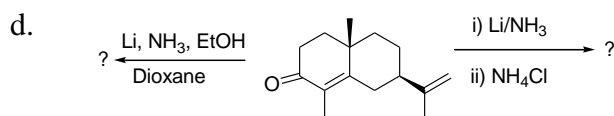
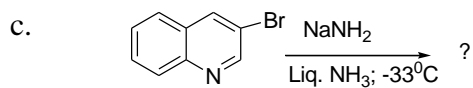
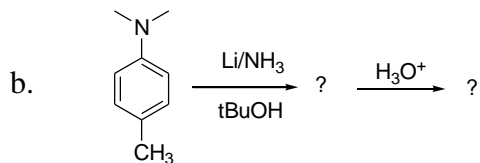
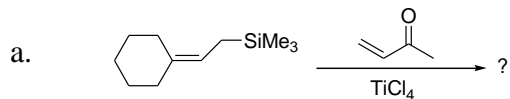
4 x 2.5 = 10





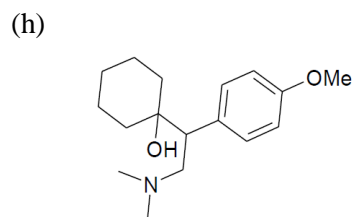
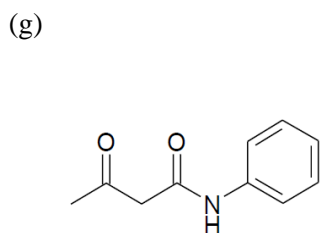
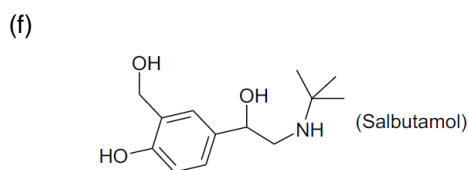
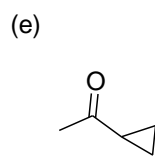
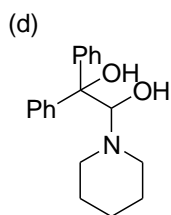
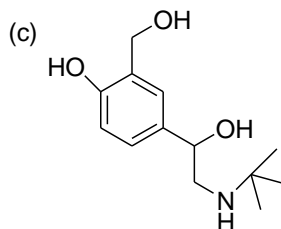
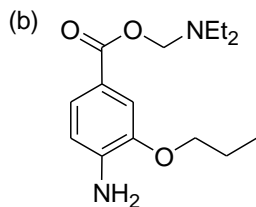
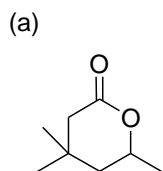
ii) Predict the products of the following reaction.

4 x 2.5 = 10



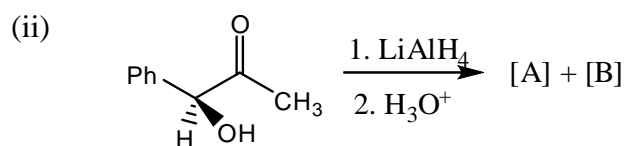
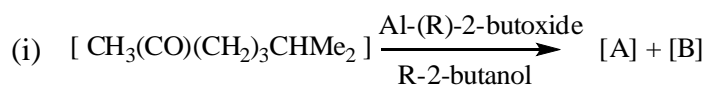
5. Suggest the synthetic pathway of these following compounds with a retro synthetic analysis. (Any five)

5 x 4=20

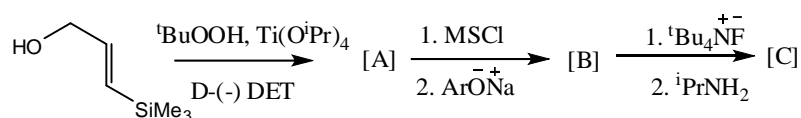


6. a. Define with example: Stereoselective and Stereospecific reaction.

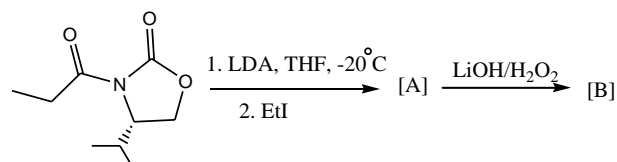
b. Write the structure of [A] and [B] and explain their formation



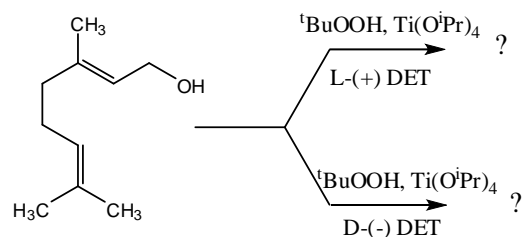
c. Identify the structures of [A], [B] and [C]



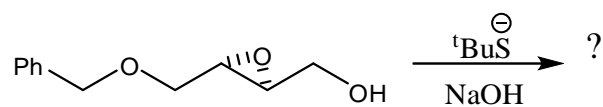
d. Complete the following transformation:



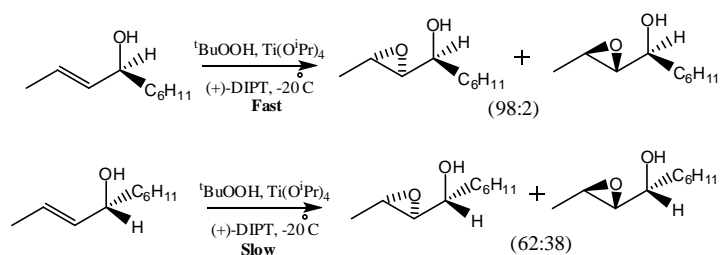
e. Predict the product (s) of the following reactions with plausible mechanism.



f. Write down the product of the following reaction with plausible mechanism.



g. Explain the following observation:



3+4+3+2+3+2+3