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Your Roll No.....

5775

B.Sc. (H) CHEMISTRY/III Sem. B

Paper—CHHT-306 : Organic Chemistry—II

(Admission of 2010 and onwards)

Time : 3 *Hours* *Maximum Marks* : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer any *five* questions.

All questions carry equal marks.

1. An unsaturated hydrocarbon **A** (C_6H_{12}) on ozonolysis gave two compounds **B** and **C**. The compound **B** gave a positive Fehling's solution test and negative iodoform test. The compound **C** gave negative Fehling's solution test and positive iodoform test. Compound **B** on reaction with dilute alkali solution followed by heating gave a compound **D**.

P.T.O.

Compound **A** was obtained back when **D** was treated with zinc amalgam in presence of hydrochloric acid. Identify **A**, **B**, **C** and **D** explaining the reactions involved. Name the reaction by which **B** is converted into **D** and write the mechanism of this reaction. 15

2. Explain the following :

(*a*) Vinyl chloride is less reactive than ethyl chloride towards nucleophilic substitution reactions.

(*b*) Compound I undergoes nucleophilic addition reaction at a faster than that in case of compound II :

I, X = Cl

II, X = CH_3

(*c*) S_Ni type of reactions normally proceed with retention of configuration.

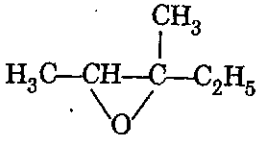
(*d*) The rate in S_N2 reaction increases with the increasing polarity of solvent.

(*e*) Carboxylic acids do not form oxime, though they have a  group. 3×5=15

3. (*a*) How do you explain the formation of *m*-toluidine along with *p*-toluidine on reaction of *p*-chlorotoluene with potassium amide in liquid ammonia ?

(*b*) What products are formed when calcium salts of various dicarboxylic acids are heated ?

(*c*) Write the reaction sequence involved in the ring opening of :

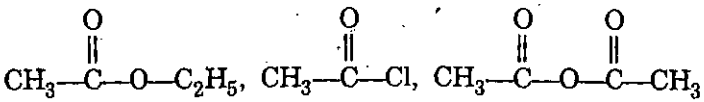


with methanol in presence of acid. Also explain the formatin of different products on reaction with sodium methoide.

(*d*) Writ a method to synthesise citric acid using reformatski reaction. 4+4+4+3=15

4. (*a*) What happens when 2-bromopentane is treated with alcoholic KOH ? Name the rule which governs the formation of major product.

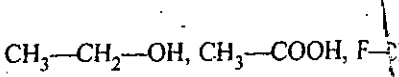
(*b*) Giving reasons, arrange the following in order of preference to be used as acetylating agent :



(*c*) Write the most common mechanism for acid catalysed ester hydrolysis.

(*d*) Write a test to distinguish between propan-2-ol and 2-methylpropan-2-ol.

(*e*) Arrange the following compounds in increasing order of their acidity. Give reasons for your answer :



3×5=15

5. (*a*) How will you carry out the synthesis of any *three* of the following from ethyl acetoacetate or malonic ester ?

(*i*) Pentan-1, 5-dioic acid

(*ii*) 5-Ethylbarbituric acid

(*iii*) 3-Methylbutan-2-one

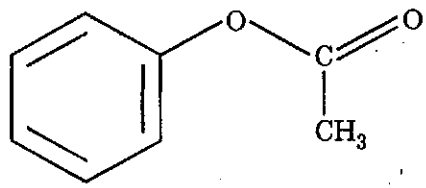
(*iv*) Cinnamic acid.

(*b*) What products are formed when anisole is heated with HI ? Explain with the help of mechanism.

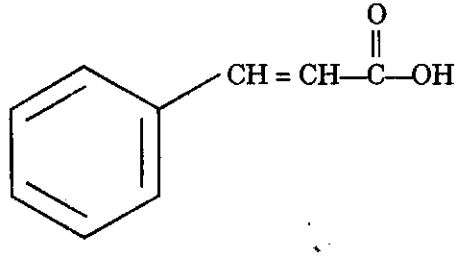
(*c*) How does a Grignard reagent react with an ester ? Explain with the help of an example. 9+3+3=15

6. (*a*) Complete the following reactions :

(*i*) $CH_3-\overset{\overset{O}{\|}}{C}-O-C_2H_5 \xrightarrow{C_2H_5ONa} ?$

(*ii*) 

$$\xrightarrow[\Delta]{\text{Anhydrous } AlCl_3} ?$$

(*iii*) 

$$+ HCl \longrightarrow ?$$

(*iv*) $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—\overset{\displaystyle O}{\overset{\|}{C}}—OH \xrightarrow{\Delta} ?$

(*v*) $C_2H_5—S—C_2H_5 + H_2O_2 \longrightarrow ?$

(*vi*) $\begin{matrix} CH_2—OH \\ | \\ CH_2—OH \end{matrix} \xrightarrow{HIO_4} ?$

(*b*) How do you explain the formation of 2, 3-dimethylbutan-2-ol from 3, 3-dimethyl-but-1-ene on addition of water in acidic medium ? 12+3=15

7. Write short notes on any *three* of the following. Give emphasis to :

(*i*) the functional groups which undergo these reactions,

(*ii*) products formed,

(*iii*) reaction conditions and

(*iv*) the mechanism involved.

(*a*) Benzil-benzilic acid rearrangement

(*b*) Reimer-Tiemann reaction

(*c*) Hofmann bromamide degradation

(*d*) Wittig reaction. 5×3=15