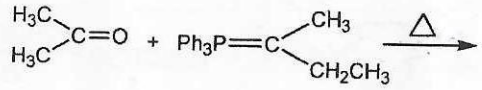
(xv) 

Mostly 02/01/2024

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4396 **G**

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 any **five** questions.

1. (a) An organic compound **A** (C_4H_8O) reacts with hydroxylamine in the presence of an acid to give two isomeric compounds **B** and **C** with molecular formula (C_4H_9NO). **B** reacts with *m*-

chloroperbenzoic acid and gives organic compound **D** (C_4H_9NO). **D** on hydrolysis gives acetic acid and ethanamine. **C** reacts with *m*-chloroperbenzoic acid to give organic compound **E** (C_4H_9NO). **E** on hydrolysis gives propanoic acid and methanamine. Identify the organic compounds **A, B, C, D** and **E.** Give the name reaction involved along with mechanism (**B** to **D**).

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

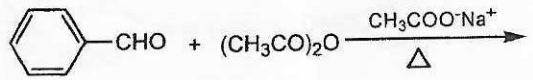
(i) Methanol and ethanol

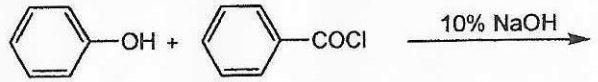
(ii) Benzoic acid and benzyl alcohol

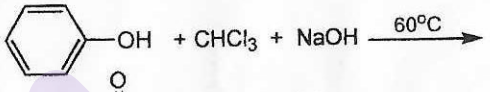
(iii) Benzaldehyde and propanal

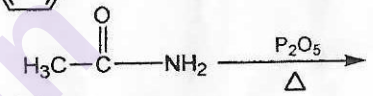
(iv) Formic acid and benzoic acid (9,6)

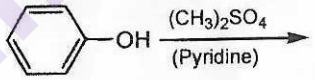
2. (a) Identify organic compound A ($C_4H_{10}O_2$) which reacts with sodium metal to evolve one mole of hydrogen gas and on reaction with lead tetraacetate gives methanal and propanal. Write down the structure of the organic compound A ($C_4H_{10}O_2$) along with both the reactions involved.

(iii) 

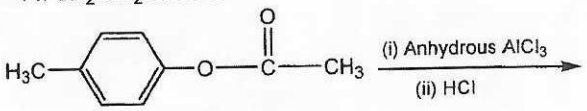
(iv) 

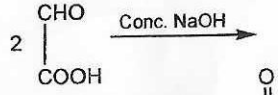
(v) 

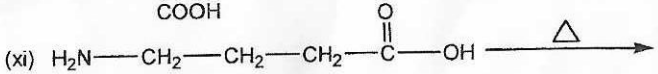
(vi) 

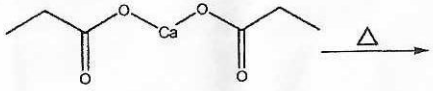
(vii) 

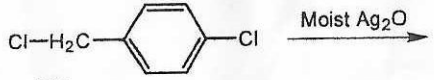
(viii) 

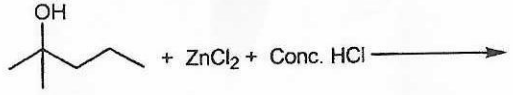
(ix) 

(x) 

(xi) 

(xii) 

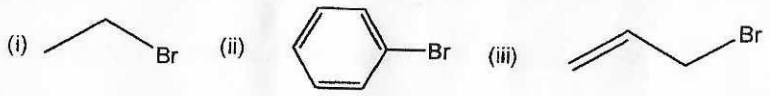
(xiii) 

(xiv) 

(iii) Barbituric acid (Malonyl urea)

(iv) Hexane-2,5-dione

(b) Arrange the following compounds in decreasing order of reactivity towards nucleophilic substitution reaction with suitable explanation :

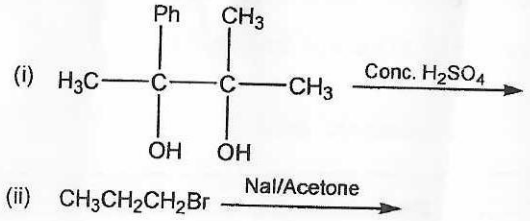


OR

Explain why benzyne have a shorter life-time.

(c) Why enol form of acetylacetone is more stable than that of acetone. (3,3,3,3,3)

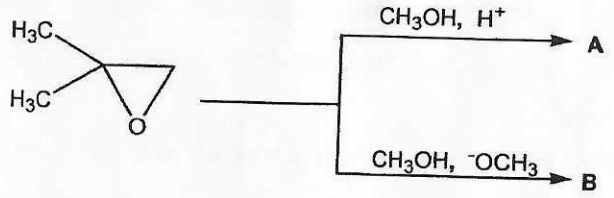
6. Complete the following reactions : (15)



(b) What happens when malonic acid, succinic acid and adipic acid are heated at 200°C separately?

(c) Why *o*-bromoanisole and *m*-bromoanisole give the same product on reaction with $NaNH_2$ in NH_3 (*l*) at high temperature? Explain giving mechanism.

(d) Identify A and B and justify your answer with the help of mechanism :



(3,3,3,6)

3. (a) Give reasons for the following **(any four)** :

(i) In the Reformatsky reaction, magnesium should not be used in place of zinc.

(ii) During the reaction of carbonyl compounds with ammonia derivatives, pH of the reaction should be well controlled.

P.T.O.

(iii) –R group at *o*, *p*-position in aryl halide facilitates Ar_NS (Aryl nucleophilic substitution) reaction.

(iv) *p*-Dimethylaminobenzaldehyde does not respond to Cannizzaro's reaction.

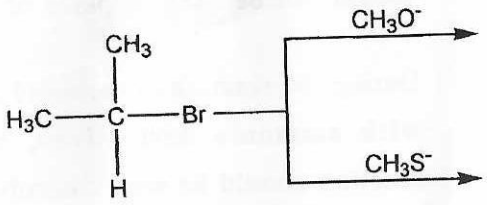
(v) Aryl vinyl ethers readily undergo hydrolysis in acidic medium to give phenol.

(vi) Polar protic solvents speed up an S_N1 reaction enormously, while it slows down S_N2 reaction by a factor as large as 10^{20}.

(b) Hydrolysis of an ester is preferred in alkaline medium. Explain.

OR

Write down the products of the following reaction and give explanation for your answer.



(3,3,3,3,3)

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

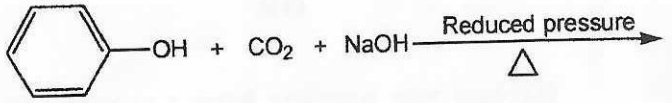
(i) Toluene → Cinnamic acid

(ii) Ethanal → Butanol

(iii) Benzene → 1-Phenylpropane

(iv) Benzoic acid → Acetophenone

(b) Write down the product(s), name and mechanism of the following reaction :



Why *ortho* product is the major product in the above reaction? (3,3,3,6)

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

(i) Succinic acid

(ii) Pentan-2-one

P.T.O.