(3 Hours)

N.B.: 1. All questions are compulsory **Total Marks: 80**

2. Answer all sub questions together

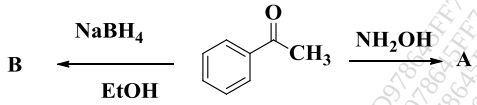
3. Figures to right indicate full marks

Q1 a. Match the following in terms of type of reaction involved. (04)

Sr. No	Name of the reaction	Sr. No.	Types of reaction
1.	Oxymercuration-Demercuration	a.	Nucleophilic substitution at C=O with loss of carbonyl oxygen
2.	Imine formation	b.	Electrophilic aromatic substitution reaction
3.	Friedel Craft acylation	c.	Electrophilic addition to alkene
4.	Cannizzaro reaction	d.	Nucleophilic addition to C=O

Q1b. Answer the following questions (Any Eight) (16)

1 Identify A and B for following reaction.



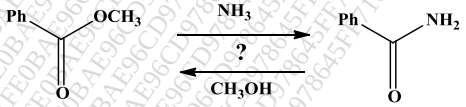
2 Write structure of tetrahedral intermediates formed for following reactions.
   i) Acetaldehyde with water
   ii) Acetyl chloride with hydroxyl ion

3 Identify whether following compounds are enolizable or non-enolizable when treated in presence of base.

4 Justify using suitable examples: acid or base catalyst increase rate of equilibrium of hemiacetals but does not shift position of equilibrium.

5 Predict the product for following molecule at specified reaction conditions

6. In the reaction given below, predict which of the following reaction is feasible?



7. Draw a picture depicting the HOMO and LUMO of formaldehyde.
8. Aldehydes are more reactive than ketones in nucleophilic addition reaction; account for the same.
9. Using phenol, suggest a suitable scheme for synthesis of 5-nitrosalicylaldehyde.

Q2 a. Give the mechanism for the following reactions (Any three): (06)

i) Kolbe reaction ii) Claissen condensation

iii) Mannich reaction iv) Cannizzaro reaction

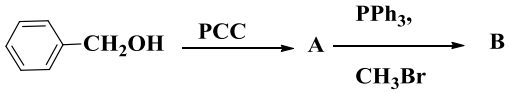
b Answer the following questions (06)

1. Identify product obtained when bromobenzene is treated with:

i) Conc. H_2SO_4 ii) NaOH at high temperature and pressure

2. o-Bromoanisole and m-bromoanisole yield m-anisidine by reaction with $NaNH_2$ and Liq. NH_3. Justify

3. Identify A and B from the following reaction



Q3 a. Compare the reactivity of amides and acid chlorides (04)

b. Suggest suitable reagents to obtain the following products and comment on stereochemistry of addition (04)

1) 2,3-Dibromobutane from 2-butene

2) 2-methylcyclopentanol from 1-methylcyclopentene

c. Attempt the following conversions (Any four): (04)

1) Acetaldehyde to 2-butenal 2) Benzene to p-nitrotoluene

3) 2-methyl-2-butene to 2-methyl-2-butanol 4) Phenol to 2-hydroxy benzaldehyde

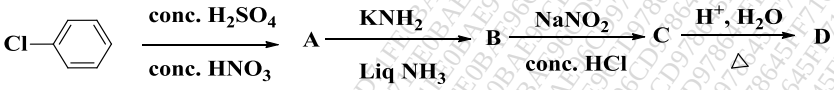
5) Acetophenone to phenylacetate

Q4 a. Using organomagnesium and organolithium compounds, suggest suitable schemes for synthesis of 2-Phenyl-2-butanol and n-Pentanol (04)

b. i) Give the mechanism for sulfonation of benzaldehyde (02)

ii) Indicate the position of nitration of 2-chloroaniline and designate whether the starting aromatic compound is activated or deactivated relative to benzene (02)

c. Identify A, B, C and D (04)



Q 5 a. Acid catalyzed hydrolysis of ester is reversible while base catalyzed is irreversible. Justify with mechanism. (04)

OR

a. Answer the questions pertaining to following reaction:

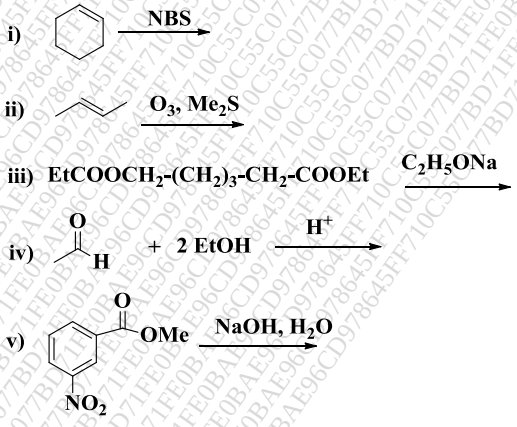
i) Predict the product of reaction.

ii) Write the type of reaction involved.

iii) Write in detail mechanism for the same.

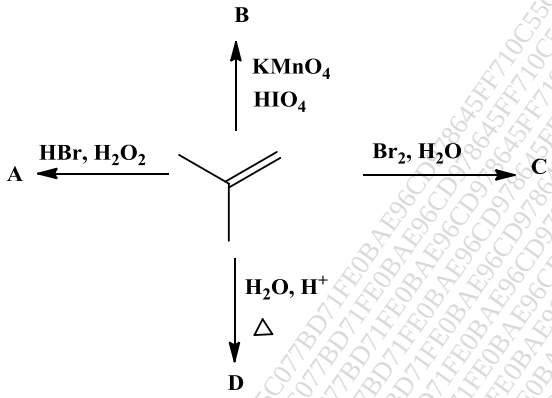
b. Compound A ($C_7H_5O_4N$) reacts with $POCl_3$ to give compound B ($C_7H_4O_3NCl$). Compound B is reduced with Sn/HCl to compound C (C_7H_6ONCl). Compound C on treatment with ammonia gives D ($C_7H_8ON_2$). Identify A, B, C and D. (04)

c. Give the products of the following reactions (Any four): (04)

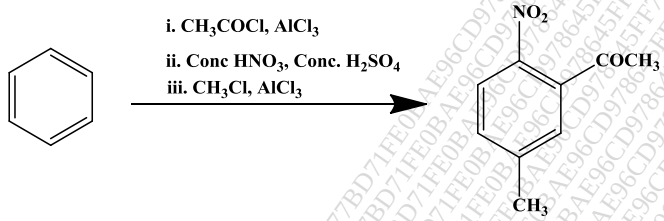


Q.6. a. Propose mechanisms for synthesis of *syn* and *anti* diol from 2-hexene using suitable reagents. (04)

b. Identify A, B, C and D (04)



c. Predict whether the said order of reaction conditions would yield the desired product. Suggest suitable modifications, if necessary: (04)



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