

2021

(March)

CHEMISTRY

(Major)

Course : 303

(Organic Chemistry—I)

Full Marks : 48

Pass Marks : 14

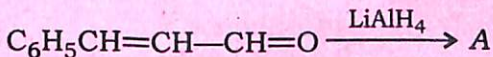
Time : 2 hours

*The figures in the margin indicate full marks
for the questions*

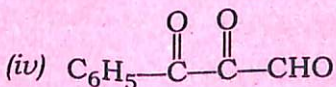
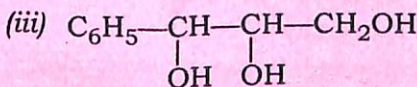
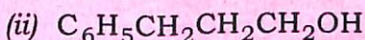
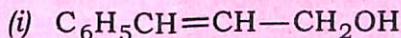
1. Select the correct answer from the following :

1×5=5

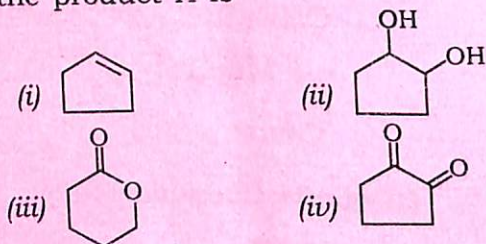
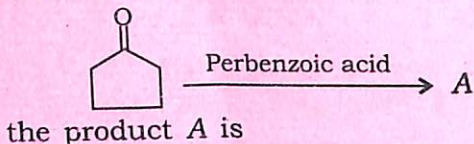
(a) In the reduction reaction



the product A is



(b) In the reaction



(c) Which of the following phenols is most acidic?

- (i) *o*-nitrophenol
- (ii) *p*-nitrophenol
- (iii) 2,4-dinitrophenol
- (iv) 2,4,6-trinitrophenol

(d) The compound formed as a result of oxidation of ethyl benzene by KMnO_4 is

- (i) benzyl alcohol
- (ii) benzophenone
- (iii) acetophenone
- (iv) benzoic acid

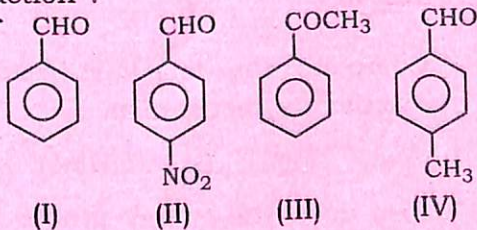
(e) Which of the following is a Michael acceptor?

- (i) Acrolein
- (ii) Acetone
- (iii) Cyclohexane
- (iv) Formaldehyde

2. Answer any four of the following questions :

$1\frac{1}{2} \times 4 = 6$

- (a) Vinyl halides show low reactivity to nucleophilic substitutions. Explain with reasons.
- (b) How will you prepare methyl vinyl ketone from vinyl acetylene?
- (c) How are primary, secondary and tertiary amines distinguished? Discuss the reactions involved.
- (d) Arrange the following carbonyl compounds in decreasing order of their reactivity in nucleophilic addition reaction :



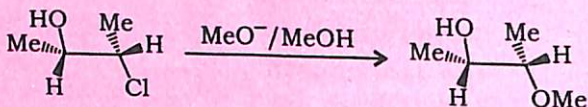
- (i) (II) > (III) > (I) > (IV)
- (ii) (II) > (I) > (IV) > (III)
- (iii) (III) > (II) > (I) > (IV)
- (iv) (III) > (I) > (IV) > (II)
- (e) How do you convert benzoyl chloride to benzoic acid?

UNIT—I

Answer any *two* of the following questions : $4 \times 2 = 8$

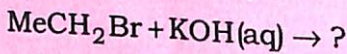
3. (a) Why is chlorobenzene less reactive to nucleophilic substitution reaction? 2

(b) Write the mechanism of the following reaction showing the participation of a neighbouring group : 2



4. (a) Using organometallic compound, how would you prepare 3° alcohol from ethyl acetate? 2

(b) Complete the following reaction and discuss its mechanism :



Also draw the energy profile diagram.

1+1=2

5. (a) What is benzene intermediate? Why is it so reactive? 2

(b) Synthesize ethyl bromide by Hunsdiecker reaction and predict the mechanism. 1+1=2

UNIT—II

Answer any *two* of the following questions : $5 \times 2 = 10$

6. (a) How will you convert—

(i) phenol to picric acid;

(ii) benzoyl chloride to benzaldehyde?

$1\frac{1}{2} \times 2 = 3$

(b) Synthesize the following (any *two*) : $1 \times 2 = 2$

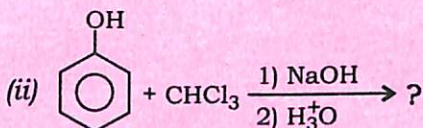
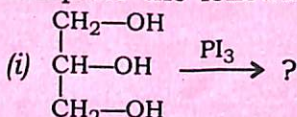
(i) Benzyl alcohol

(ii) *m*-Nitrophenol from *m*-di-nitrobenzene

(iii) Glycerol from propene

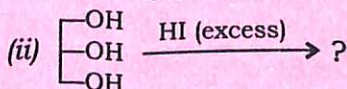
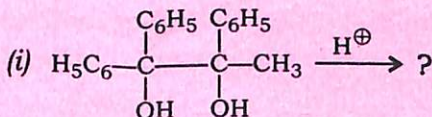
(iv) Ethylene glycol

7. (a) Complete the following reactions : $1 \times 2 = 2$



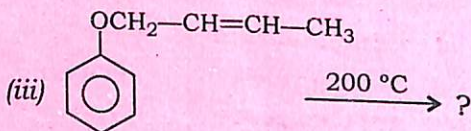
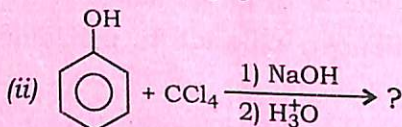
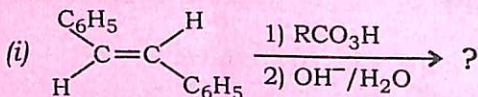
(b) Distinguish among 1° , 2° and 3° alcohols by using Lucas' reagent. 3

8. (a) Complete the following reactions : $1 \times 2 = 2$



(b) Complete the following reactions

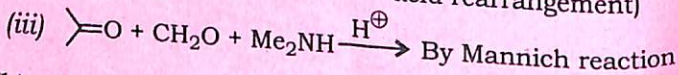
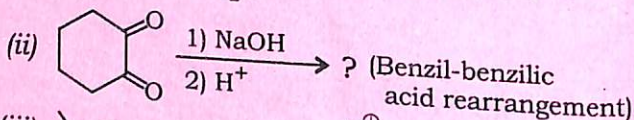
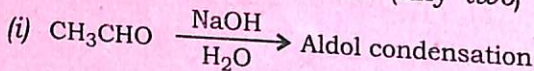
(any two) :

 $1\frac{1}{2} \times 2 = 3$ 

UNIT—III

Answer any one of the following questions :

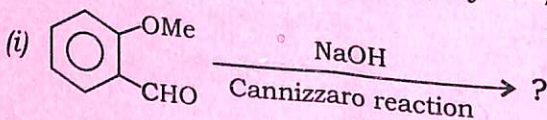
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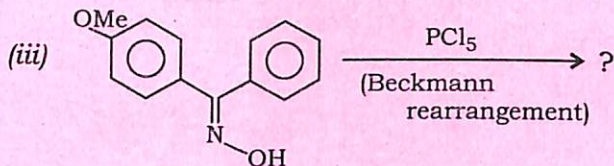
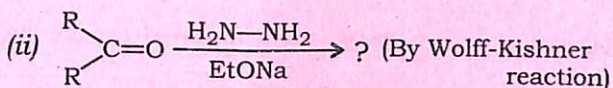
9. (a) Complete the following reactions and write their mechanisms (any two) : $3 \times 2 = 6$ 

(b) How would you synthesize cinnamaldehyde from benzaldehyde?

2

10. (a) Complete the following reactions and write down their mechanisms (any two) :

 $3 \times 2 = 6$ 



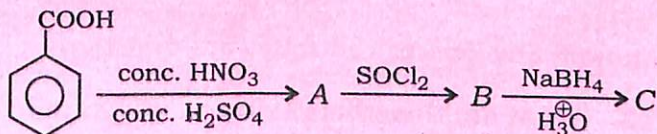
(b) Synthesize the following : 1×2=2

- (i) Cinnamaldehyde by using Claisen-Schmidt condensation
 (ii) Acrolein from glycerol

UNIT—IV

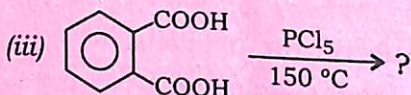
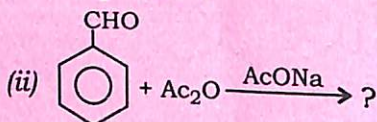
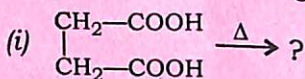
Answer any one of the following questions : 9

11. (a) Explain the preparation of carboxylic acids from Grignard reagent. Give equation. 2
- (b) Identify A, B and C in the following reactions : 3



- (c) Synthesize the following (any two) : 2×2=4
- (i) Citric acid from glycerol
 (ii) Succinic acid from ethylene bromide
 (iii) Coumarin from o-hydroxybenzaldehyde

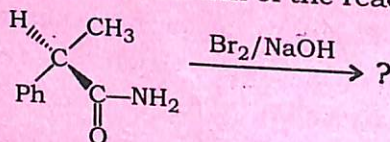
12. (a) Complete the following reactions : $1 \times 3 = 3$



(b) Convert tartaric acid to pyruvic acid. 2

(c) Discuss the mechanism of acid catalyzed hydrolysis of ester. 2

(d) Complete the following reaction and discuss the mechanism of the reaction : 2



UNIT—V

Answer any one of the following questions : 2

13. What are thioethers? How would you prepare a thioether from alkyl halide by $\text{S}_{\text{N}}2$ reaction? $\frac{1}{2} + 1\frac{1}{2} = 2$

14. What are mercaptans? How do you get rid of the smell of mercaptan? 2
