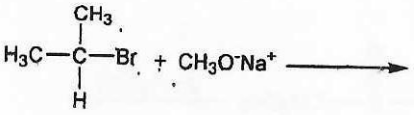
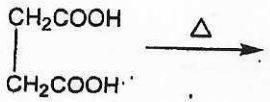
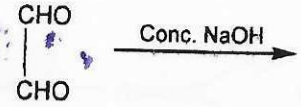
(xiii) 

(xiv) 

(xv)  (15)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1401 **C**

Unique Paper Code : 32171302

Name of the Paper : Organic Chemistry – II (Oxygen Containing Functional Groups)

Name of the Course : **B.Sc. (H) Chemistry**

Semester : III

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

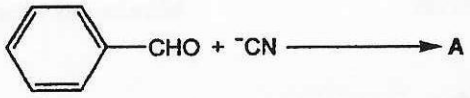
1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.

1. (a) An organic compound A ($C_5H_{10}O_2$) on reduction with lithium aluminium hydride ($LiAlH_4$) forms organic compounds B (C_3H_8O) and C (C_2H_6O). B on oxidation followed by heating with calcium oxide gives D ($C_5H_{10}O$). C on reaction with NaOH/

P.T.O.

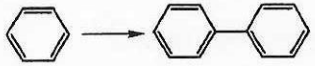
b forms E and a yellow precipitate of CHI_3. Identify the organic compounds A, B, C, D and E. Give the name reaction involved during the conversion of C to E along with mechanism.

(b) Identify A having molecular formula ($C_{14}H_{12}O_2$) in the following reaction. Give the name of the reaction and mechanism involved. Write down the role of cyanide ion in the following reaction :



(9,6)

2. (a) Carry out the following conversions **(any three)** :

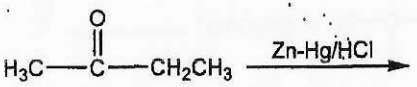
(i) 

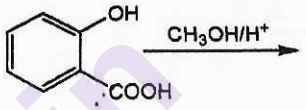
(ii) Propanal → Propan-2-ol.

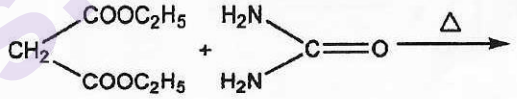
(iii) Ethane nitrile → Butan-2-one.

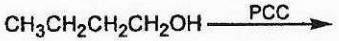
(iv) Ethanal → Butane.

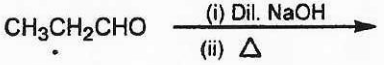
(b) Identify A and B in the following reaction and justify your answer :

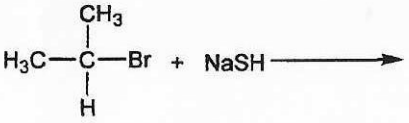
(vi) 

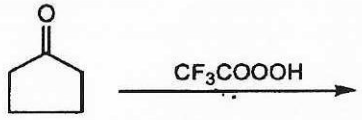
(vii) 

(viii) 

(ix) 

(x) 

(xi) 

(xii) 

P.T.O.

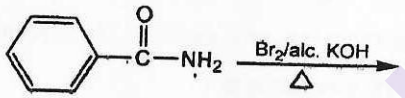
(c) (i) Write down the products obtained on heating α, β and γ-hydroxycarboxylic acid separately.

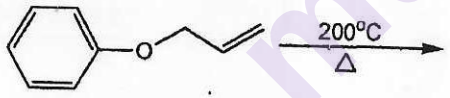
(ii) Tertiary alkyl halides are not good substrates for nucleophilic substitution reactions. Explain.

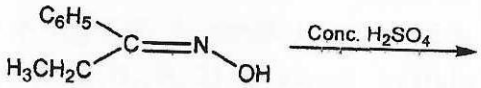
(iii) *p*-Chlorotoluene on reaction with $NaNH_2$ in liq. NH_3 forms *m*-toluidine along with *p*-toluidine. Explain. (4,2,3,3,3)

6. Complete the following reactions :

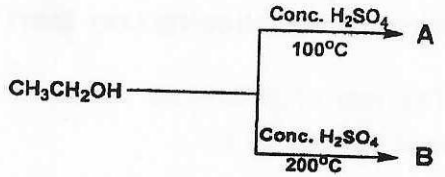
(i) $CH_3CH_2COOH \xrightarrow{Cl_2/Red\ P}$

(ii) 

(iii) 

(iv) 

(v) $PhCHO + CH_3COCH_2COOEt \xrightarrow{Na^+{}^-OC_2H_5}$



(9,6)

3. (a) Carry out the synthesis of any three following compounds either from EAA (Ethyl acetoacetate) or DEM (Diethyl malonate) :

(i) Methylsuccinic acid

(ii) 4-Oxopentanoic acid

(iii) Crotonic acid

(iv) Antipyrine

(b) Differentiate between the following (give visible test only) and write down the reaction involved **(any three)** :

(i) Acetaldehyde and acetophenone

(ii) Ethanol and propan-2-ol

(iii) Benzoic acid and *p*-cresol

(iv) Ethylchloride and chlorobenzene (9,6)

P.T.O.

4. (a) Give reason for the following **(any four)** :

(i) The rate of hydrolysis of the carboxylic acid derivatives is:

$CH_3COCl > (CH_3CO)_2O > CH_3CONH_2$

(ii) S_N1 reactions are accompanied by racemization, while S_N2 reactions result in the inversion of the configuration.

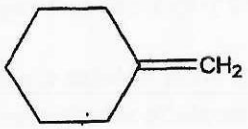
(iii) 2,2-Dimethylpropanal gives Cannizzzaro's reaction, while 2-methylpropanal does not.

(iv) Carboxylic acid does not form oxime though they have carbonyl group (>C=0) in their structure.

(v) Malonic acid and β-keto carboxylic acid decarboxlate readily on heating 200°C.

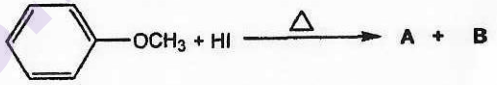
(vi) Ketones cannot be prepared from acid chloride and RMgX although they can be prepared from acid chloride and R_2Cd/ R_2CuLi.

(b) Prepare the following organic compound using Wittig reaction :



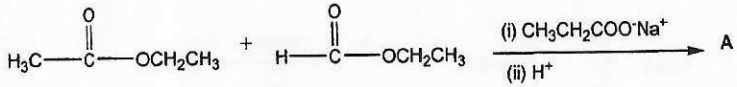
(12,3)

5. (a) Identify the organic compounds (A, B) and explain their formation with the help of mechanism.



OR

Identify the organic compound (A) formed in the following reaction and explain its formation with the help of mechanism.



(b) Benzene on reaction with propene in the presence of a Lewis acid forms A (C_9H_{12}). A on aerial oxidation forms B ($C_9H_{12}O_2$). B on acidic hydrolysis gives C (C_6H_6O) and D (C_3H_6O). Identify the organic compounds A, B, C and D.

P.T.O.