

TDC Odd Semester Exam., 2020  
held in July, 2021

CHEMISTRY  
( Honours )

( 1st Semester )

Course No. : CHMH-102

( Organic Chemistry—I )

Full Marks : 35  
Pass Marks : 12

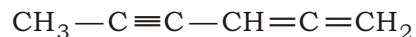
Time : 2 hours

The figures in the margin indicate full marks  
for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

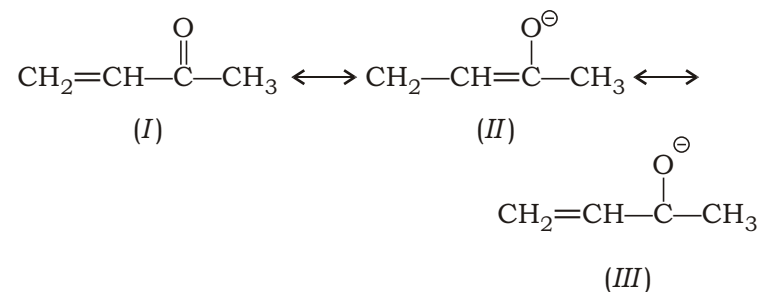
1. (a) Indicate the hybridization of all carbon atoms in the following compound : 3



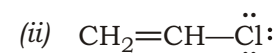
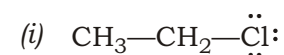
- (b) One of the isomers of 1,2-dichloroethene has zero dipole moment value. Draw the structure of the isomer and give reason for its dipole moment value.

1+1=2

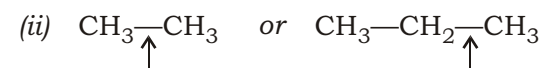
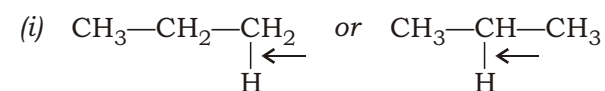
- (c) Which of the following will contribute most to the resonance hybrid? Give reason : 1+1=2



2. (a) Which of the following molecules has greater C—Cl bond length and why? 1½

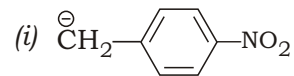


- (b) Which of the following indicated bonds have greater bond strength and why? 1×2=2

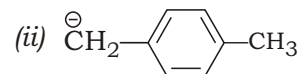


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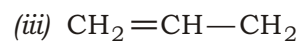
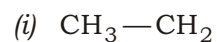
- (c) Which of the following anions is more stable? Justify : 2



or

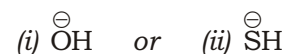


- (d) Arrange the following cations in the decreasing order of their stabilities (most stable first) : 1½



UNIT—II

3. (a) Which of the following species has higher nucleophilicity and why? 1½

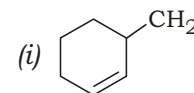


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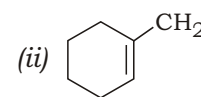
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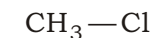
- (b) Which of the following carbocation is more stable? Give reason : 2



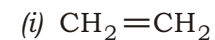
or



- (c) Write the products formed when the marked bond of the following molecule is cleaved (i) homolytically and (ii) heterolytically. 2



- (d) Pick up electrophiles and nucleophiles from the following : 1½



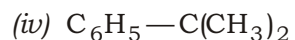
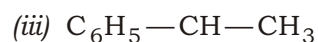
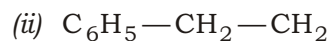
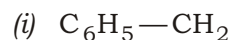
4. (a) What are carbenes? Explain the different electronic states in which carbene can exist. Discuss, with orbital diagram, the bonding and structure of singlet carbene. 1+2+2=5

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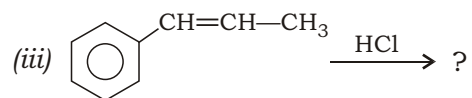
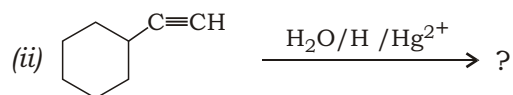
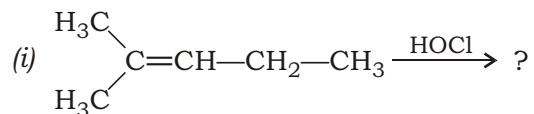
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(b) Identify the most stable and least stable carbocation from the following and provide reason for your choice : 2



UNIT—III

5. (a) Predict the product of the following reactions : 1×3=3

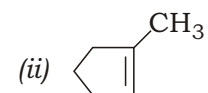
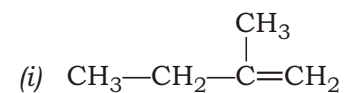


(b) Convert benzene into 2-phenylpentane and propose a suitable mechanism for the reaction. 3

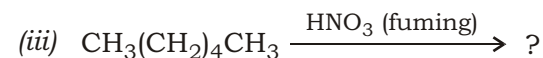
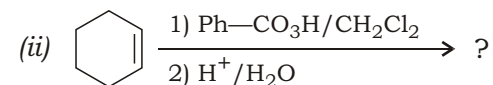
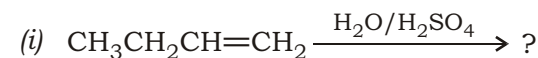
( 6 )

(c) How can you convert bromoethane into butane? 1

6. (a) Predict the products obtained from the following alkenes on treatment with ozone followed by oxidative work-up with  $H_2O_2$  : 1×2=2



(b) Complete the following reactions : 1×3=3



(c) Why does HI not show peroxide effect? 2

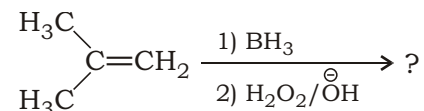
UNIT—IV

7. (a) Write the synthesis of DDT from chlorobenzene. 2

( 7 )

(b) Write the mechanism of Williamson's ether synthesis. 2

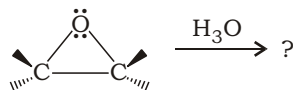
(c) Complete the following reaction and write a plausible mechanism : 3



8. (a) Write a short note on BHC. 2

(b) Carry out the synthesis of primary, secondary and tertiary alcohols using Grignard reagent. 3

(c) Complete and give the mechanism of the following reaction : 2

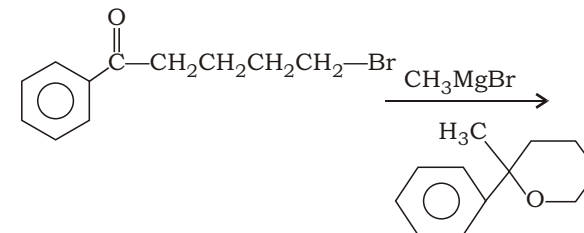


UNIT—V

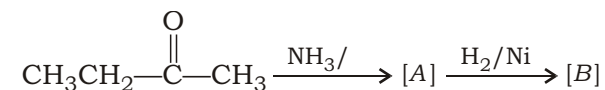
9. (a) Write a chemical test along with relevant chemical equation by which an aldehyde can be distinguished from a ketone. 2½

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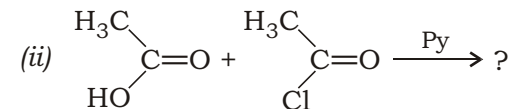
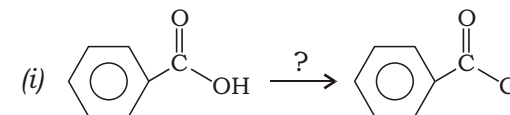
(b) Propose a reasonable mechanism for the following conversion : 2½



(c) Identify [A] and [B] in the following reaction sequence : 2



10. (a) Complete the following reactions and write the mechanism of each reaction : 2½×2=5



(b) Provide the mechanism of hydrolysis of ester under alkaline conditions. 2

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