[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2050 **L**

Unique Paper Code : 2172011202

Name of the Paper : DSC – Haloalkanes, Arenes, Haloarenes, Alcohols, Phenols, Ethers and Epoxides

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

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. Each question carries **15** marks.

Q.1 Answer the following *(any* five):

(a) Explain why Friedel Crafts alkylation of benzene with *n*-propyl chloride and $AlCl_3$ does not yield *n*-propyl benzene? What modification can accomplish the reaction?

(b) Out of *ortho*-nitrophenol and *para*-nitrophenol which one is more acidic and why?

(c) Write the product(s) obtained upon oxidation of propylene glycol with periodic acid.

(d) Starting with (*S*) 2-Bromobutane outline the synthesis (*R*) 2-ethoxybutane.

(e) Explain the Kolbe-Schmidt reaction with mechanism.

(f) Why haloalkanes undergo nucleophilic substitution reactions readily but alcohols undergo nucleophilic substitution in presence of strong acid as catalyst?

(3 X 5= 15)

P.T.O.

Q2 (a) For the reaction of 1-bromobutane with potassium tert-butoxide, predict whether S_N2 or E2 dominates. Justify your answer.

(b) What happens when phenol reacts with chloroform in the presence of sodium hydroxide? Name the reaction and give the mechanism involved.

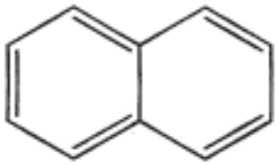
(c) Substitution nucleophilic unimolecular proceeds with racemization along with some net inversion. Justify the statement.

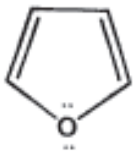
(5 x 3=15)

Q3. (a) *o*-Chlorotoluene reacts with potassium amide in liquid ammonia to yield a mixture of *o*-toluidine and *m*-toluidine. Explain giving mechanism.

(b) Explain why nucleophilic substitution in aryl halides do not follow S_N1 or S_N2 mechanism.

(c) Classify each of the following as aromatic, anti-aromatic and non-aromatic:




(5 x 3=15)

Q4. (a) Explain substitution nucleophilic internal (S_Ni) mechanism with a suitable example.

(b) Explain why halogens in aryl halides are ortho/para director but weak deactivator towards electrophilic substitution reactions.

(c) Choose the correct option:

(i) Primary alkyl halide in the presence of polar aprotic solvent and strong base would ideally undergo substitution nucleophilic_____(unimolecular / bimolecular/ intramolecular/ aromatic).

(ii) Grignard reagents will react with CO_2 to give_____(aldehyde/ ketone/ carboxylic acid/ alcohol).

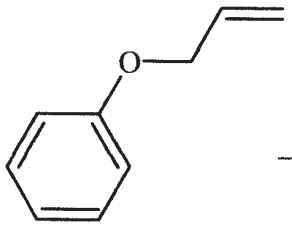
(iii) The least reactive towards an S_N1 reaction would be_____(benzyl chloride/ chlorobenzene/ *t*-butyl chloride/ allyl chloride).

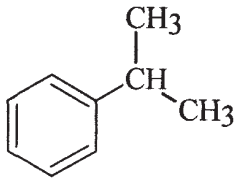
(iv) Primary, secondary and tertiary alcohols can be distinguished by_____(Ferric chloride test/ Lucas test/ Tollen's test)

(v) Pyridine is_____(aromatic with 6π electrons/ anti-aromatic with 8π electrons/ aromatic with 8π electrons/ non-aromatic 8π electrons)

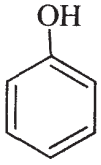
(5 x 3=15)

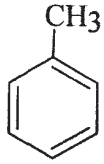
Q5. Complete the following reactions:

(i)  $\xrightarrow{200°C}$ **A**

(ii)  $\xrightarrow[(ii)\ H^+/H_2O]{(i)\ O_2}$ **B + C**

(iii) $CH_3-Mg-Br + CH_3C{\equiv}N \longrightarrow$ **D** $\xrightarrow{H_3O^+}$ **E**

(iv)  $\xrightarrow[NaOH]{C_6H_5COCl}$ **F**

(v)  $\xrightarrow{Na_2Cr_2O_7 / H^+}$ **G** $\xrightarrow{HNO_3 / H_2SO_4}$ **H**

(vi) $CH_3CH_2OH \xrightarrow[CH_2Cl_2]{PCC}$ **I**

(vii)  $\xrightarrow[H^+ / H_2O]{CH_3MgI}$ **J**

(1.5 x 10 =15)

Q6. Write short notes on (*any three*):

(i) Houben Hoesch Reaction

(ii) Pinacol-Pinacolone rearrangement

(iii) Fischer's Esterification

(iv) Fries Rearrangement (5 x 3=15)