

(3 Hours)

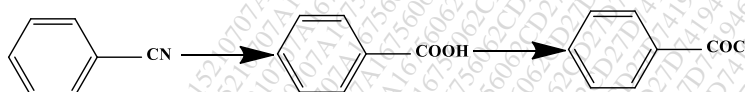
N.B.: 1. All questions are compulsory**Total Marks: 80****2. Answer all subquestions together****3. Figures to right indicate full marks**

Q1 a. Complete the given table stating the electronic effects of the following functional groups on the benzene nucleus (04)

Groups	Inductive effect	Resonance effect
-CHO		
-NH ₂		
-CONH ₂		
C ₆ H ₅ -		

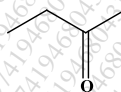
Q1b. Answer the following questions (Any Eight) (16)

1 Identify the reagents to be used for the following reactions:



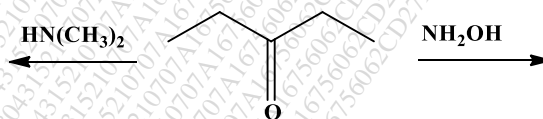
2 Depict the tetrahedral intermediate involved in the reaction between benzaldehyde with aniline and predict the product thus formed.

3 Give the tautomer of the given molecule. State which form is more stable.



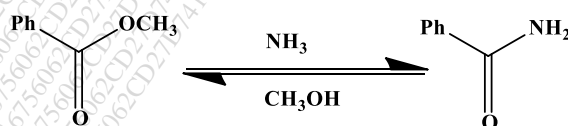
4 Justify using suitable examples: acetals can be hydrolysed in acid but are stable to bases.

5 Complete the following reactions:



6 Lower the pK_a of HX, better the leaving group ability of X⁻ in carbonyl substitution reactions. Justify using a suitable example.

7 In the reaction given below, predict whether the rates of the forward and backward reactions are the same:



8 Draw a picture depicting the HOMO and LUMO of formaldehyde

9 Equilibrium favours formation of aldehyde cyanohydrins than ketone cyanohydrins. Justify.

Q.2a. Give the mechanism for the following reactions (**Any three**): (06)

1. Kolbe's reaction
2. Cross Cannizzaro reaction
3. Baeyer Villiger oxidation
4. Mannich reaction
5. Transesterification

b Answer the following questions (06)

1. Give the product when chlorobenzene is treated with : (a). KNH_2 in liq. ammonia and (b). aq. NaOH at 340°C .
2. Identify which of the following molecules can undergo nucleophilic aromatic substitution reaction: 2,6-dimethylbromobenzene and bromobenzene. Justify your answer.
3. Identify A and B from the following reaction



Q.3 a Compare the reactivity of amides and acid chlorides (04)

b. Give the products for the following alkenes with the specified reagents (04)

Alkene	Br ₂ , H ₂ O	NBS, MeOH

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

1. Cyclohexanoyl chloride to N,N-dimethylcyclohexanamide
2. Ethyl methyl ketone to 3-Methylpentanol
3. Cyclohexene to hexanedial
4. 2-Methyl-2-pentene to acetone and propanoic acid
5. Acetanilide to p-bromoacetanilide

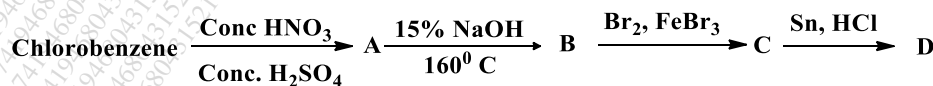
Q.4a: Suggest at least two methods for the preparation of each of the following using organometallic compounds (04)

- i. 2-Phenyl-2-propanol
- ii. 3-methyl-3-pentanol

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

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

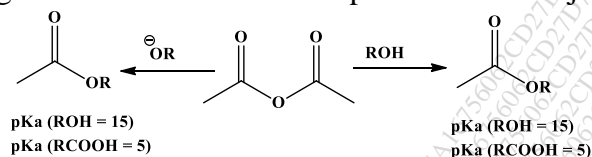
c. Identify A, B, C and D (04)



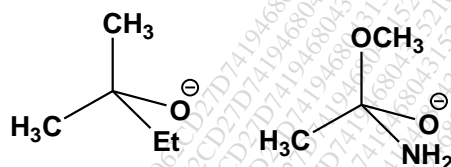
Q.5a. Give the mechanism for acid and base catalyzed hydrolysis of amides. (04)

OR

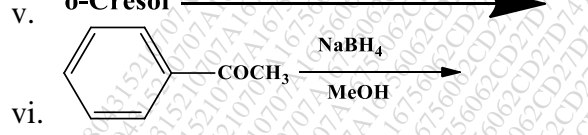
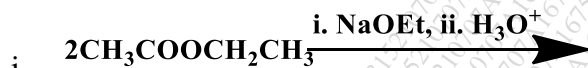
a. Predict which of the given reactions will be completed faster and justify. (04)



b. Predict whether the following intermediates proceed to give substitution or addition products. Justify your answer. (04)

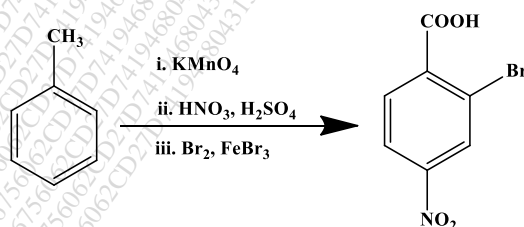


c. Give the products of the following reactions (Any four): (04)



Q.6. a. Give an account of addition of bromine to cis 2-Butene. Specify whether the reaction is stereospecific and/or stereoselective. (04)

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



c. Which of the following compounds would lead to the formation of an amide? (04)

