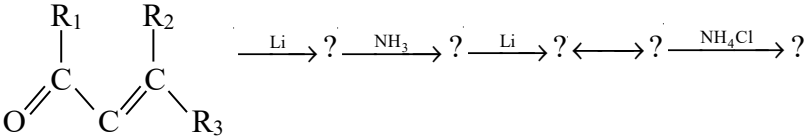
2024
M.Sc.
Second Semester
CORE – 06
CHEMISTRY
Course Code: MCHC 2.21
(Organic Chemistry - II)

Total Mark: 70 *Pass Mark: 28*
Time: 3 hours

Answer five *questions, taking* one *from each unit.*

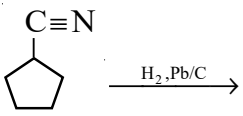
UNIT–I

1. (a) Explain the mechanism of catalytic hydrogenation of alkene. 4
   (b) Explain Birch reduction with mechanism. 5
   (c) Complete the following reaction with mechanism: 5



2. (a) Explain the homogeneous catalytic hydrogenation of alkene. 5
   (b) Explain dissolving metal reduction of benzophenone with sodium in liquid ammonia. 5
   (c) Complete the following reactions: 2×2=4

(i)



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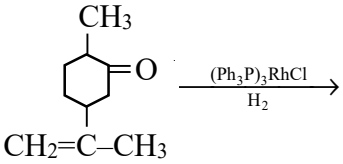


UNIT–II

3. (a) Explain the following reactions with mechanism: 4+3=7
   (i) Oxidation of cis and trans diol by lead tetra acetate
   (ii) Alkene epoxidation by peracid
   (b) Explain Prevost and Woodward hydroxylation of alkene. 4
   (c) Write the oxidation reaction mechanism of alcohol with chromium oxidants. 3

4. (a) Complete the following reactions: 1½×4=6
   (i) $R - CH = CH - CH_3 + HN = NH \longrightarrow$
   (ii) $R - CO - R + NH_2 - NH - CO - NH_2 \longrightarrow$
   (iii) $CH_3 - CH(OH) - CO - CH_2 - CH_3 \xrightarrow{MnO_2}$
   (iv) $R - CH_3 \xrightarrow{(CH_3COO)_2Mn}$
   (b) Explain the mechanism of carbonylation of organoboranes. 4
   (c) Explain the concerted mechanism of hydroboration reaction of alkene. 4

UNIT–III

5. (a) Write any two methods for the preparation of carbene. 4
   (b) Write the spin dependence and stereochemistry of cycloaddition of singlet and triplet carbine. 6
   (c) Explain Wolf rearrangement reaction of acyl carbene with mechanism. 4

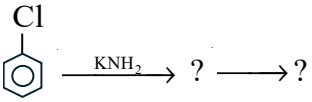
6. (a) Explain Curtius reaction with mechanism for acyl azide and write two of its application. 6
   (b) Write the cis and trans formation of aziridine from singlet and triplet nitrene. 4
   (c) Explain the stability of nitrene and insertion of nitrene in to C–H bond. 4

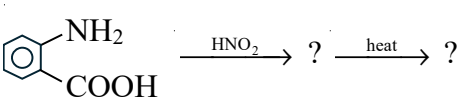
UNIT–IV

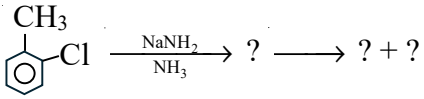
7. (a) Explain the stability of free radicals. 4
   (b) Explain allylic bromination by NBS with mechanism. 4

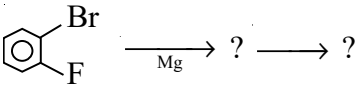
(c) Explain the reactivity of free radical in aromatic substrate. 6

8. (a) Write the benzyne mechanism for aromatic nucleophilic substitution of the following: 3×2=6
   (i) Bromobenzene
   (ii) m-bromoanisole
   (b) Complete the following reactions: 2×4=8

(i) 

(ii) 

(iii) 

(iv) 

UNIT–V

9. (a) Explain the following reactions 5×2=10
   (i) Henery reaction
   (ii) Mukaiyanama reaction
   (b) Write the stereoselective enolate reactions. 4

10. (a) Explain the following reactions with suitable examples: 4×2 =8
   (i) Prins reaction
   (ii) Vilsmeier-Hack reaction
   (b) Explain carbon cyclizations and its cleavages with suitable example. 6