INTER B. SC. EXAMINATION, 2017

(1st Semester)

CHEMISTRY (HONOURS)

ORGANIC CHEMISTRY

PAPER - VI

Time : Two hours Full Marks : 50

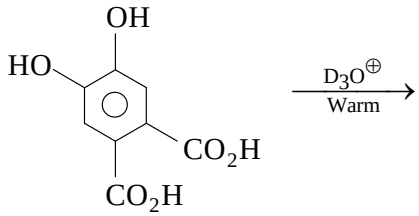
25 marks for each group

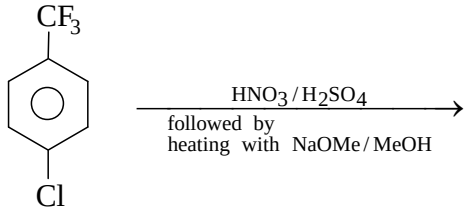
Use a separate answerscript for each group.

GROUP - A

1. a) Draw the energy profile diagram for the following reaction and justify your answer.
   Cycloheptatriene $\xrightarrow{\text{Base}}$ Cycloheptatrienyl anion 2
   b) "Benzyl chloride is about 100 times as reactive as ethyl chloride in S_N2 displacement reaction" – Justify the statement with appropriate TS. $2\frac{1}{2}$
   c) Write down the structure of a compound which is isomeric to naphthalene but has colour and high dipole moment – Justify. $1\frac{1}{2}$
   d) How would you prepare thiophene - free benzene in the laboratory ? Comment on the chemistry involved in the process. 2
   e) Predict the product in the following reactions $1\frac{1}{2}\times2$

   i)



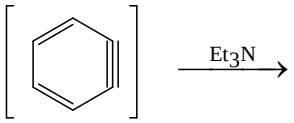
ii) 

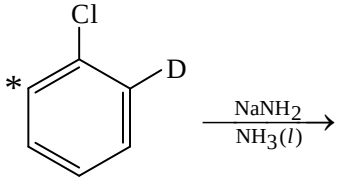
f) How would you synthesise the following two compounds from a suitable monosubstituted benzene derivative ?

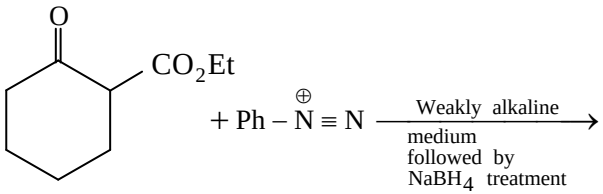
i) 2, 4, 6 – Trimethylnitrobenzene 2×2

ii) 2, 4, 6 – Tribromobenzaldehyde

g) Mechanistically predict the product(s) of the following reactions : 2×3

i) 

ii) 

iii) 

d) Starting from diethyl malonate (DEM) or ethyl aceto-acetate (EAA) and using other useful reagents synthesise the following compounds ***(any two)*** : 2×2

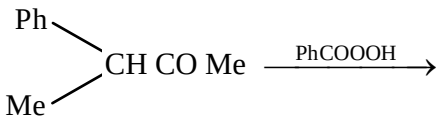
i) C_2H_5 $\underset{\underset{CH_3}{|}}{CH}$ – $COOC_2H_5$

ii) CH_3 CO CH_2 $COCH_3$

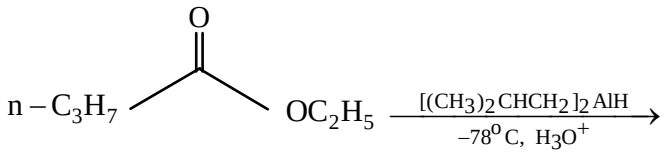
iii) CH_2 COOH
|
CH COOH
|
CH_2 COOH

4. a) Butan-2-one behaves differently towards bromination reaction under acidic and basic medium. Explain why ? 2

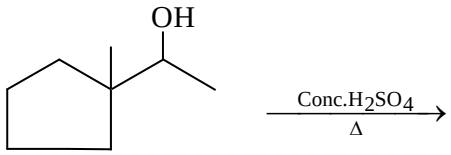
b) Predict the product in the following reaction and explain with mechanism. 2



c) Acetone in dilute aqueous solution is 100 per cent unhydrated. When acetone is dissolved in water enriched with ^{18}O, recovered acetone contains ^{18}O. Explain. 1

d) 

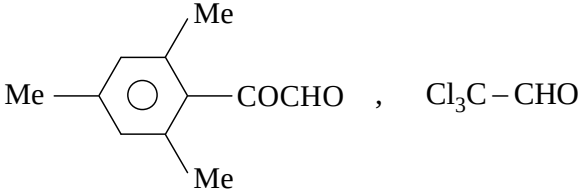
e) $C_2H_5COCH_3 \xrightarrow[HCl]{C_2H_5ONO}$

f) 

g) $(CH_3)_3C-O-Me \xrightarrow{MeCOCl,\ Anhy.AlCl_3}$

h) $C_2H_5COCH_2Br \xrightarrow[NaOH/EtOH]{Pyridine}$

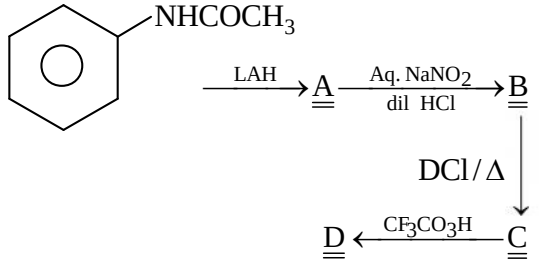
3. a) Explain why the following aldehydes with no α-hydrogen atom do not undergo the Cannizzaro reaction : 2



b) Which one is the reagent of choice for the preparation of acid chloride from carboxylic acids - PCl_5 or $SOCl_2$? Give reason for your answer. 2

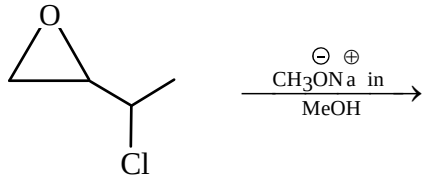
c) A solution of Ph_3C-COOH in conc. H_2SO_4 gives $MeOCPh_3$ when poured into methanol. Discuss the mechanism of this reaction. 2

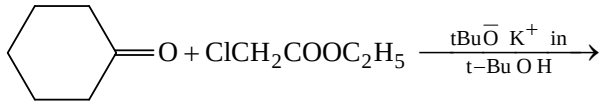
h) Identify the compounds $(\underline{\underline{A}} - \underline{\underline{D}})$ in the following reactions : 1×4



GROUP - B

2. Predict the product(s) in the following reactions and explain with plausible mechanism. ***(any five)*** : 2×5

a) 

b) 

c)