

provide by : Anowar

2024/FYUG/ODD/SEM/
CHMDSC-202T/190

FYUG Odd Semester Exam., 2024

CHEMISTRY
(3rd Semester)

Course No. : CHMDSC-202T

(Functional Group Chemistry)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

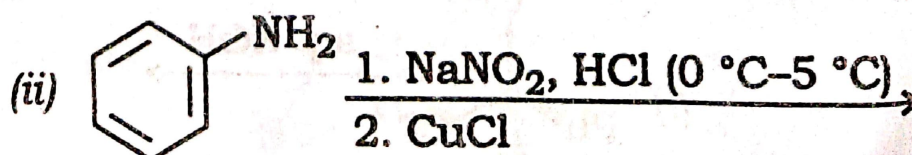
The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any two from the following : $2 \times 2 = 4$

(a) Explain why allyl halides are more reactive than vinyl halides in nucleophilic substitution reaction.

(b) Identify the products of the following :

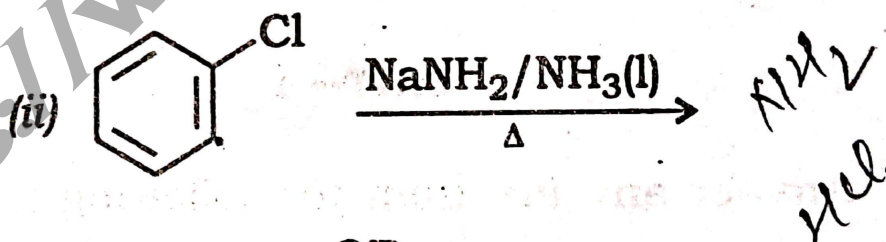
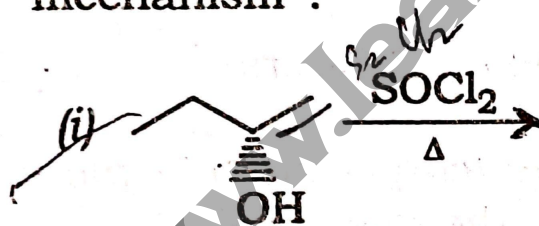


(c) Discuss the effect of solvent in the reactivity of S_N1 and S_N2 mechanism.

2. (a) Explain why the treatment of alkyl halides with aqueous KOH leads to the formation of alcohols but alkenes are the products in presence of alc. KOH. 3

(b) Explain with suitable example that S_N2 reaction proceeds with inversion of configuration. 3

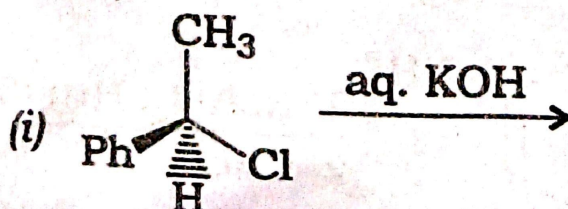
(c) Predict the product and depict the mechanism : $2 \times 2 = 4$

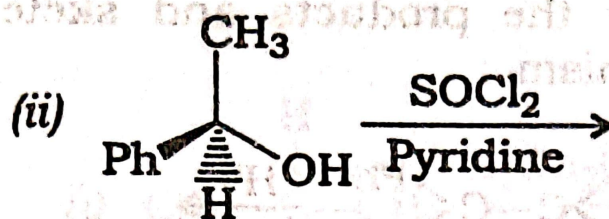


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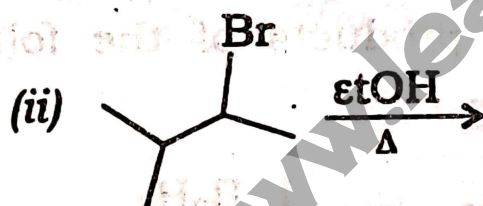
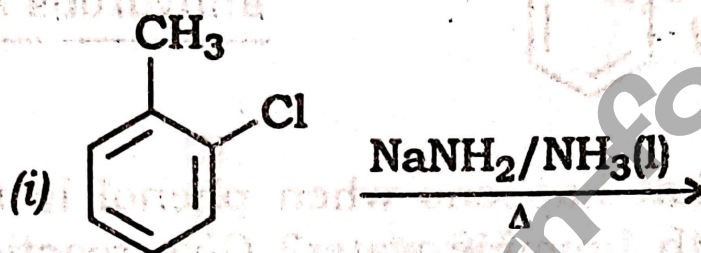
3. (a) Explain why benzyl halides are more reactive than aryl halides towards Nucleophilic substitution reaction. 2

(b) Predict the product and depict mechanism : $3 \times 2 = 6$





(c) Identify the product(s) of the following reaction : 1×2=2



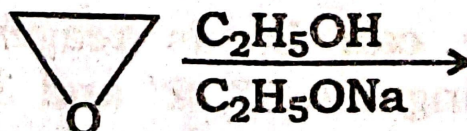
UNIT—II

4. Answer any two from the following : 2×2=4

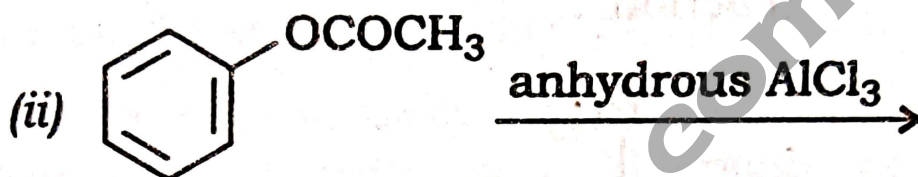
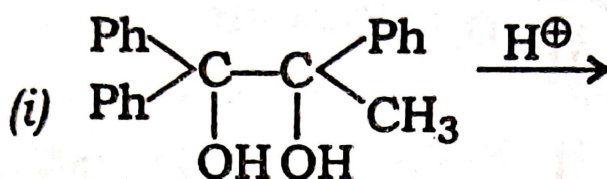
(a) Explain why *p*-Nitrophenol is more acidic than ortho and meta isomers.

(b) What happens when glycol is treated with periodic acid?

(c) Identify the product in the following reaction :

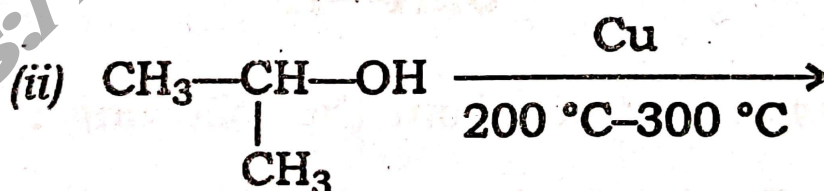
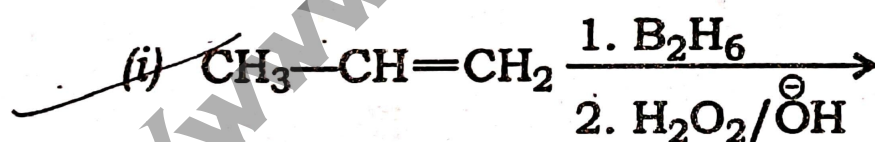


5. (a) Identify the products and sketch the mechanism : 3×2=6



~~(b)~~ What happens when phenol is treated with bromine water? Give reaction. 2

(c) Identify the products of the following reaction : 2



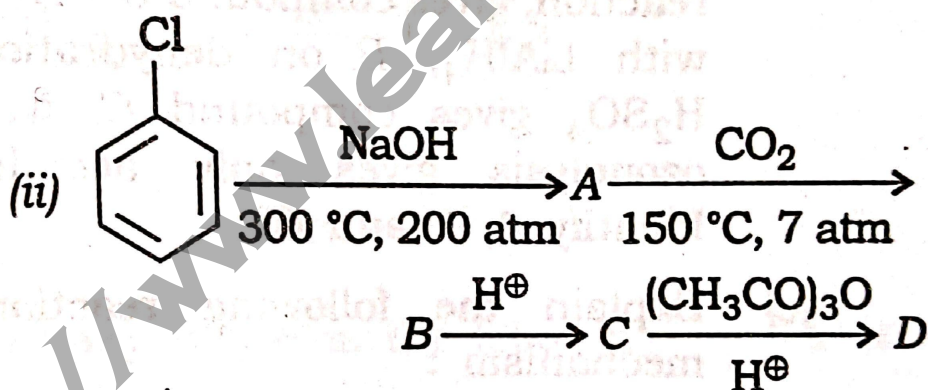
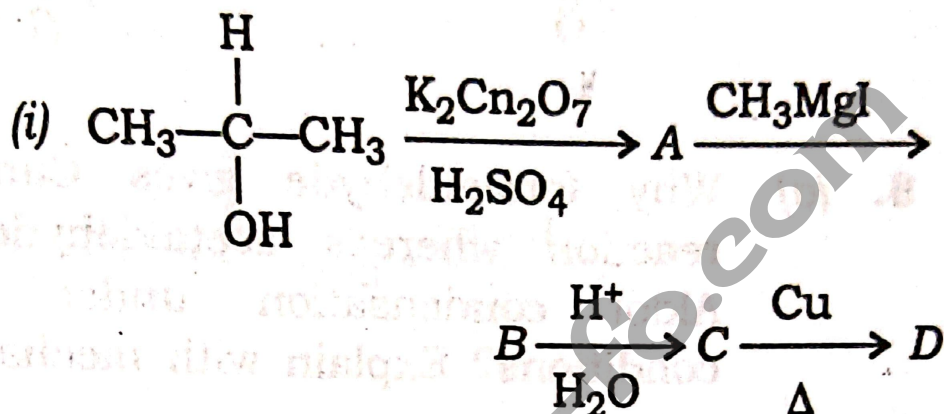
OR

6. (a) Sketch the mechanism of Reimer-Tiemann reaction. What intermediate is formed in this reaction? 3+1=4

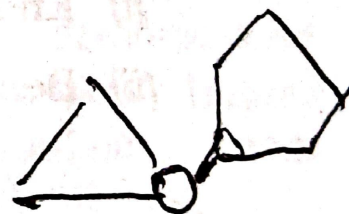
(b) How can Lucas reagent be used to distinguish 1°, 2° and 3° alcohol? 2

(c) Identify A, B, C and D in the following :

2×2=4



UNIT—III



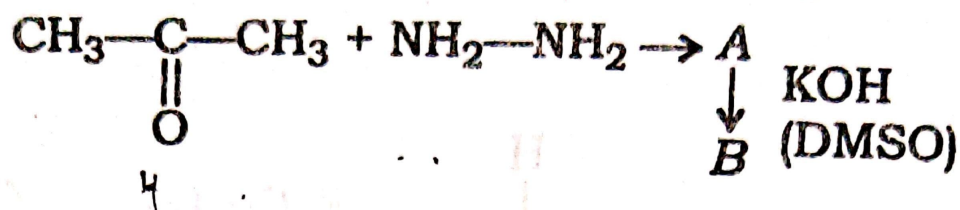
7. Answer any *two* from the following : 2×2=4

(a) How will you distinguish between ethanal and propanal? Explain with reactions.

(b) What happens when acetaldehyde is treated with HCN followed by hydrolysis?

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(c) Identify A and B in the following :



8. (a) Why formaldehyde gives Cannizzaro reaction whereas acetaldehyde gives Aldol condensation under similar conditions? Explain with mechanism. 3

(b) A ketone A, which undergoes Haloform reaction, gives compound B on reduction with LiAlH_4 , B on dehydration with H_2SO_4 gives compound C, which on ozonolysis gives only acetaldehyde. Identify A, B and C. 3

(c) Explain the following reaction with mechanism : $2 \times 2 = 4$

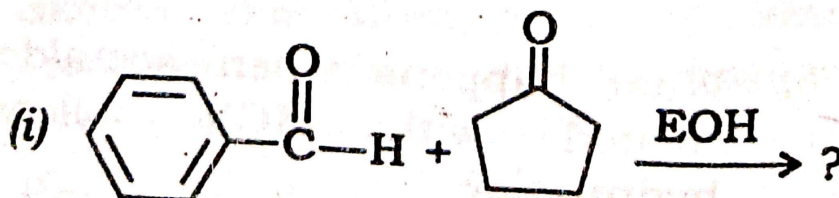
(i) Knoevenagel condensation

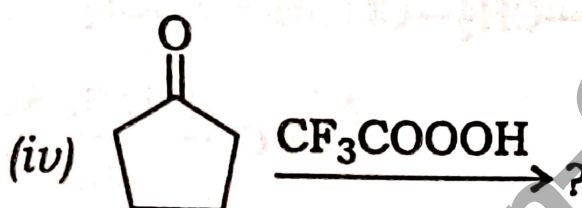
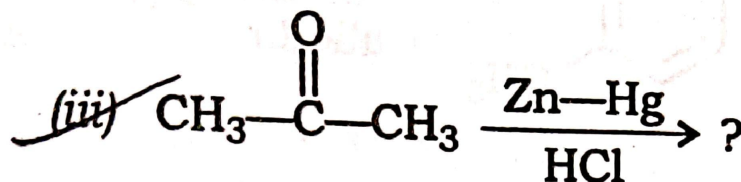
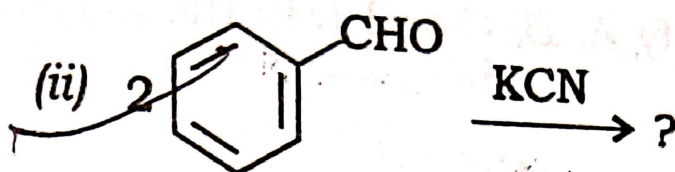
(ii) Benzil-Benzilic acid rearrangement

OR

9. (a) What are ylides? How alkenes can be prepared from carbonyl compounds using Wittig reaction? $\frac{1}{2} + 2 = 2\frac{1}{2}$

(b) Predict the product and sketch the mechanism (any three) : $2\frac{1}{2} \times 3 = 7\frac{1}{2}$





UNIT—IV

10. Answer any *two* from the following : $2 \times 2 = 4$

(a) Fumaric and maleic acid give the same anhydride on heating, but fumaric acid must be heated to much higher temperature than maleic acid. Explain.

(b) What happens when lactic acid is oxidised with Fenton's reagent? Explain with reaction.

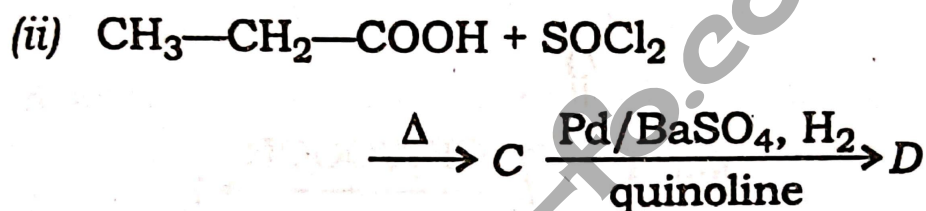
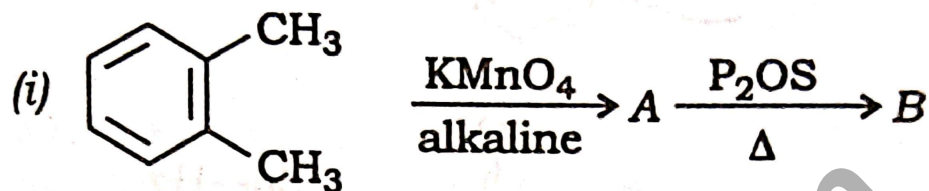
(c) What happens when tartaric acid is treated vigorously with HI?

11. (a) Describe the following reactions with mechanism : $3 \times 2 = 6$

(i) Claisen condensation

(ii) Curtius rearrangement

(b) Identify A, B, C and D in the following : 4

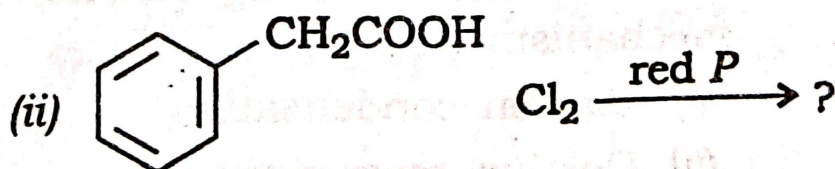
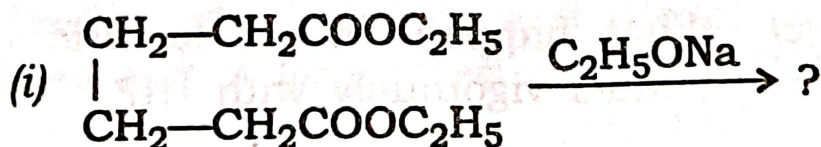


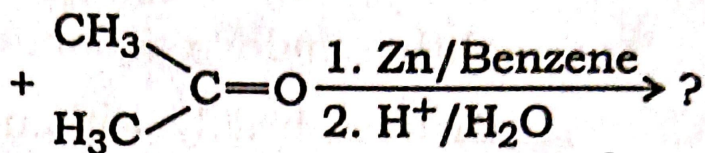
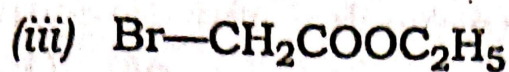
OR

12. (a) Sketch the mechanism of acid catalysed hydrolysis of ester by taking suitable example. 3

(b) Explain Hofmann-bromamide degradation reaction with mechanism. 3

(c) Identify the products of the following reactions : $1 \times 4 = 4$



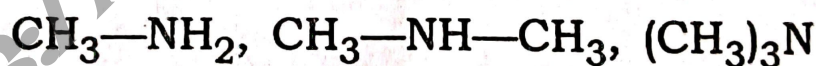


UNIT—V

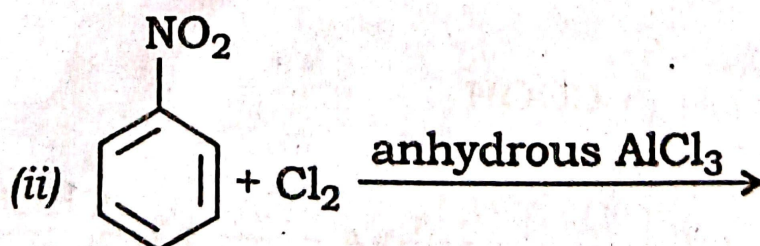
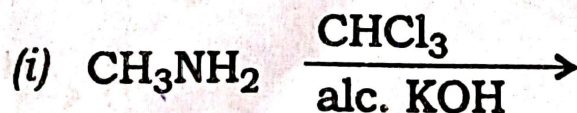
13. Answer any *two* from the following : $2 \times 2 = 4$

(a) Explain why thioalcohols are more acidic than alcohols.

(b) Arrange the following in increasing order of basicity in aqueous solution :



(c) Complete the following reactions :



14. (a) How can the Hinsberg's test be used to distinguish 1° , 2° and 3° amine?

4.

(10)

(b) Describe with mechanism the synthesis of primary amine using Gabriel-phthalimide reaction. 2

(c) Discuss briefly with mechanism : $3 \times 2 = 6$

(i) Mannich reaction

(ii) Hofmann exhaustive methylation

OR

15. (a) Describe carbylamine reaction with mechanism. 3

(b) Explain why in Hofmann elimination reaction, least substituted alkene is generally major product. 3

(c) Identify A, B, C and D in the following reaction : $2 \times 2 = 4$

