Q. P. Code: 38128

(3 Hours)

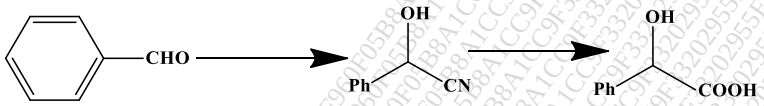
N.B.: 1. All questions are compulsory **Total Marks: 80**
2. Answer all subquestions together
3. Figures to right indicate full marks

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
$-COOCH_3$		
$-CH_3$		
-Cl		
$-NO_2$		

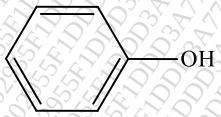
Q1b. Answer the following questions (Any Eight): (16)

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



2 Depict the tetrahedral intermediate involved in the reaction between acid halide with ethanol in presence of a base and predict the product formed.

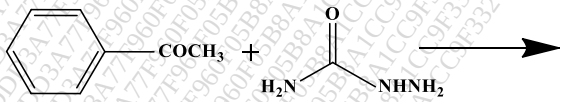
3 Give the tautomer of the given molecule. State which form is more stable.



4 Justify: Hemiacetal formation and decomposition is catalyzed by acid or base.

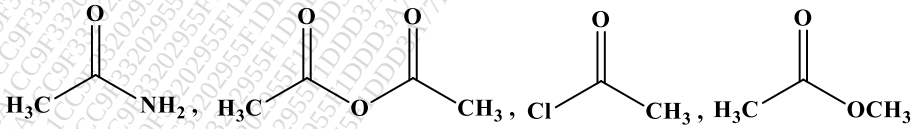
5 Complete the following reactions:

i. 

ii. 

6 Justify: Imines obtained from ammonia are less stable than imines obtained from hydroxylamine.

7 Arrange the following acid derivatives in increasing order of hydrolysis. Justify the same.



8 With the help of molecular orbitals, depict the addition of a nucleophile (eg. cyanide ion) to a carbonyl group.

9 Cyanohydrin formation is an equilibrium reaction. Justify

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

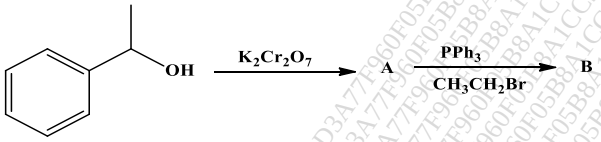
1. Cannizzaro reaction
2. Mannich reaction
3 Kolbe's reaction
4. Claisen condensation

b. Give the product when p-chloronitrobenzene is treated with: (02)

i. KNH_2 in liq. ammonia ii.15%. NaOH at 160°C.

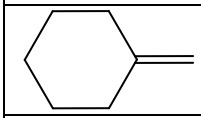
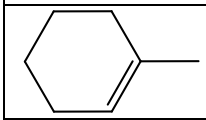
c. Identify which of the following molecules can undergo nucleophilic aromatic substitution reaction: Chlorobenzene or aniline. Justify your answer. (02)

d. Identify A and B from the following reaction: (02)



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

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

Alkene	1. $Hg(OAc)_2$, 2. H_2O, $NaBH_4$	1.NBS, 2. EtOH
		
		

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

1. Acetophenone to 2-Phenyl-2-butanol
2. 2-Methylpropanoyl chloride to 2-Methylpropanramide
3. 2-Aminobenzoic acid to salicylic acid
4. 2-Methyl-2-butene to ethanoic acid and acetone
5. Toluene to p-toluene sulfonic acid

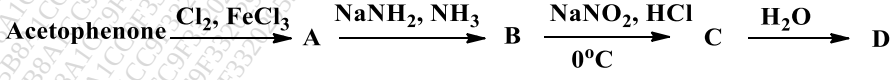
Q.4a: Suggest at least two methods using organometallic compounds for the preparation of each of the following alcohols: (04)

i. 3-Methyl-3-hexanol ii. 1,1-diphenyl-1-ethanol

b i. Give the mechanism for chlorination of toluene. (02)

ii. What is the product obtained in a reaction between acetyl chloride and m-xylene (1,3-dimethylbenzene). Indicate whether the starting aromatic compound is activated or deactivated relative to benzene (02)

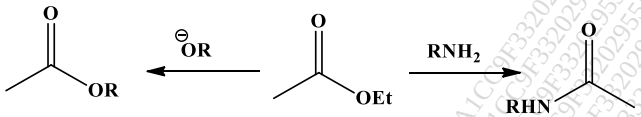
c. Identify A, B, C and D (04)



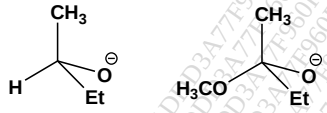
Q5a. Give the mechanism for acid catalyzed hydrolysis of amides and esters. (04)

OR

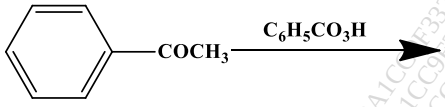
Q.5 a. Predict which of the given reactions will be completed faster and justify. (04)

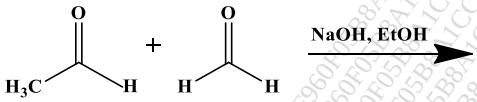


b. Predict whether the following intermediates proceed to give substitution or addition products. Justify your answer. (04)

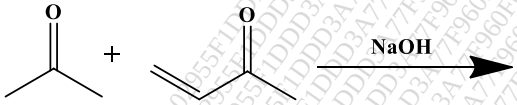


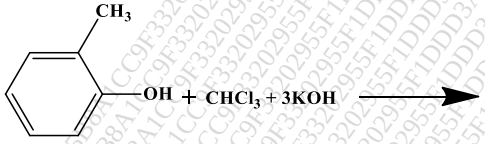
c. Give the products of the following reactions (Any four): (04)

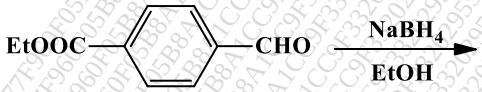
i. 

ii. 

iii. 

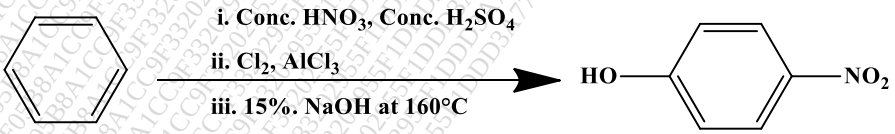
iv. 

v. 

vi. 

Q6 a. Addition of bromine to isomers of 2-Butene is both, stereospecific as well as stereoselective. Justify this statement by giving the mechanism of the above reaction. (04)

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



c. Why is 1,3-Pentadiene is more stable than 1,4- Pentadiene. What is the product obtained on addition of HBr to1,3-Pentadiene? (04)

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