

4/CHE-251 Syllabus-2023

2026

(May-June)

FYUP : 4th Semester Examination

CHEMISTRY

(Organic Chemistry—I)

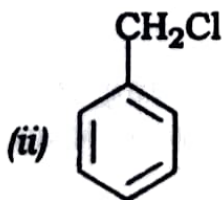
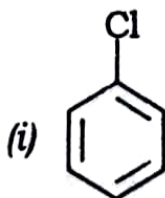
(CHE-251)

Marks : 75

Time : 3 hours

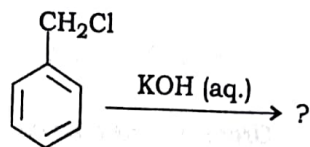
*The figures in the margin indicate full marks
for the questions.*

1. (a) Give a method of preparation for each
of the following compounds : $1 \times 2 = 2$

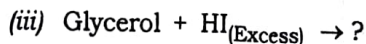
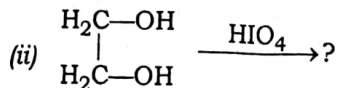
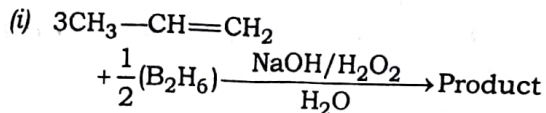


(2)

- (b) Explain, why electrophilic aromatic substitution of aryl halides takes place at *o*- and *p*-positions? 2
- (c) Predict the product of the following reaction : 1



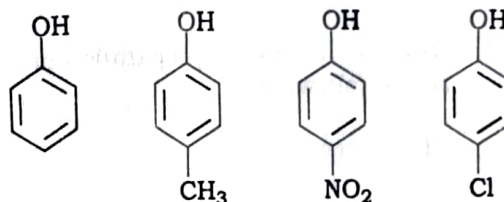
- (d) How will you distinguish among primary, secondary and tertiary alcohols by Lucas' test? 2
- (e) Complete the following reactions : $2+1+1=4$



- (f) Write the chemical reaction, when ethylene oxide undergoes acidic hydrolysis. 2
- (g) Explain, why the melting point of *o*-nitrophenol is very low as compared to that of *p*-nitrophenol? 2

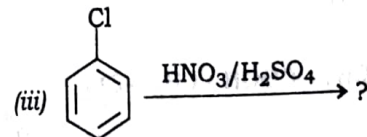
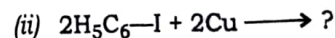
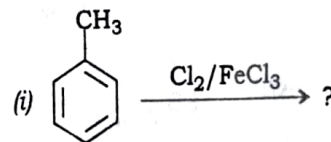
(3)

- (h) Giving proper mechanism, write the products obtained when phenol undergoes Kolbe's reaction. 2
- (i) Arrange the following molecules in order of increasing acid strength with justification : 2



OR

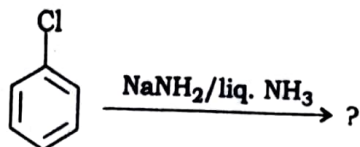
2. (a) Suggest the products of the following reactions : $1 \times 3 = 3$



(4)

- (b) Complete the following reaction with mechanism :

2

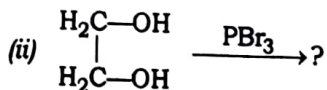
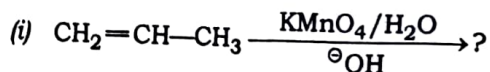


- (c) Give one method of preparation of each of the following : 1+1=2

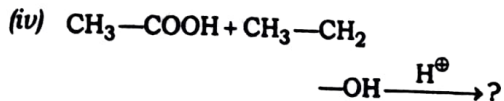
(i) Glycerol

(ii) Propan-2-ol

- (d) Write the products of the following reactions : 1×4=4



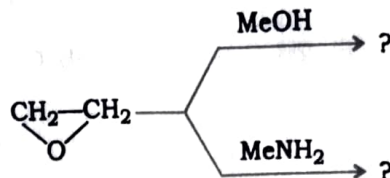
(iii) Glycerol heated with oxalic acid at 260°C



(5)

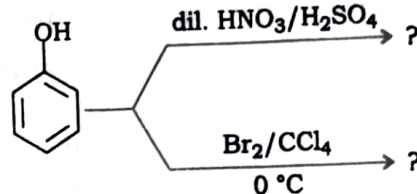
- (e) Give the products of the following reactions :

2



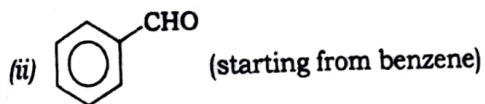
- (f) Explain why $-\text{OH}$ (Phenolic) is *o*- and *p*-directing group in electrophilic aromatic substitution. 2

- (g) Complete the following reactions with mechanism : 2×2=4



3. (a) How will you prepare the following? 2

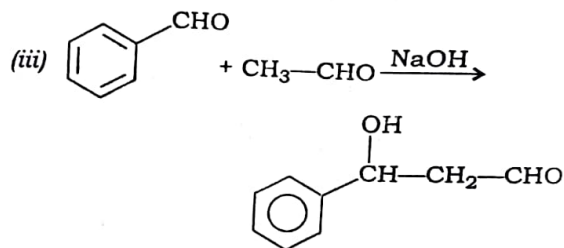
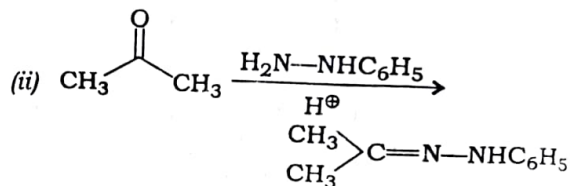
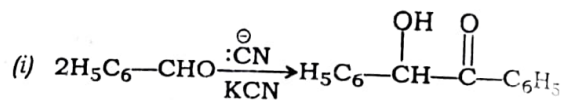
(i) Acetone (starting from propan-2-ol)



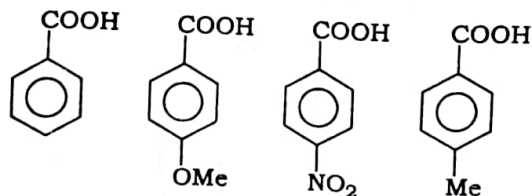
- (b) Give one reaction to differentiate between aldehydes and ketones. 1

(6)

- (c) Write the mechanism of the following reactions : 2×3=6



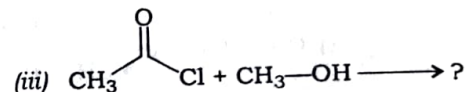
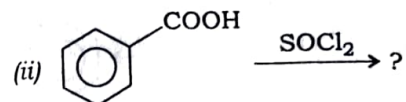
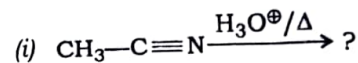
- (d) Arrange the decreasing order of acid strength of the following acids : 1



(Continued)

(7)

- (e) Complete the following reactions with mechanism : 2×3=6

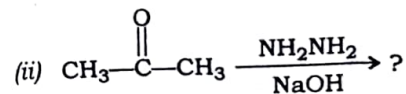
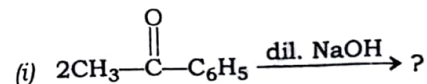


- (f) Write the chemical reaction of the following : 1×2=2

- (i) Malic acid with Br_2
 (ii) Succinic acid with two equivalent moles of ethanol

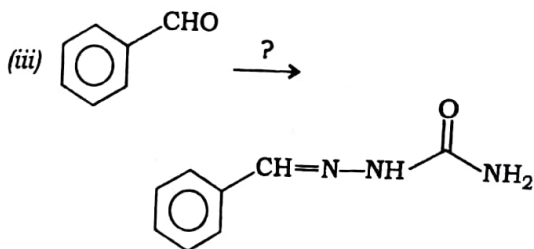
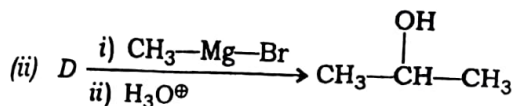
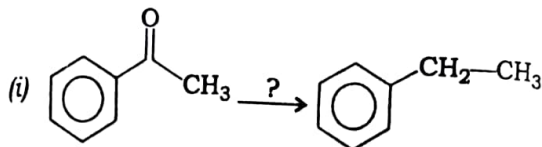
OR

4. (a) Write the mechanism of the following reactions : 3×2=6

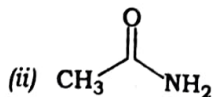
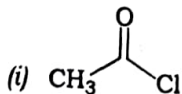


(8)

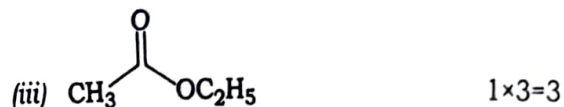
- (b) Complete the following reactions by adding suitable reactant(s) or reagent(s) : 1×3=3



- (c) How will you prepare the following compounds from acetic acid?

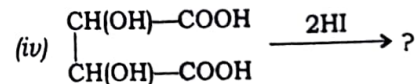
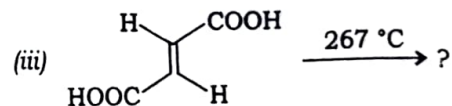
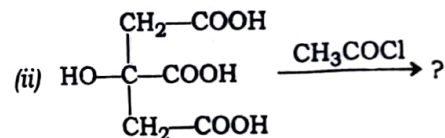
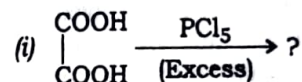


(9)



- (d) How will you convert benzoic acid to benzamide? 2

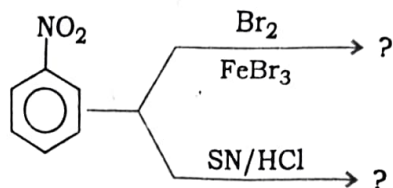
- (e) Complete the following reactions : 1×4=4



5. (a) Write the chemical reaction for the formation of different products on treatment of primary, secondary and tertiary nitroalkanes with HNO_2 .

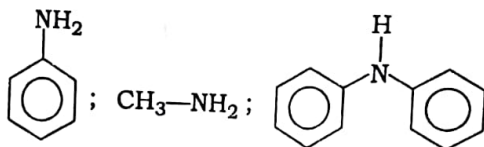
(10)

- (b) Suggest the products of the following reactions :

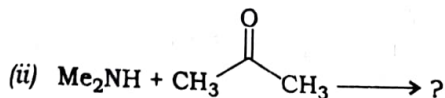
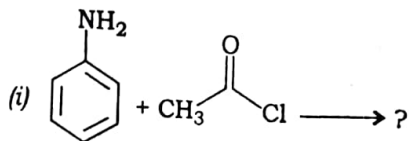


- (c) Write the steps involved for the synthesis of aminoethane by using Gabriel phthalimide synthesis.

- (d) Arrange the following molecules in order of their increasing basic strength and give reasons :



- (e) Give the products of the following : $1 \times 2 = 2$



(11)

- (f) Write the mechanism for the formation of benzene diazonium chloride.

- (g) Give one example each for Sandmeyer and diazo coupling reaction.

- (h) What happens when urea—

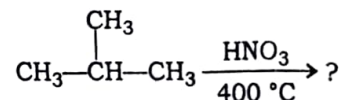
- (i) undergoes acidic hydrolysis;
- (ii) treated with acetyl chloride;
- (iii) heated gently at about 130°C ;
- (iv) treated with excess of NaOBr?

(Write the equations only)

$1 \times 4 = 4$

OR

6. (a) Write the possible products of the following reaction, mention its major and minor products and suggest a plausible mechanism :



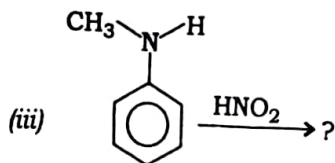
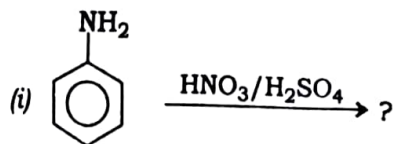
- (b) Why are α -Hydrogen atoms of primary and secondary nitroalkanes acidic in nature?

- (c) What happens when nitroethane is treated with acetaldehyde in the presence of dil. NaOH?

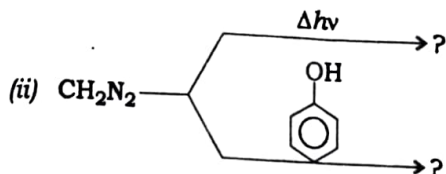
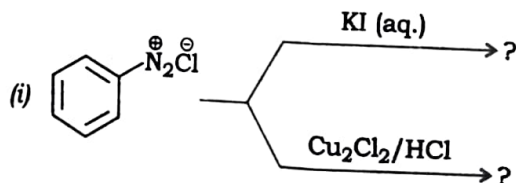
- (d) How can you distinguish among primary, secondary and tertiary amines by Hoffmann's method?

(12)

- (e) Write the correct products of the following reactions : $1 \times 3 = 3$



- (f) Complete the following reactions : $2 + 2 = 4$



(13)

- (g) Give a method of preparation of urea. 1

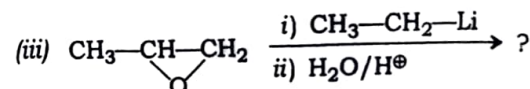
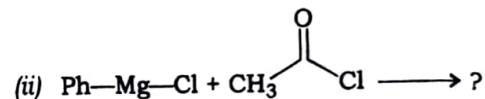
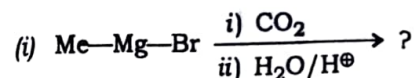
- (h) How does urea react with—

(i) $\text{NH}_2\text{—NH}_2$;

(ii) Ethanol;

(iii) Diethyl malonate? $1 \times 3 = 3$

7. (a) Complete and write the mechanism of the following reactions : $2 \times 3 = 6$



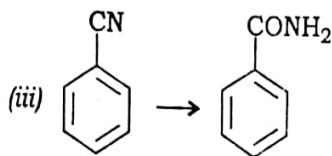
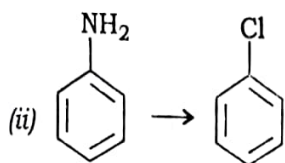
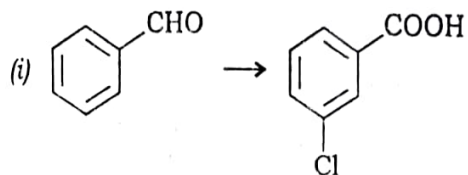
- (b) Why H-atoms on methylene group of active methylene compounds are more acidic than α -Hydrogen atoms of aldehydes or ketones? Explain by giving suitable examples. 2

- (c) How can you synthesize cinnamic acid using ethyl acetoacetate? 3

- (d) Give one method of preparation of diethyl malonate, and write its tautomeric forms. 2

(14)

- (e) Write the steps involved for the following conversions : $2 \times 3 = 6$

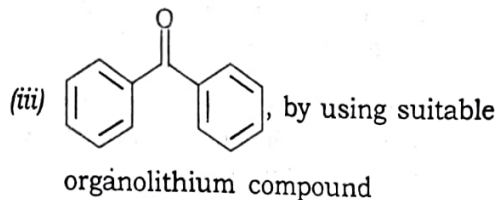


OR

8. (a) Write the synthesis of the following compounds with proper mechanism : $2 \times 3 = 6$

(i) Benzyl alcohol

(ii) Acetone by using suitable Grignard reagents



(15)

- (b) Mention two differences between resonance and tautomerism. Give one example for keto-enol tautomerism. 2

- (c) Write the steps involved for the synthesis of—

(i) butanoic acid;

(ii) crotonic acid from diethyl malonate. $2\frac{1}{2} \times 2 = 5$

- (d) How will you carry out the following conversions? $2 \times 3 = 6$

(i) Methyl magnesium bromide to propan-2-ol

(ii) Benzene to Aniline

(iii) Acetic acid to Acetamide

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