

1079

B.E. (Biotechnology) Second Semester  
CH-202: General Chemistry

Max. Marks: 50

Time allowed: 3 Hours

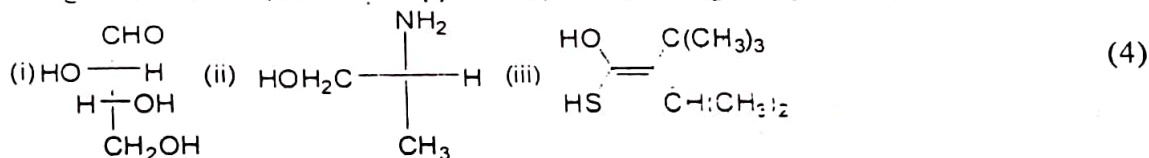
**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

- Q.(1) (i) Define bonding and antibonding molecular orbitals (1)  
(ii) Define crystal field stabilization energy with an example. (1)  
(iii) How racemic mixture differs from meso compounds? (2)  
(iv) Define Saytzeff rule with example. (2)  
(v) Amongst aldehydes and ketones, which one is more reactive towards nucleophilic addition reactions and why? (2)  
(vi) Why Pyridine is more basic compared to pyrrole. (2)

**SECTION-A**

- Q.(2) (a) What is valence bond theory? How it differ from the Lewis concept of chemical bonding? (4)  
(b) Draw the molecular orbital diagram of CO molecule with the help of MO diagram. (6)
- Q.(3) (a) Explain crystal field splitting in tetrahedral complexes. (7)  
(b) How Crystal field theory is helpful in explaining various colours of transition metal complexes? (3)
- Q.(4) (a) Assign R/S or E/Z (wherever applicable) to following compounds;



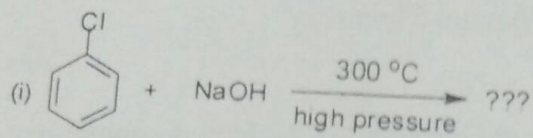
- (b) Draw the different conformations for cyclohexane and arrange them in increasing order of stability. Explain with the help of conformational analysis. (4)  
(c) What are meso compounds? Giving suitable example, explain why meso compounds are optically inactive. (2)

**SECTION-B**

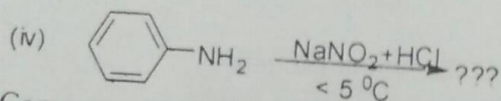
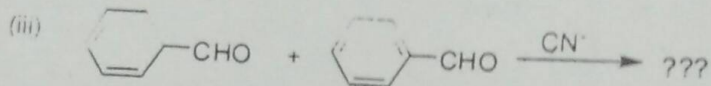
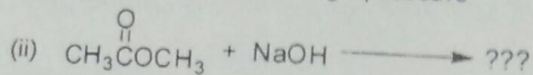
- Q.(5) (a) Complete following reactions;
- (i)  $\square \xrightarrow[h\nu]{\text{Cl}_2} ???$
- (ii)  $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{Br}_2 \xrightarrow{500-600^\circ\text{C}} ???$
- (iii)  $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2 + \text{HBr} \xrightarrow[40^\circ\text{C}]{\text{High temp.}} ???$  (4)
- (iv)  $\text{C}_6\text{H}_5\text{OH} \xrightarrow{\text{Electrophile (E}^+)} ???$
- (b) Give the mechanism for bromination of 2-methylpropane. (3)  
(c) Explain why alkynes are less reactive than alkenes towards electrophilic addition reactions. (3)
- Q.(6) (a) Explain the mechanism of Hell-Volhard-Zelinsky reaction. (4)  
(b) Complete following reactions:

P.T.O.

(2)



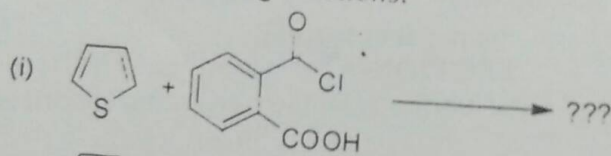
(4)



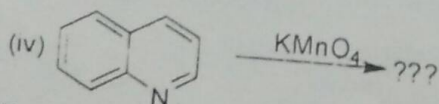
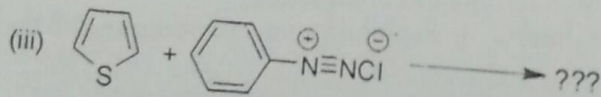
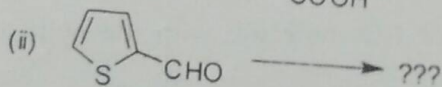
(c) Comment on the basic strength of aromatic amines with respect to aliphatic amines. (2)

Q.(7)(a) Discuss the aromaticity of pyrrole, furan and thiophene (3)

(b) Complete following reactions: (3)



(4)



(c) Explain Fisher Indole synthesis with mechanism. (3)

X-X-X