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PG Even Semester (CBCS) Exam., May—2018

CHEMISTRY

(2nd Semester)

Course No. : CHMCC-202

(Organic Chemistry—II)

Full Marks : 70

Pass Marks : 28

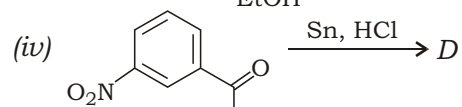
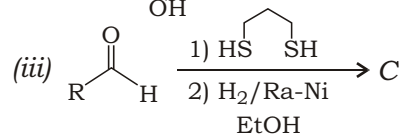
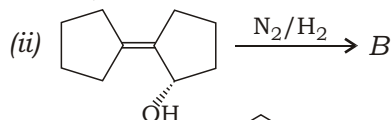
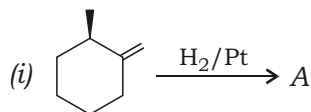
Time : 3 hours

The figures in the margin indicate full marks
for the questions

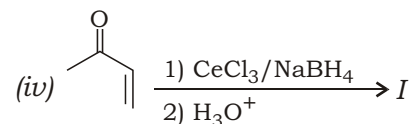
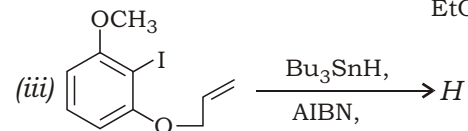
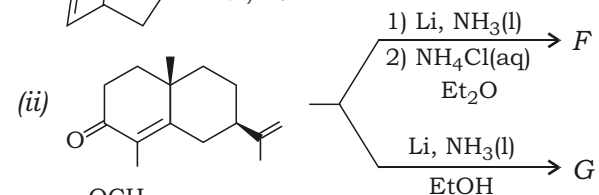
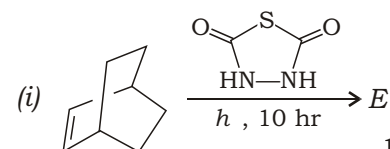
Answer **five** questions, taking **one** from each Unit

UNIT—I

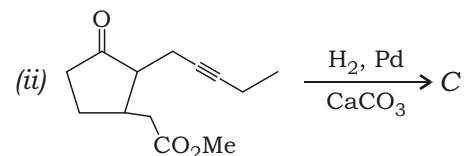
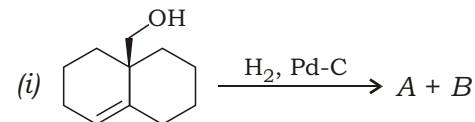
1. (a) Suggest the products of the following reactions : 1×4=4



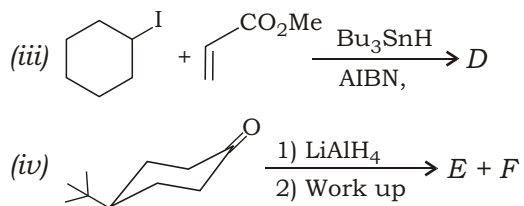
- (b) Write the products and suggest plausible mechanism for the following conversions : 2+3+3+2=10



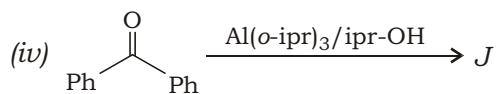
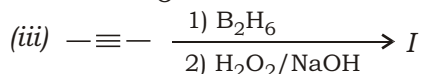
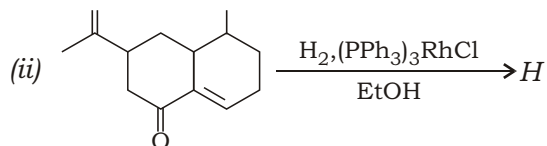
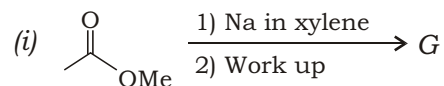
2. (a) Complete the following reactions (depict the stereochemistry of the products) : 1×4=4



(3)



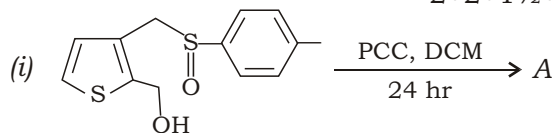
(b) Identify the following products and provide supportive mechanisms : $2+3+2+3=10$



UNIT—II

3. (a) What are Jones reagent and Collins reagent? Describe briefly the preparative methods of Jones reagent and Collins reagent. Predict the major products of the following reactions with mechanisms :

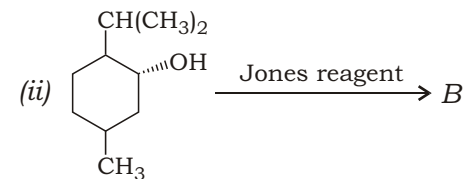
$2+2+1\frac{1}{2}+1\frac{1}{2}=7$



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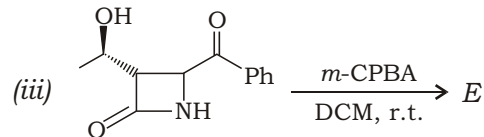
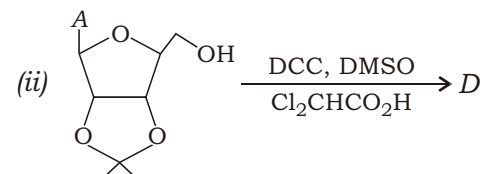
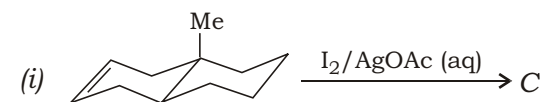
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(4)



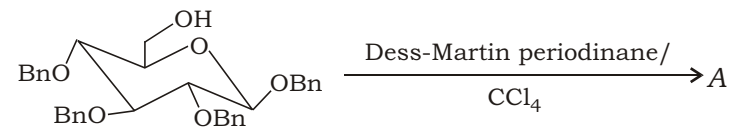
(b) Predict the products for the following reactions with plausible mechanisms :

$2\frac{1}{2}+2\frac{1}{2}+2=7$



4. (a) What is Dess-Martin periodinane and how can it be prepared from 2-iodobenzoic acid? Predict the products of the following reactions with mechanistic pathway :

$2+2=4$

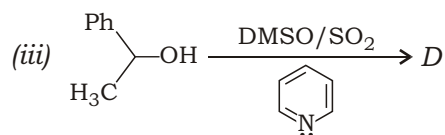
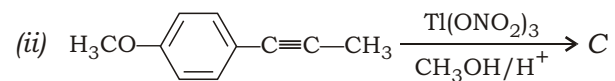
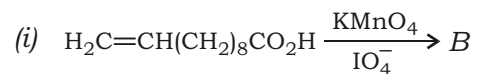


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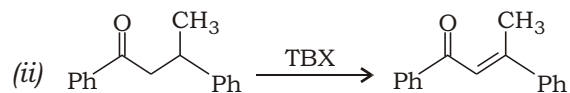
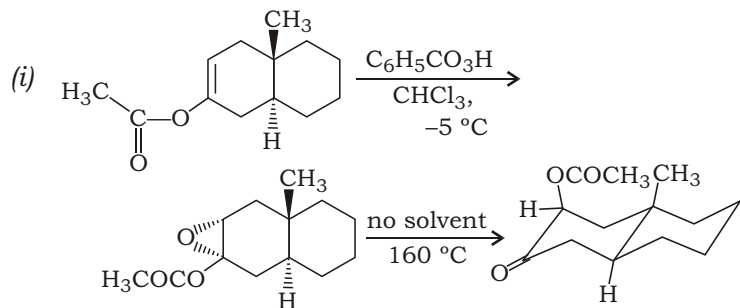
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(5)

(b) Predict the products of the following reactions with mechanisms : $2 \times 3 = 6$



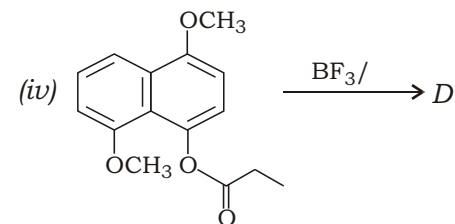
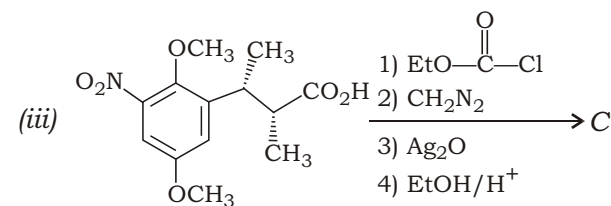
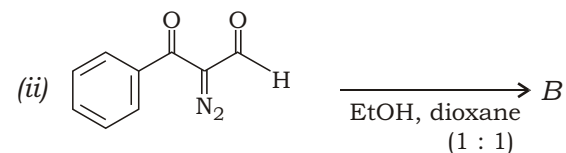
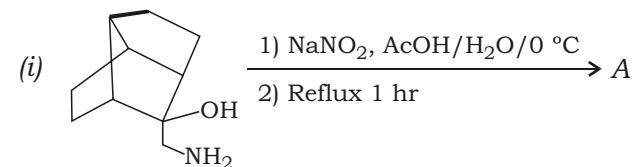
(c) Provide mechanism for the following reactions : $2 \times 2 = 4$



(6)

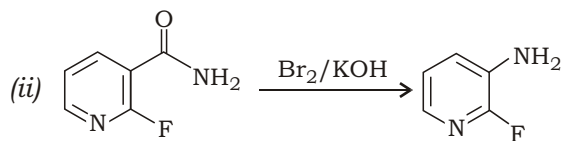
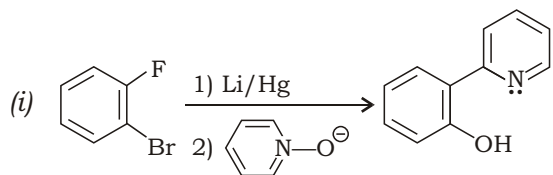
UNIT—III

5. (a) Predict the products of the following reactions and provide plausible mechanisms : $2\frac{1}{2} \times 4 = 10$



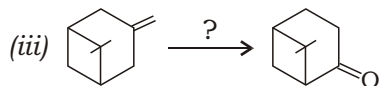
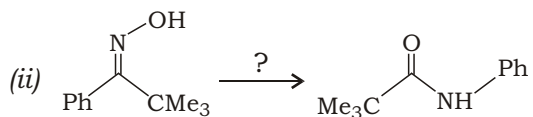
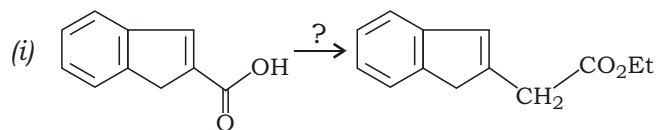
(7)

(b) Provide mechanisms to justify the formation of the following products : $2 \times 2 = 4$



6. (a) Carry out the following transformations with appropriate reagent(s), reaction conditions and provide mechanisms :

$2\frac{1}{2} \times 3 = 7\frac{1}{2}$



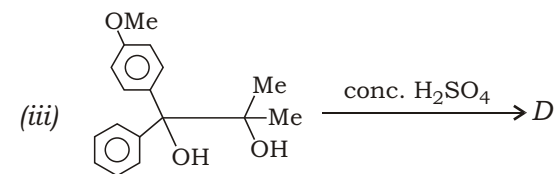
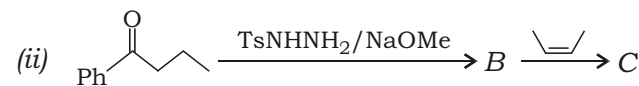
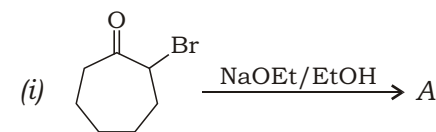
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(8)

(b) Predict the products of the following reactions along with mechanisms :

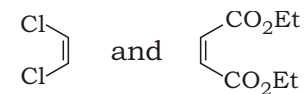
$2 + 2\frac{1}{2} + 2 = 6\frac{1}{2}$



UNIT—IV

7. (a) Explain the following observations. Provide the outcomes along with mechanistic support : $2 \times 3 = 6$

(i) Individually



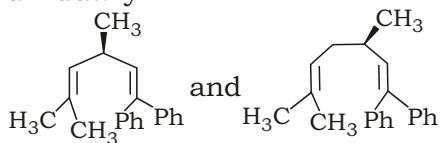
undergoes different types of photochemical reactions with acetone under non-sensitized conditions.

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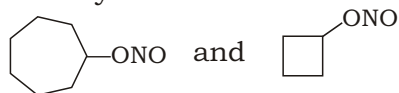
(9)

(ii) Individually



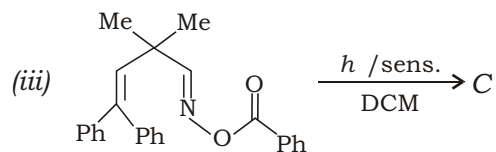
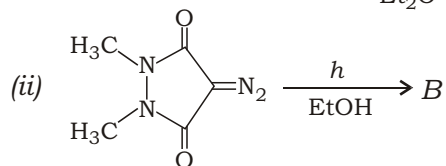
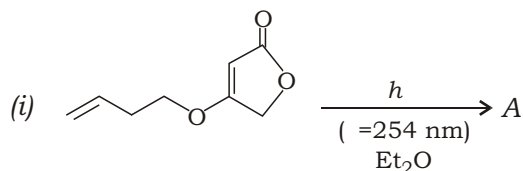
both undergo different types of photochemical transformations.

(iii) Individually



produces two different products upon irradiation with light.

(b) Delineate the outcomes of the following photochemical processes with the aid of correct mechanisms : $2 \times 3 = 6$



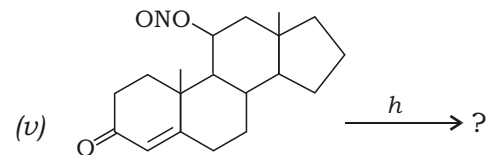
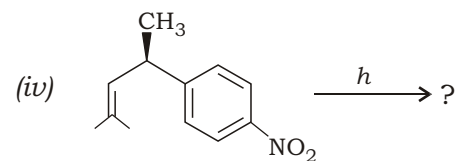
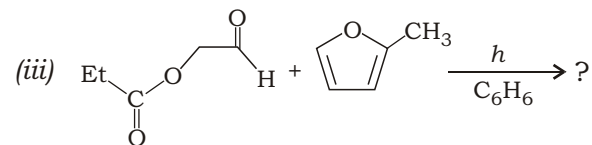
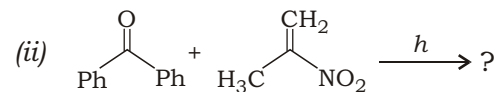
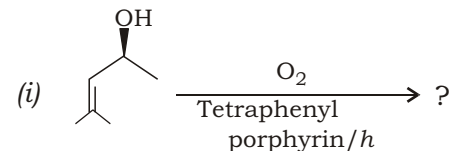
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(Turn Over)

(10)

(c) How can singlet oxygen be generated? Explain with an example. (Use spin states in support of your answer.) 2

8. (a) Delineate the photochemical outcomes of the reactions with befitting mechanism on each. Provide the exact stereochemistry where applicable : $2 \times 5 = 10$

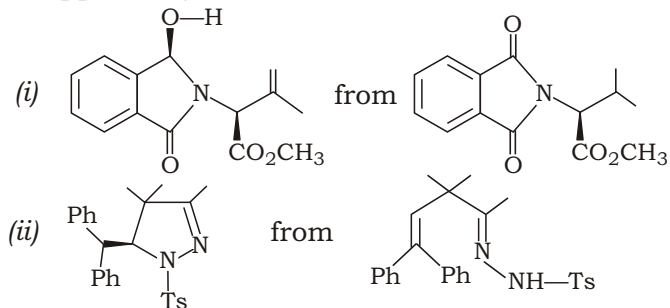


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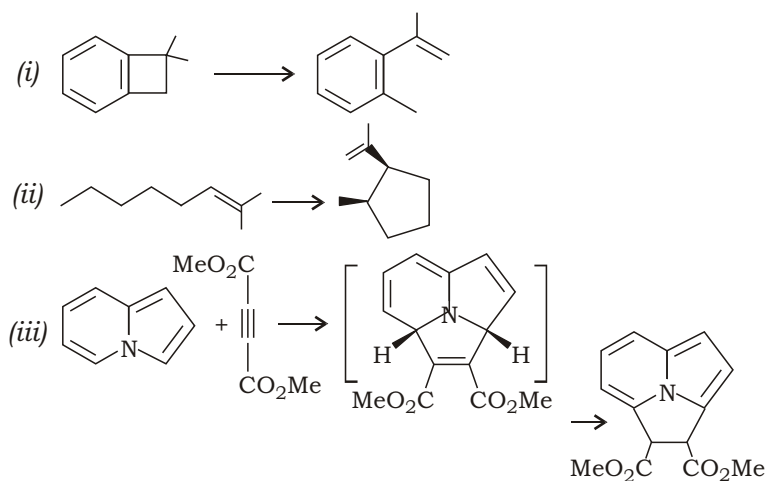
(11)

- (b) How can the following photochemical conversions be achieved? Provide mechanisms with explanations (if applicable) : $2 \times 2 = 4$



UNIT—V

9. (a) Each of the following reactions involves at least one pericyclic process. Provide mechanisms for the reactions. Identify the pericyclic process or processes : $(2+1) \times 3 = 9$

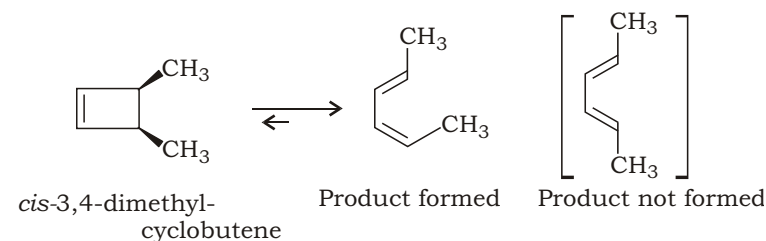


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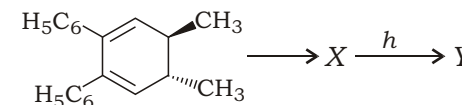
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(12)

- (b) What is 1,3-dipolar cycloaddition? 2
- (c) With FMO analysis, show that Nazarov cyclization is a thermally allowed process (with mechanism). 3
10. (a) Draw the π -molecular orbitals of 1,3,5-hexatriene. How many nodes are present in ψ_4 ? 2
- (b) With correlation diagram treatment, explain the stereospecificity in the following reactions : 4



- (c) With reasoning identify X and Y in the following reaction sequence. Label each process : $1+1+1+\frac{1}{2}+\frac{1}{2}=4$

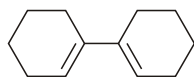


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(13)

- (d) Draw the product formed when the following compound undergoes disrotatory cyclization. Indicate the stereochemistry (*R/S*) at the new sp^3 -hybridized carbons. Will the reaction occur under thermal or photochemical conditions? 1+1+1=3



- (e) What is a cheletropic reaction? 1
