

2019

PG Even Semester (CBCS) Exam., May—2019

CHEMISTRY

(2nd Semester)

Course No. : CHMCC-202

(Organic Chemistry—II)

Full Marks : 70

Pass Marks : 28

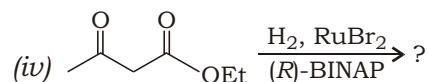
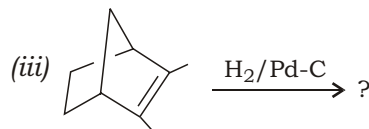
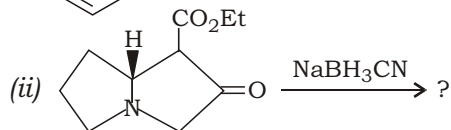
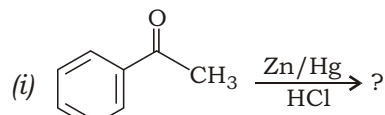
Time : 3 hours

The figures in the margin indicate full marks
for the questions

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

UNIT—I

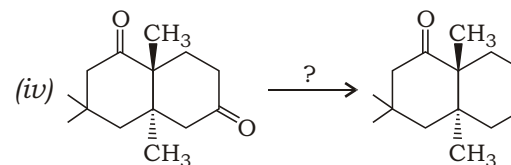
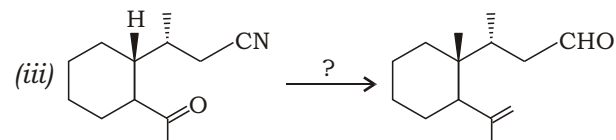
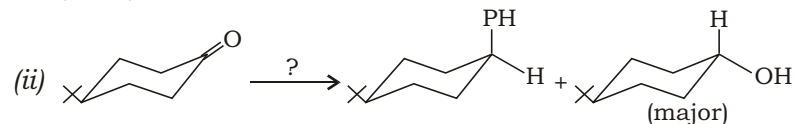
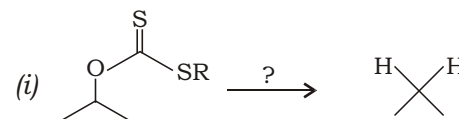
1. (a) Predict the product(s) of the following reactions : 1×4=4



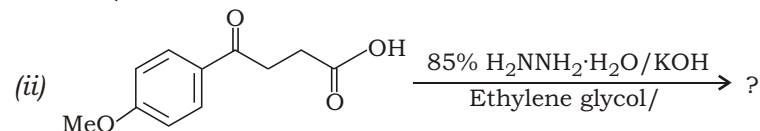
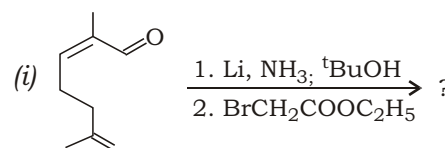
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- (b) Predict the reagent(s) for the following conversions and suggest plausible mechanism : 2+2+3+3=10



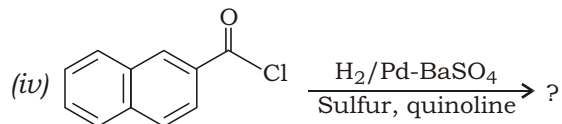
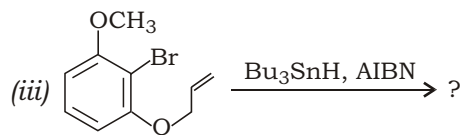
2. (a) Predict the product(s) and suggest plausible mechanism for the following reactions : 3+2+2+2=9



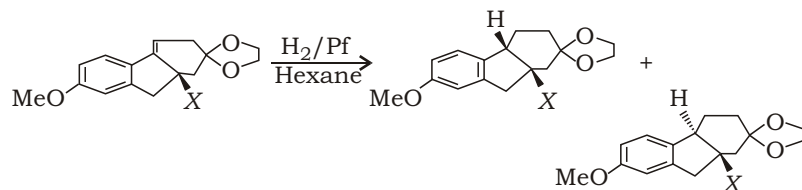
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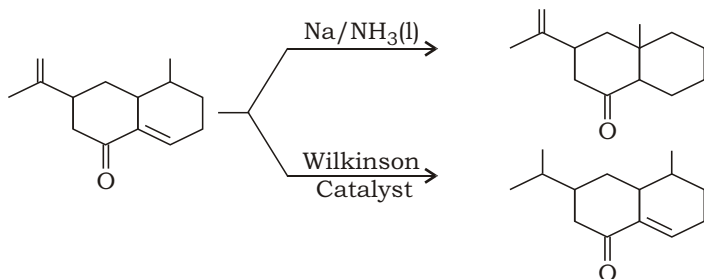


(b) Explain the yield of the following reaction : 2



If X = CH ₂ OH	94%	6%
X = CO ₂ CH ₃	15%	85%

(c) Suggest mechanism for the following conversion : 3



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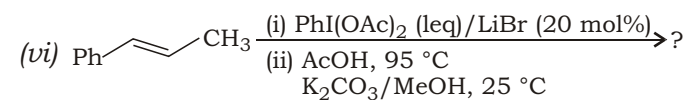
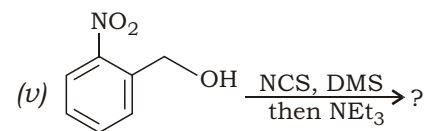
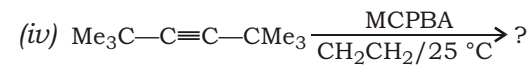
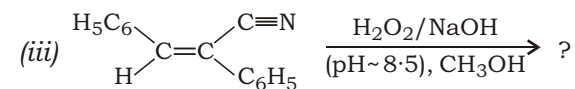
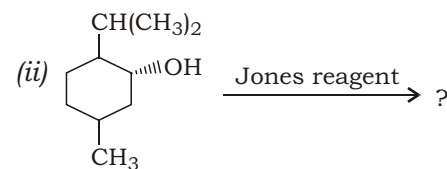
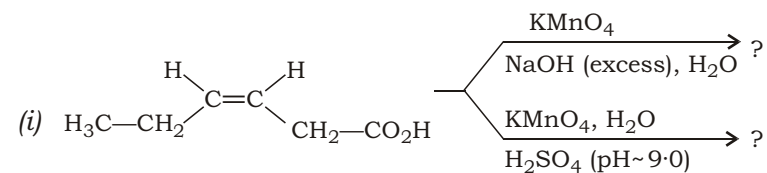
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(4)

UNIT—II

3. (a) Predict the products and depict the mechanism for the following :

$$(2+2)+1\frac{1}{2}+1\frac{1}{2}+1\frac{1}{2}+2+2\frac{1}{2}=13$$



(b) What is PCC or PDC?

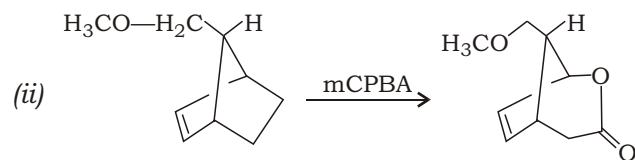
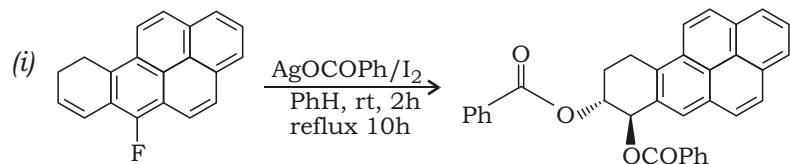
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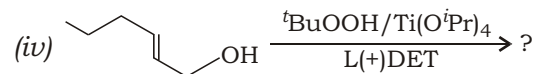
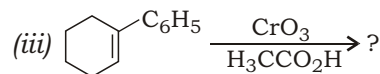
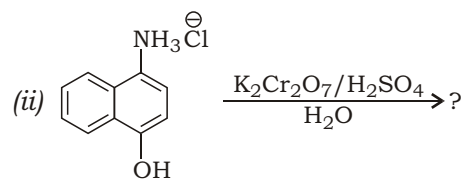
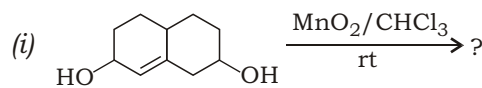
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(5)

4. (a) Provide mechanism for the following reactions : 2×2=4

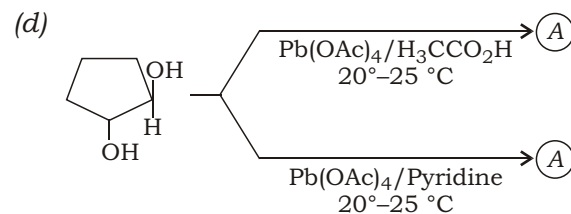
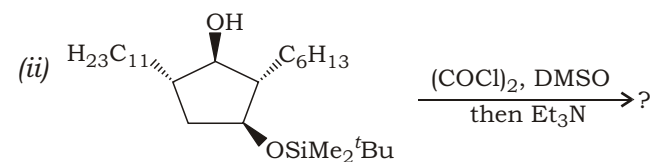
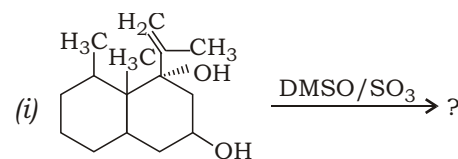


- (b) Predict the major product(s) and reagent (mechanism is not required) for the following : 1×4=4



(6)

- (c) Provide the product along with the support of mechanism for the following : 2×2=4

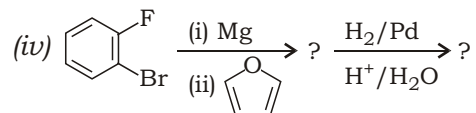
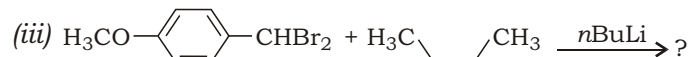
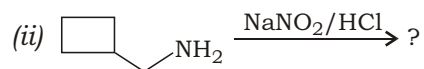
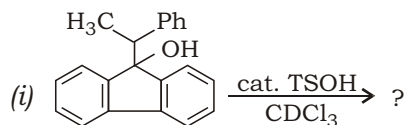


Identify compound (A) and mention which reaction condition produces the best yield (high reaction rate) and why. 2

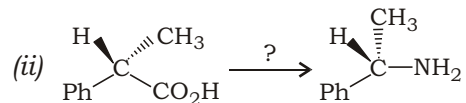
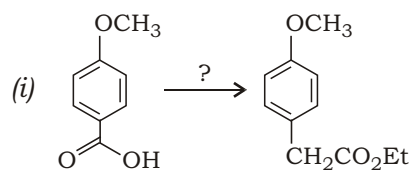
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UNIT—III

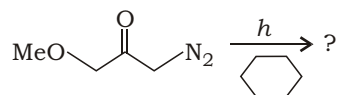
5. (a) Predict the product(s) of the following and provide plausible mechanism : 2×4=8



- (b) Carry out the following conversion by providing appropriate reagents or reaction conditions along with mechanism : 2½×2=5



- (c) Suggest the outcome of the following : 1



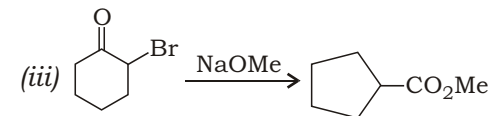
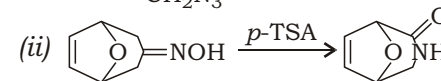
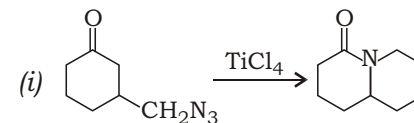
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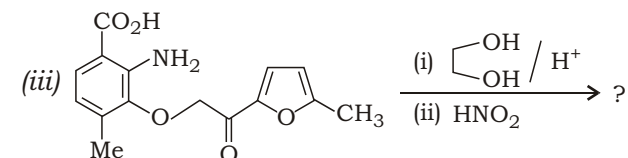
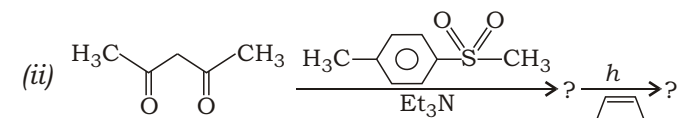
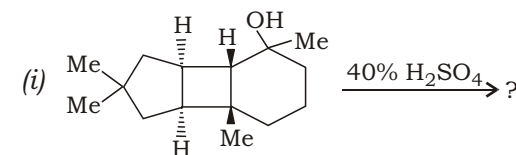
(8)

6. (a) Explain why addition of singlet carbene to alkene is stereospecific but triplet carbene to alkene is not stereospecific. 2

- (b) Provide mechanism for the following reactions : 2×3=6



- (c) Provide product(s) and suggest mechanism for the following : 2×3=6



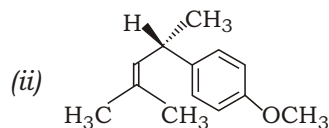
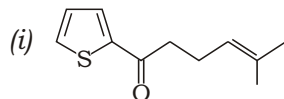
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(9)

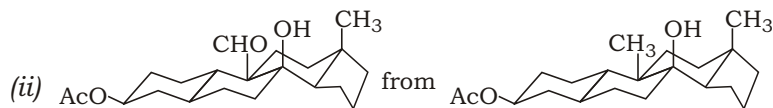
UNIT—IV

7. (a) Explain why the mentioned compounds have to be stored in a cool-dark place. Provide the outcome of exposure to light with a detailed mechanism : $2\frac{1}{2}\times 2=5$



(Provide stereochemical relevance where applicable.)

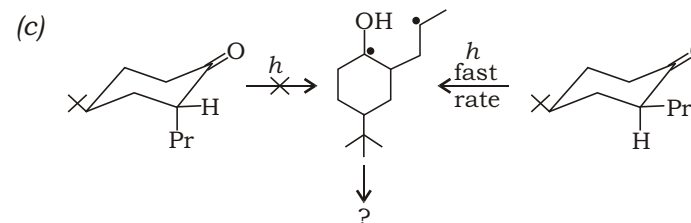
- (b) How can the following compounds be obtained from their precursors? Provide reagents or conditions where it is applicable : $2\frac{1}{2}\times 2=5$



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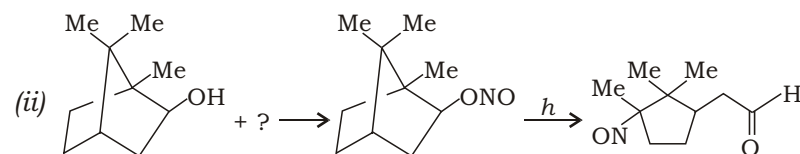
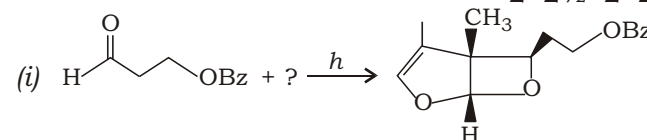
(10)



Explain the above observation and provide mechanism to obtain the product. 2

- (d) How many singlet excited states of O_2 are possible? Explain. How does a sensitized O_2 -molecule react with pyrrole in the presence of methanol? Provide mechanism. 2

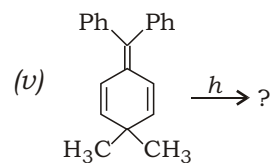
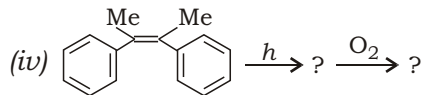
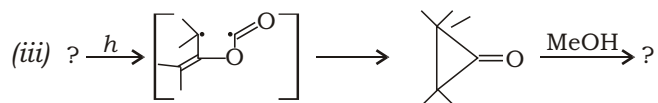
8. (a) Provide reagents/conditions/products for the following. Support your answers with detailed mechanisms (where applicable) : $2+2\frac{1}{2}+2+2+2\frac{1}{2}=11$



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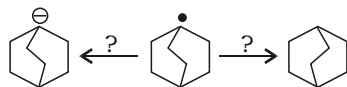
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(11)



(b) Provide evidence for converting acetone into an electron donating as well as an electron withdrawing agent in the presence of your choice of two alkenes. Provide molecular orbital representations and other supportive explanations in support of your answer. 2

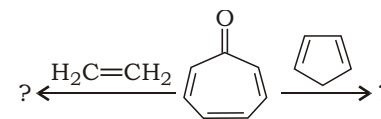
(c) Suggest reagents for the following (mechanism is not required) : 1



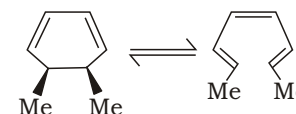
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UNIT—V

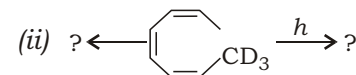
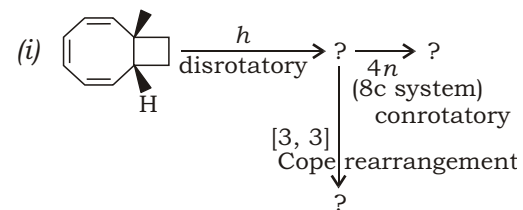
9. (a) Compare the reaction of 2,4,6-cycloheptatrienone with cyclopentadiene to that with ethene. Explain why 2,4,6-cycloheptatrienone uses two π -electrons in one reaction and four π -electrons in the other. Explain : 3



(b) With the aid of correlation diagram, explain the stereospecificity of the following reaction : 3



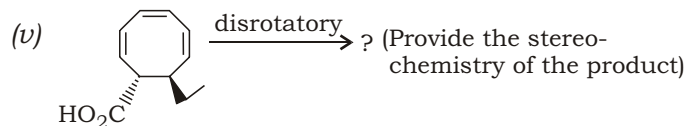
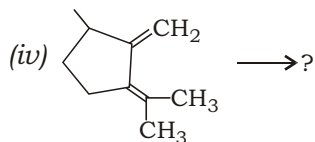
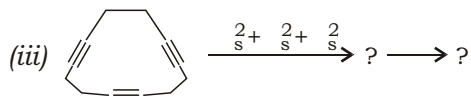
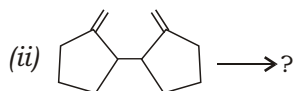
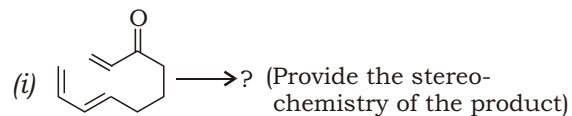
(c) Assign the intermediate(s) or product(s) for the following pericyclic processes : $1 \times 5 = 5$



(13)

- (d) Explain the two modes of orbitals overlap for the simultaneous formation of two π -bonds. 1½
- (e) Explain why the less stable endo product is preferred in irreversible Diels-Alder reactions. 1½

10. (a) Provide the outcomes of the following pericyclic reactions with the support of mechanism : 2+1½+2+1½+2=9



(14)

- (b) Use frontier orbital analysis to explain why maleic anhydride reacts rapidly with 1,3-butadiene but not with ethene under thermal conditions. 4
- (c) What is a cheletropic reaction? 1
