

2019/TDC/ODD/SEM/CHMHCC-302T/134

TDC (CBCS) Odd Semester Exam., 2019

CHEMISTRY

(3rd Semester)

Course No. : CHMHCC-302 T

(Organic Chemistry)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

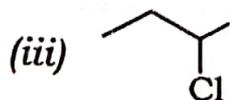
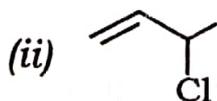
GROUP—A

Answer **two** questions from each Unit in this Group

UNIT—I

1. (a) Arrange the following three chlorides in decreasing order towards S_N1 reactivity :

1



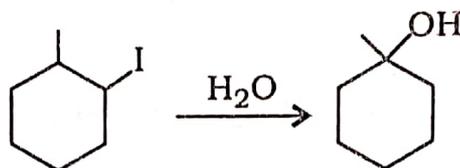
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(2)

(b) For the reaction

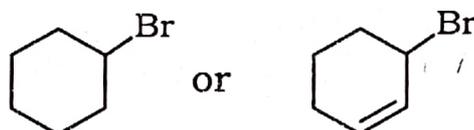


show the mechanism of formation of intermediate carbocation.

1

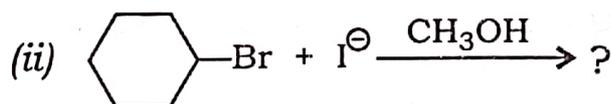
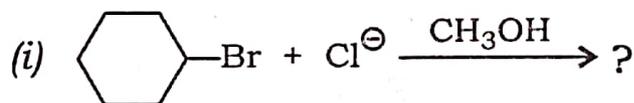
2. (a) Which of the following reacts faster in S_N1 reaction and why?

1



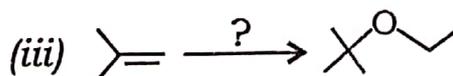
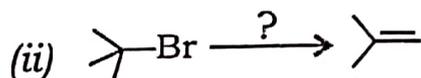
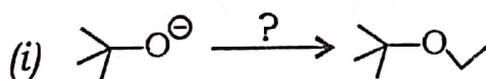
(b) Which of the following will exhibit higher S_N2 reaction rate and why?

1



3. Provide the appropriate reagent for each of the following conversions :

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



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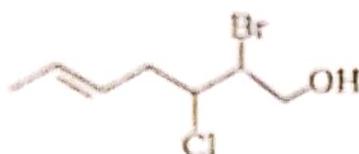
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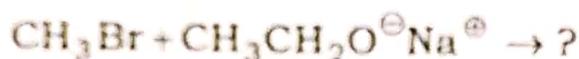
(3)

UNIT—II

4. (a) Write the IUPAC name of the following compound : ½



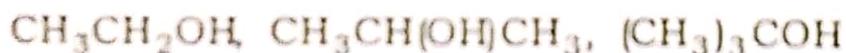
- (b) (i) Predict the following product : ½



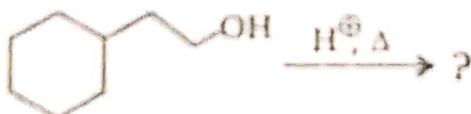
- (ii) Identify the following product with stereochemistry : 1



5. (a) What is Lucas reagent? Arrange the following compounds in increasing order of reactivity towards Lucas reagent : ½+1=1½



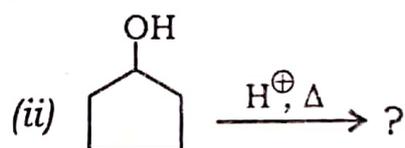
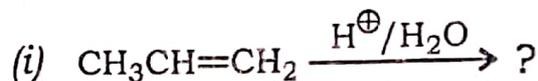
- (b) Predict the following product : ½



6. (a) Phenols generally do not undergo substitution of OH group like alcohol. Why? 1

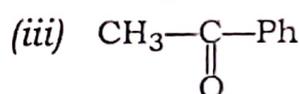
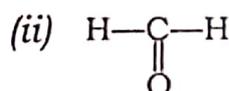
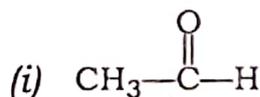
(4)

(b) Identify the following products : $\frac{1}{2} \times 2 = 1$

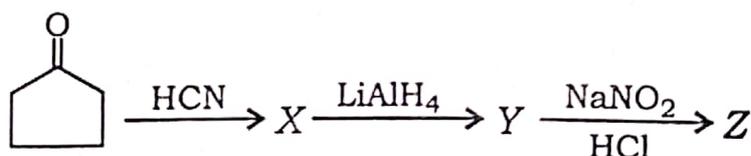


UNIT—III

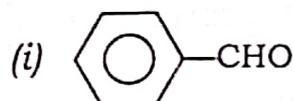
7. (a) Arrange the following compounds in decreasing order of reactivity with Grignard reagent : $\frac{1}{2}$



(b) Identify X, Y and Z in the following reaction : $1\frac{1}{2}$



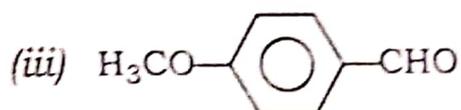
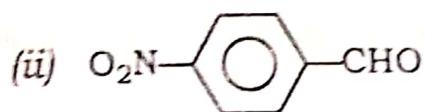
8. (a) Arrange the following in increasing order of reaction rate towards nucleophilic addition reaction : 1



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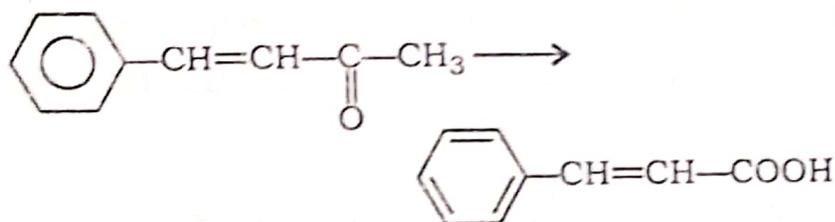
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(5)



(b) Choose the correct answer : 1

Which of the following reagents is appropriate for the reaction?



- (i) KMnO_4, Δ followed by H^{\oplus}
- (ii) I_2/NaOH followed by H^{\oplus}
- (iii) H_2/Pt
- (iv) LiAlH_4

9. (a) Choose the correct answer : $\frac{1}{2}$

Cannizzaro reaction is

- (i) oxidation reaction
- (ii) reduction reaction
- (iii) ion exchange reaction
- (iv) disproportionation reaction

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(7)

- (b) Convert phthalic acid into phthalimide.
(Give equation only) 1

UNIT—V

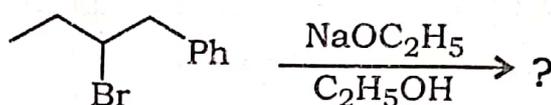
13. (a) Why is the Grignard reagent prepared in anhydrous condition? 1
- (b) A Grignard reagent reacts with methanal to form $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2\text{OH}$.
Identify the Grignard reagent. 1
14. (a) Write various tautomeric forms of $\text{CH}_3\text{COCH}_2\text{COOCH}_2\text{CH}_3$. 1
- (b) Explain why methylenic hydrogen in ethylacetoacetate is acidic in nature. 1
15. (a) What is oleum? 1
- (b) Why SO_3 acts as an electrophile, though it is a natural molecule? 1

GROUP—B

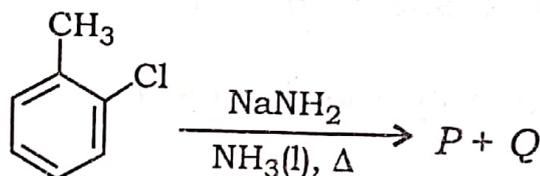
Answer **one** question from each Unit in this Group

UNIT—I

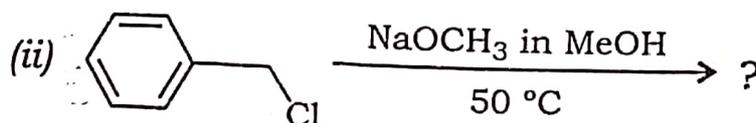
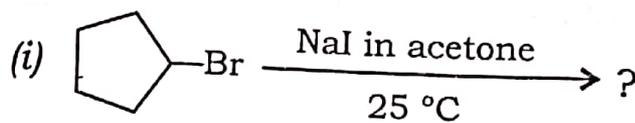
16. (a) Predict the major product and provide the mechanism : 2



- (b) Identify *P* and *Q*, and propose plausible mechanism : 2



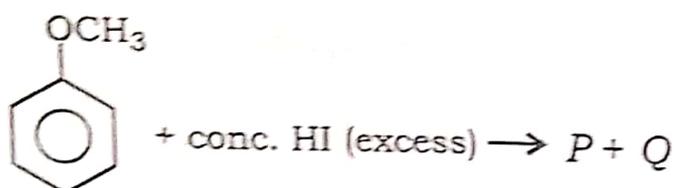
- (c) Select, with reasons, whether the following combination of reactants will react following S_N1 or S_N2 pathway. Write the corresponding products of the reactions : 1+1=2



17. (a) Haloarenes undergo nucleophilic substitutions less readily than haloalkanes. Explain. 1½

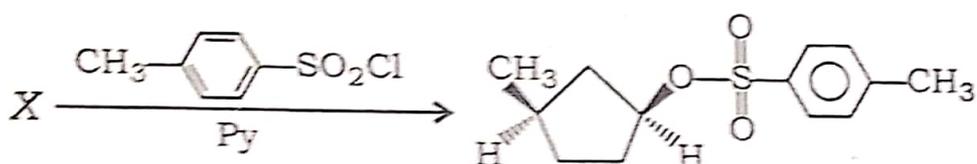
- (b) Identify *P* and *Q* from the following reaction :

1



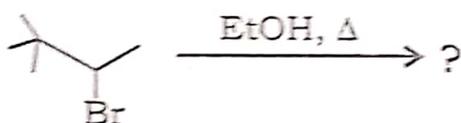
- (c) Identify *X*, and propose a mechanism for the following reaction :

1½



- (d) Complete the following elimination reaction and provide mechanism :

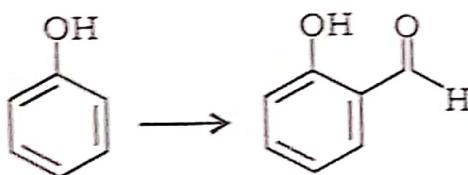
2



UNIT—II

18. (a) What is the electrophile in Reimer-Tiemann reaction? How is it generated and how can this be useful in bringing the following conversion? Explain with mechanism taking appropriate reagent(s) :

½+½+2=3

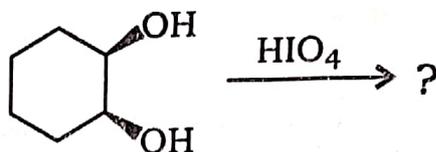


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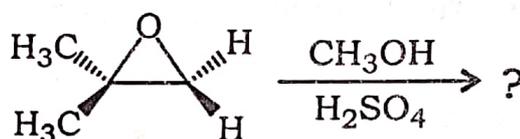
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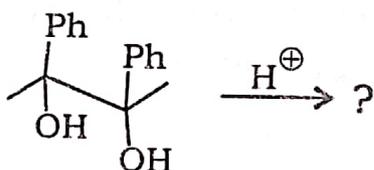
- (b) Predict the following product (with mechanism) : 1½



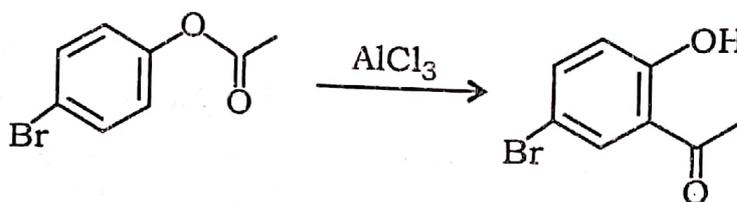
- (c) What is the predominant product of the following reaction? Provide mechanism : 1½



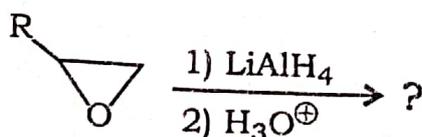
19. (a) Complete the following reaction and provide plausible mechanism : 2



- (b) Provide mechanism from the following reaction : 2



- (c) Predict the product and depict reasonable mechanism for the following reaction : 2



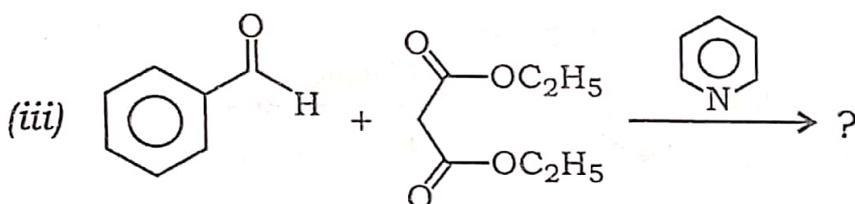
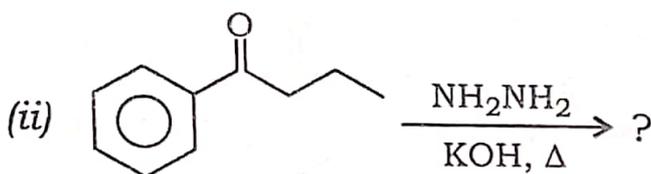
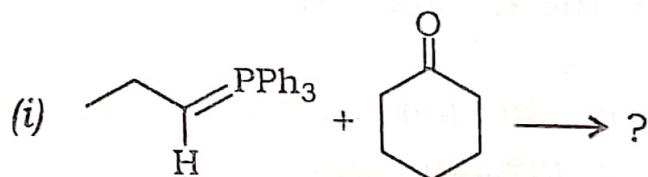
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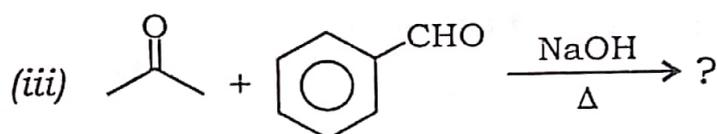
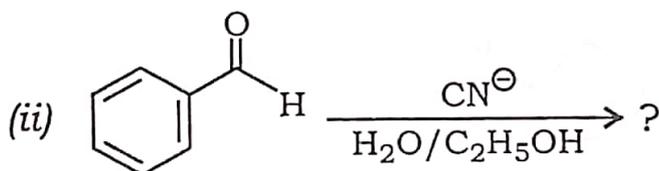
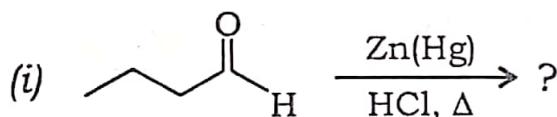
(11)

UNIT—III

20. Predict the products and depict the mechanisms for the following reactions : $2 \times 3 = 6$



21. Complete the following reactions and provide plausible mechanisms : $2 \times 3 = 6$



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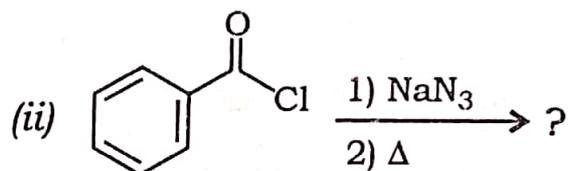
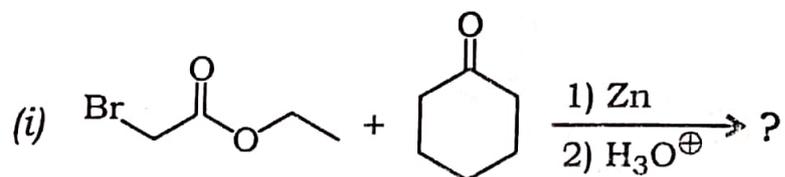
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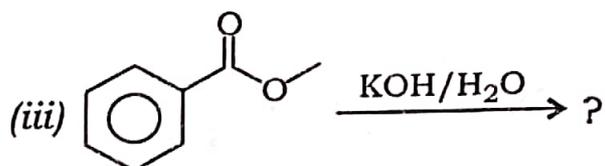
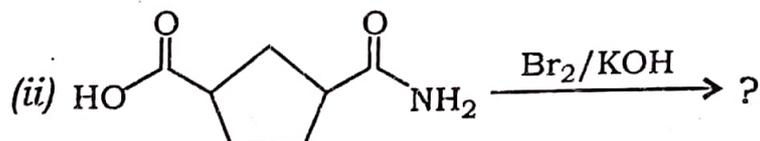
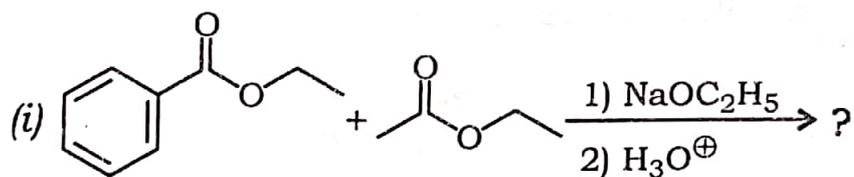
UNIT—IV

22. (a) Provide the equation for acidic hydrolysis of ethylbutanoate and provide the mechanism. 2

(b) Complete the following reactions and show the mechanisms : 2×2=4



23. Predict the products from the following reactions (with mechanisms) : 2×3=6

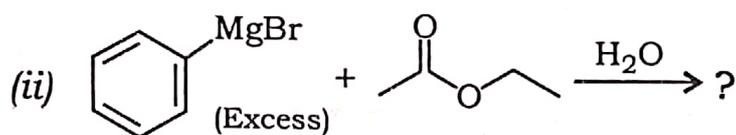
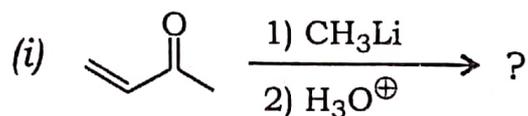


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UNIT—V

24. (a) Complete the following reactions and propose suitable mechanisms : $1\frac{1}{2} \times 2 = 3$

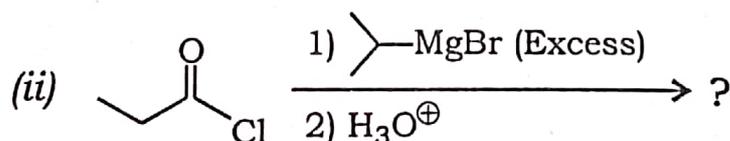
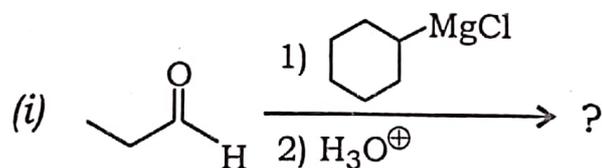


- (b) Carry out the following syntheses :

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

- (i) Succinic acid from diethylmalonate
(ii) 3-phenyl propenoic acid from ethyl-acetoacetate

25. (a) Predict the products and propose reasonable mechanisms for the following reactions : $1\frac{1}{2} \times 2 = 3$



(14)

(b) Carry out the following syntheses :

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

(i) But-2-enoic acid from diethylmalonate

(ii) Pentan-2-one from ethylacetoacetate

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