

**4/CHE-251 Syllabus-2023**

**2026**

**( May-June )**

**FYUP : 4th Semester Examination**

**CHEMISTRY**

**( Organic Chemistry—I )**

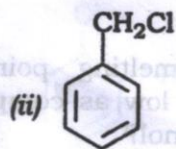
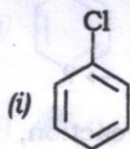
**( CHE-251 )**

**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 :  $1 \times 2 = 2$

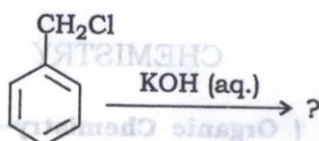


**26D/1679**

**( Turn Over )**

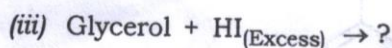
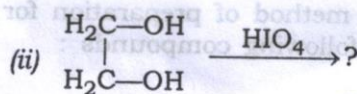
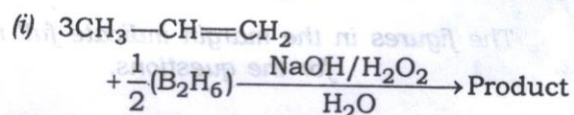
- (b) Explain, why electrophilic aromatic substitution of aryl halides takes place at *o*- and *p*-positions? 2

- (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

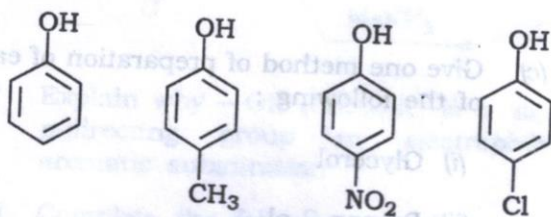
( 3 )

(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 :

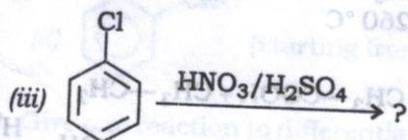
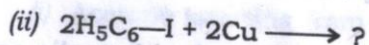
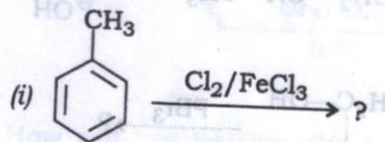
2



OR

2. (a) Suggest the products of the following reactions :

1×3=3



26D/1679

( Turn Over )

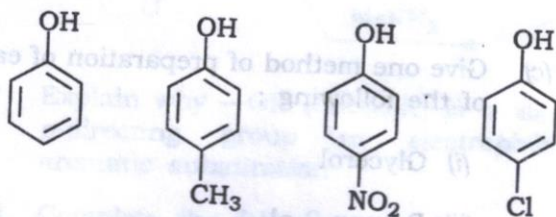
( 3 )

(h) Giving proper mechanism, write the products obtained when phenol undergoes Kolbe's reaction.

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(i) Arrange the following molecules in order of increasing acid strength with justification :

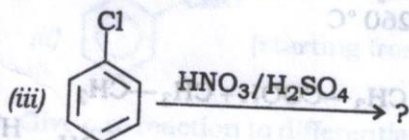
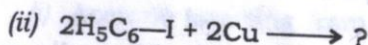
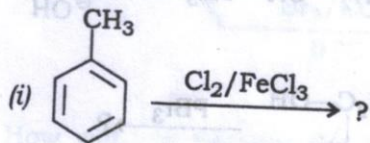
2



OR

2. (a) Suggest the products of the following reactions :

1×3=3

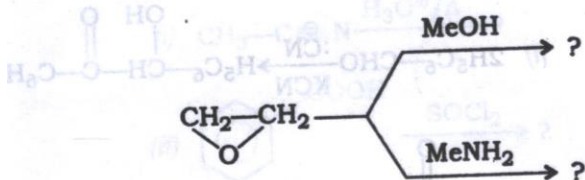


26D/1679

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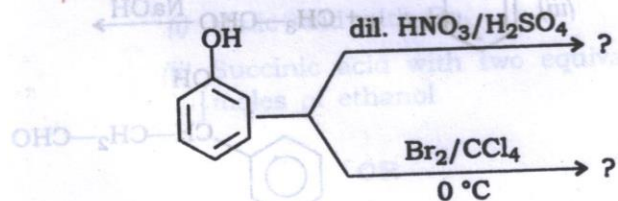
( 5 )

- (e) Give the products of the following reactions : 2



- (f) Explain why —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

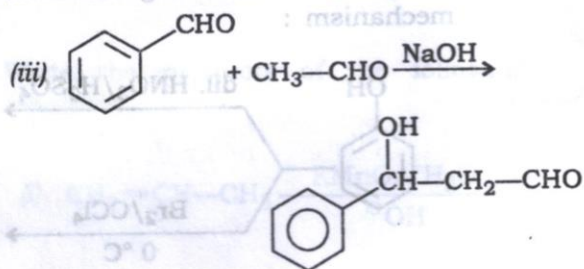
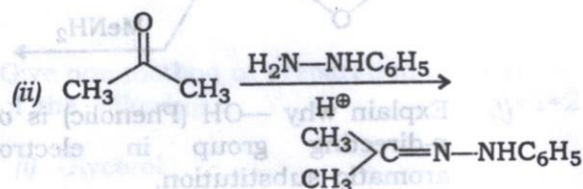
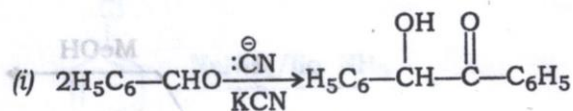
(i) Acetone (starting from propan-2-ol)

(ii)  (starting from benzene)

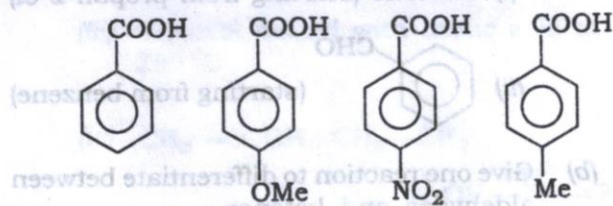
- (b) Give one reaction to differentiate between aldehydes and ketones. 1

( 6 )

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

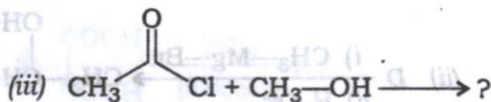
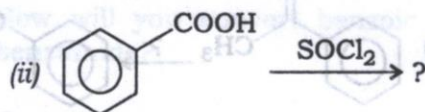
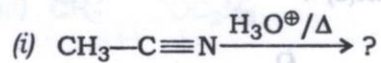


(d) Arrange the decreasing order of acid strength of the following acids : 1

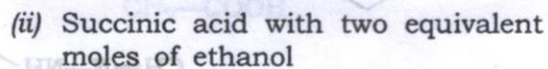
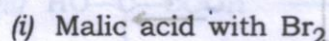


( 7 )

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

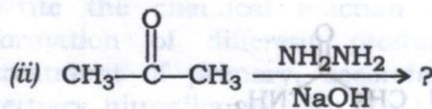
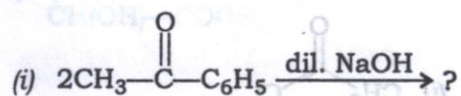


- (f) Write the chemical reaction of the following : 1×2=2



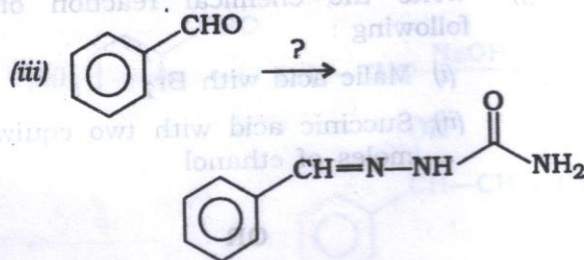
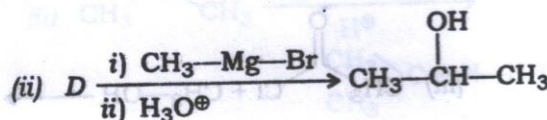
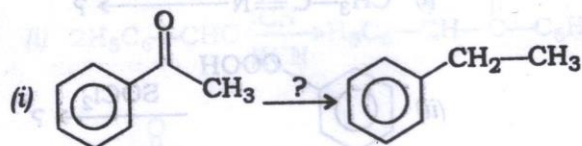
OR

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

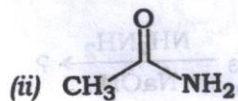
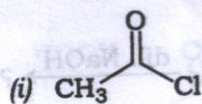


( 8 )

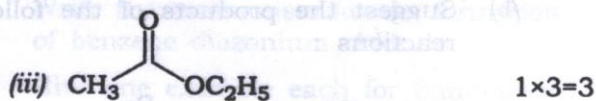
(b) Complete the following reactions by adding suitable reactant(s) or reagent(s) :  $1 \times 3 = 3$



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

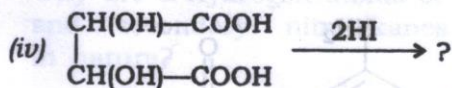
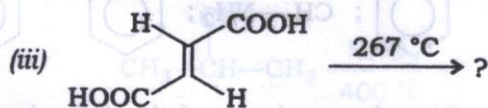
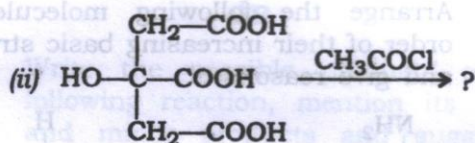
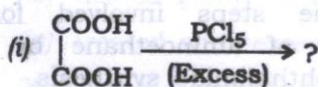


( 9 )



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

(e) Complete the following reactions :  $1 \times 4 = 4$

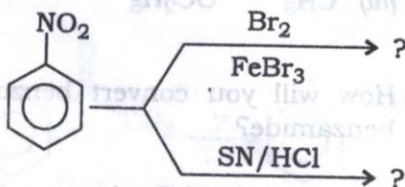


5. (a) Write the chemical reaction for the formation of different products on treatment of primary, secondary and tertiary nitroalkanes with  $\text{HNO}_2$ . 3

( 10 )

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

2

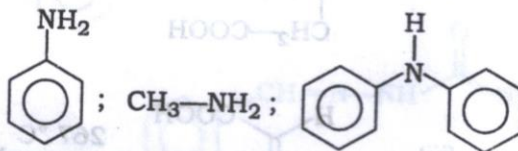


- (c) Write the steps involved for the synthesis of aminoethane by using Gabriel phthalimide synthesis.

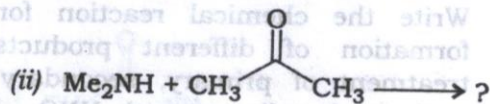
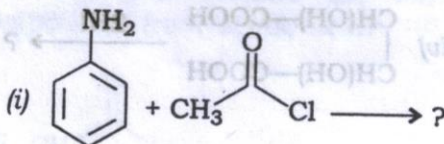
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- (d) Arrange the following molecules in order of their increasing basic strength and give reasons :

2



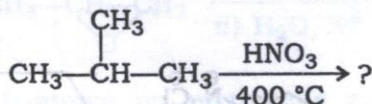
- (e) Give the products of the following : 1×2=2



- (f) Write the mechanism for the formation of benzene diazonium chloride. 2
- (g) Give one example each for Sandmeyer and diazo coupling reaction. 2
- (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) 1×4=4

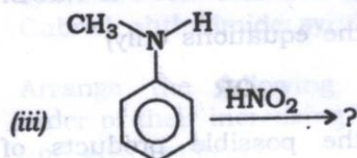
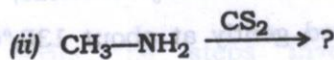
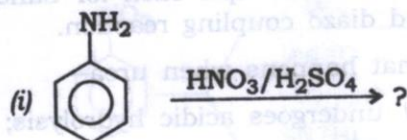
OR

6. (a) Write the possible products of the following reaction, mention its major and minor products and suggest a plausible mechanism : 3

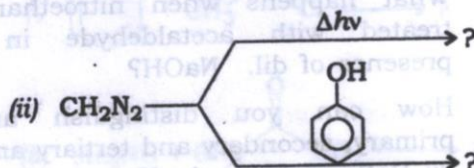
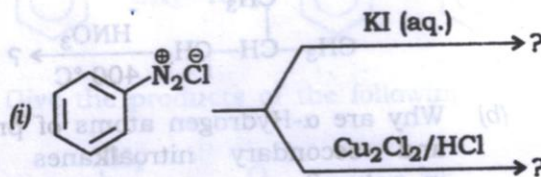


- (b) Why are  $\alpha$ -Hydrogen atoms of primary and secondary nitroalkanes acidic in nature? 1
- (c) What happens when nitroethane is treated with acetaldehyde in the presence of dil. NaOH? 1
- (d) How can you distinguish among primary, secondary and tertiary amines by Hoffmann's method? 3

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

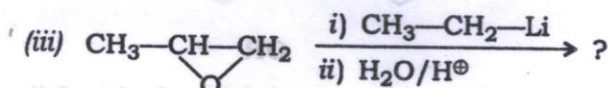
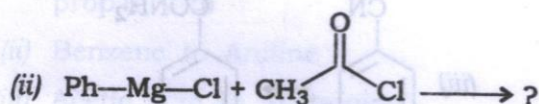
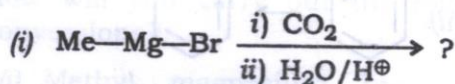


(f) Complete the following reactions :  $2 + 2 = 4$



- (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?  $1 \times 3 = 3$

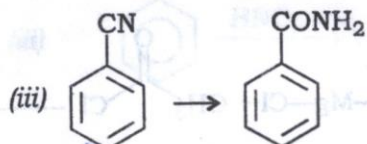
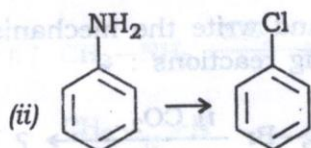
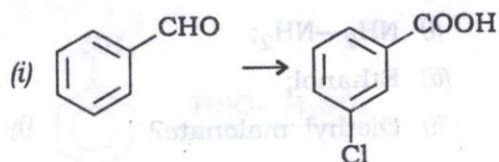
7. (a) Complete and write the mechanism of the following reactions :  $2 \times 3 = 6$



- (b) Why H-atoms on methylene group of active methylene compounds are more acidic than  $\alpha$ -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 :  $2 \times 3 = 6$



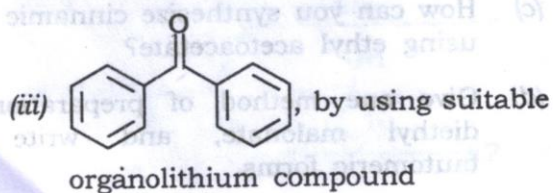
OR

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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