01. How will you detect the formation of intermediate in Riemer-Tiemann reaction?
02. What is cross over experiment? Explain its importance in determining reaction mechanism.
03. Write and explain the Benzil-Benzillic acid rearrangement.
04. What happens when acetyl chloride reacts with diazomethane in acid medium?
05. NaBH₄ is less powerful but more selective reducing agent. Justify this statement with an example.
06. Predict the major product and suggest a mechanism of the following reaction.

\[
\begin{array}{c}
\text{OH} \\
\text{CH₂OH}
\end{array} \xrightarrow{\text{H}^+} ?
\]

07. What happens when erythro 3-bromo-2-butanol react with HBr? Identify the stereochemistry of the product formed.
08. ‘trans 4-t-butyl cyclohexane carboxylic acid is more acidic than cis isomer in 66% aq. DMF’. Why?
09. State and explain Prelog’s rule with an example.
10. What is first order asymmetric transformation? Give an example.

**PART-B**

Answer *any eight* questions. (8 × 5 = 40 marks)

11. Compare the kinetically controlled and thermodynamically controlled product formation with potential energy diagram for a suitable reaction.
12. How will you determine the mechanism of hydrolysis of methylacetate reaction.
13. How does the kinetic observation used in determining the reaction mechanism?
14. Explain the Wagner-Meerwein rearrangement with mechanism.
15. Discuss any two important applications of pinacol-pinacolone rearrangement.
16. Explain the role of DDQ in aromatization reaction.

17. Explain the following with mechanism.
   a) dehydro elimination  
   b) dehydrogenation of amines


19. Explain the following:
   a) Observed dipole moment for 1,2-dibromoethane is 1 D.
   b) meso-stilbene dichloride does not react with pyridine at 200°C.

20. Explain the conformation of n-butane, C_2 – C_3 rotation.

21. How will you determine the configuration of
   a) (−) mandelic acid with respect to (+) lactic acid.
   b) (−) lactic acid with respect to (+) tartaric acid.

22. Discuss the conformational analysis of 1,2-disubstituted cyclohexane.

**PART-C**

Answer any four questions. (4 × 10 = 40 marks)

23. (a) How will you determine the mechanism for the conversion of p-chloronitrobenzene into m-chlorobenzoic acid? (5)
   (b) Suggest a method to detect the intermediate of Hofmann rearrangement and explain with mechanism. (5)

24. Explain the following rearrangements:
   (i) Baeyer-Villiger  
   (ii) Steven’s (5+5)

25. (a) Give the applications of Selenium dioxide and Osmium tetroxide with one example for each. (4)
   (b) Identify the products with mechanism. (3+3)

   (i) \[\text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {O}; 
   \end{tikzpicture}}\] \text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {\text{Zn/Hg}}; 
   \end{tikzpicture}} \rightarrow ? \text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {\text{HCl}}; 
   \end{tikzpicture}}

   (ii) \[\text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {O}; 
   \end{tikzpicture}}\] \text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {\text{H}_{2}(\text{Pt})}; 
   \end{tikzpicture}} \rightarrow ? \text{\begin{tikzpicture}[baseline] 
     \draw[thick] (0,0) -- (0.5,0) -- (0.5,0.5) -- (0,0.5) -- cycle; 
     \node at (0.25,0.25) {\text{HoAc}}; 
   \end{tikzpicture}}


26. a) Explain absolute asymmetric synthesis with a suitable example.
   b) Assign R/S configuration to the following:

   a) ![Structure a]
   b) ![Structure b]
   c) ![Structure c]
   d) ![Structure d]
   e) ![Structure e]
   f) ![Structure f]

27. a) Explain Octant rule with a suitable example.
    b) Predict the Cotton effect by the sign of the most occupied octant in the following compounds:
       (i) trans-10-methyl-2-decalone
       (ii) cholestan-6-one

28. a) How would you make racemic modifications? Explain thermal racemisation and racemization by cation formation.
    b) Explain all the steps involved in the stereochemical synthesis of yohimbine.

* * * * *