PG Even Semester (CBCS) Exam., May—2017

CHEMISTRY

(2nd Semester)

Course No. : CH–202 (C)

(Organic Chemistry—II)

Full Marks : 75
Pass Marks : 30

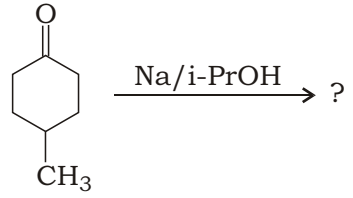
Time : 3 hours

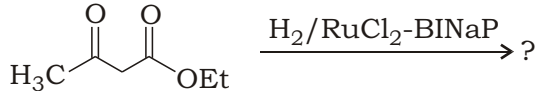
The figures in the margin indicate full marks for the questions

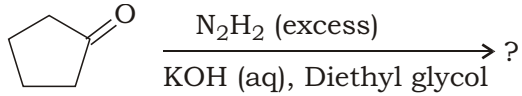
Answer **five** questions, taking **one** from each Unit

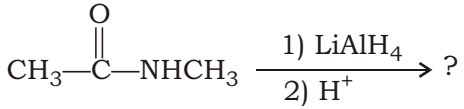
UNIT—I

1. *(a)* Predict the product with mechanism : 3×4=12

(i) 

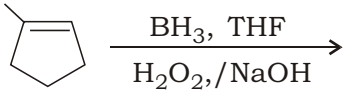
(ii) 

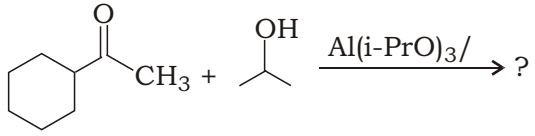
(iii) 

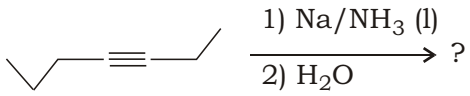
(iv) 

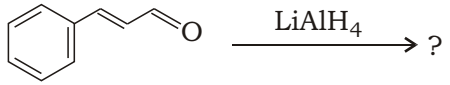
(b) Visualise the mechanism involved in reduction with Wilkinson's catalyst. 3

2. *(a)* Complete the reactions and provide the mechanisms : 3+3+3+2=11

(i) 

(ii) 

(iii) 

(iv) 

(b) Provide the general mechanism of—

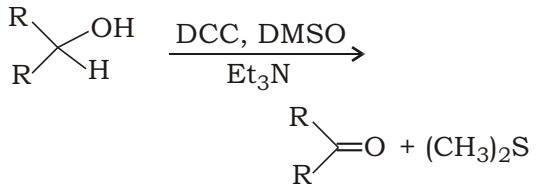
(i) Meerwein-Ponndorf-Verley reduction;

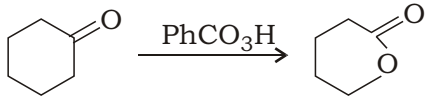
(ii) Wolff-Kishner reduction. 2+2=4

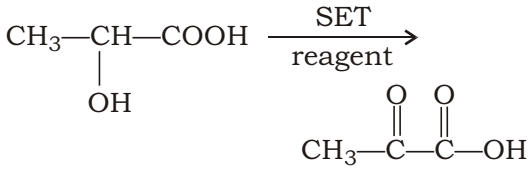
UNIT—II

3. *(a)* Provide the mechanism of Prevost and Woodward reactions. 3

(b) Depict the mechanism : 2×3=6

(i) 

(ii) 

(iii) 

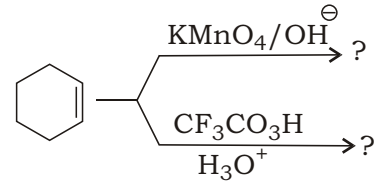
(c) Provide the mechanism of—

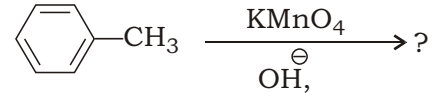
(i) sharpless asymmetric oxidation;

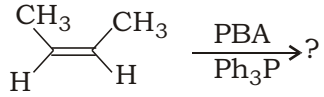
(ii) Swern oxidation. 3×2=6

4. *(a)* What is Moffatt oxidation? Depict the mechanism of Moffatt oxidation. 1+2=3

(b) Complete the reaction and show the mechanism : (2+2)+2+2=8

(i) 

(ii) 

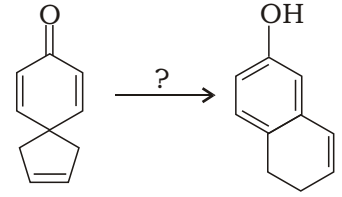
(iii) 

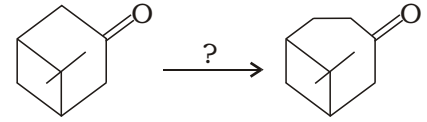
(c) What is Dess-Martin reaction? 2

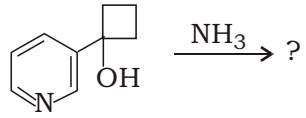
(d) What is PCC? How is PCC prepared? 1+1=2

UNIT—III

5. *(a)* Complete the following reactions (with mechanism) : 3×3=9

(i) 

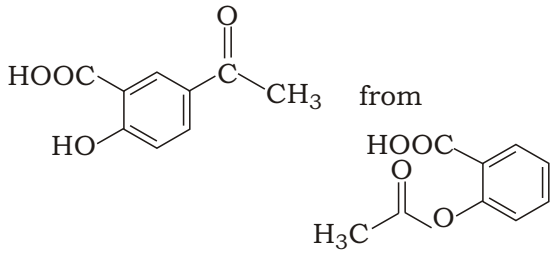
(ii) 

(iii) 

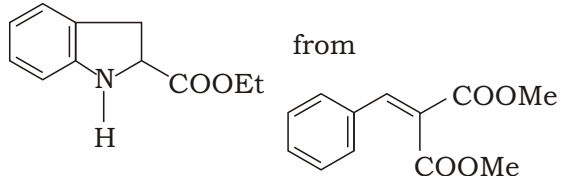
(b) Provide the reaction and general mechanism of Arndt-Eistert reaction. 3

(c) Provide the mechanism of Curtius reaction and Schmidt reaction. 1½+1½=3

6. *(a)* How will you prepare (with mechanism)? 3×3=9

(i) 

(ii) 

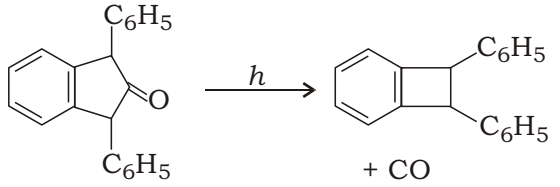
(iii) 

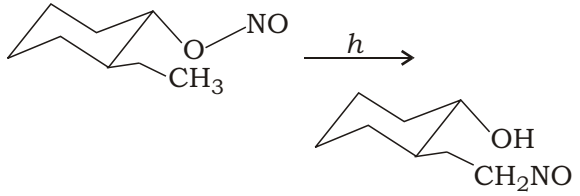
(b) Provide the mechanism of Hofmann reaction. 3

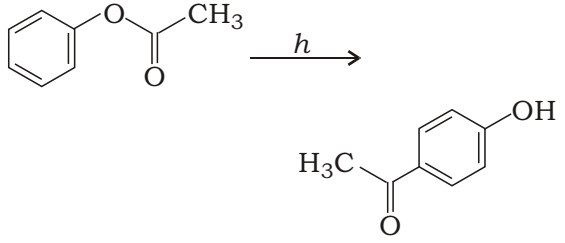
(c) Explain with MO diagram, why $:CH_2$ carbene is more stable as triplet but, $:CCl_2$ carbene is more stable as singlet. 3

UNIT—IV

7. *(a)* Provide the mechanism for the following photochemical processes : 2×3=6

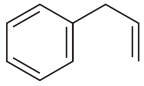
(i) 

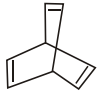
(ii) 

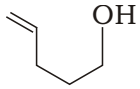
(iii) 

(b) Draw Jablonski diagram to show the pathways for *(i)* fluorescence and *(ii)* phosphorescence. 1½+1½=3

(c) What happens when (with mechanism)—

(i)  is irradiated with visible light;

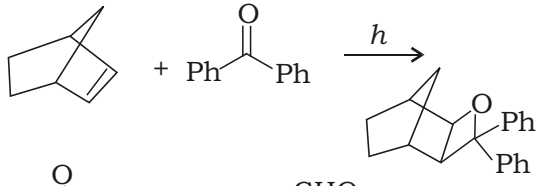
(ii)  is irradiated with light in presence of sensitiser;

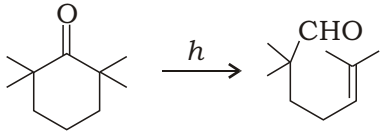
(iii)  is treated with Cl—NO and then irradiated with light? 2×3=6

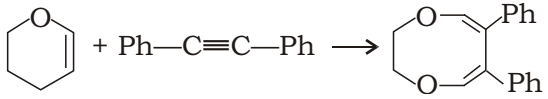
8. *(a)* Explain the sensitisation and quenching process along with their three modes of energy transfer. 3

(b) State Frank-Condon principle with the help of a potential energy diagram. 3

(c) Provide mechanism : 2×3=6

(i) 

(ii) 

(iii) 

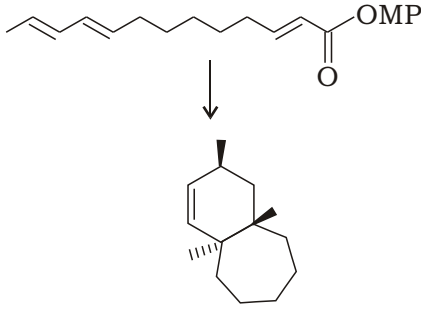
(d) Name two approaches relevant for the mechanism for Paternò-Büchi reactions. Show the molecular orbital representation with electron donating/electron withdrawing features. 3

UNIT—V

9. *(a)* Construct correlation diagram for [4+2] cyclo-addition reaction and state whether the reaction will take place under photochemical or thermal conditions. 3+1=4

(b) "[1, 3]-H shift takes place under photochemical condition." Support or oppose the statement with suitable MO treatment. 3

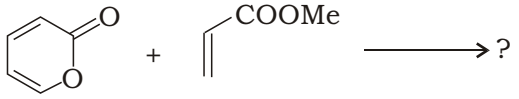
(c) Provide mechanism for the following transformation : 3

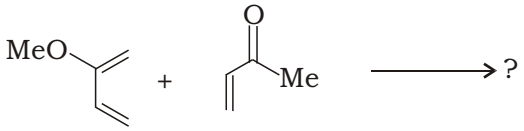


(d) What is cheleotropic reaction? Provide an example. 1+1=2

(e) Provide the mechanism of Nazarov cyclisation. Comment on the regioselectivity of this reaction. 2+1=3

10. *(a)* Complete the following reactions : 2

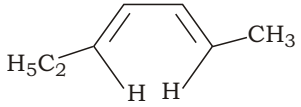
(i) 

(ii) 

(b) Write a note on Claisen rearrangement. 3

(c) What is Ene reaction? 2

(d) Using correlation diagram method, discuss the disrotation and conrotation ring closure of



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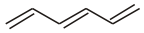
(e) Draw the Frontier molecular orbitals for—

(i) 

(ii)  1+2=3

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