

# KALYANI MAHAVIDYALAYA.

## Chemistry

### Paper V

1. Define chirotopicity and achirotopicity with suitable example.
2. What is the difference between enantiotopic and diastereotopic?
3. Discuss the stereochemistry of allene and biphenyl with mono and di substituted analogue.
4. Discuss the conformational analysis of cyclohexane derivative by mono and bi substituted methyl group.
5. Writedown the short note on
  - i) Wagner-Merwein Rearrangment
  - ii) Pinacol-Pinacolone Rearrangement
  - iii) Beckman Rearrangement
  - iv) Bayer-Villiger Rearrangement
6. Discuss the different synthetic route for the synthesis of ether and epoxide compounds
7. Draw the resonating structure of aromatic diazonium and diazomethane compound.
8. Write down short note on Grignard reagent and organocopper reagent in terms of synthetic utility.
9. Discuss the role of organozinc in the synthesis of organic compounds.
10. Define Specific conductance, Molar conductance and Equivalent conductance with their respective units.
11. What is Kohlrausch's law?
12. Write down the general equation and unit of first order reaction.
13. Define prochirality with suitable example.
14. Discuss the conformational analysis of cyclohexane derivative by tri substituted methyl group.
15. Define Baeyer strain theory.
16. Write down short note on alkaline  $\text{KMnO}_4$  and  $\text{OsO}_4$  in terms of synthetic utility.
17. Discuss the role of organolithium in the synthesis of organic compounds.
18. What is the difference between physisorption and chemisorption?
19. Write down the general equation and unit of zero, first order reaction and second order reaction.

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**Paper IV**

1. Explain whether  $\text{He}^{2+}$  exists or not.
2. Discuss the shape of  $\text{SO}_4^{2-}$  ion.
3.  $\text{CH}_4$ ,  $\text{NH}_3$ ,  $\text{H}_2\text{O}$  involve in the same kind of  $\text{sp}^3$  hybridisation. Yet they possess different geometry. Why?
4. What is lanthanide contraction?
5. Explain why  $\text{Ce}^{3+}$  is more basic than  $\text{Ce}^{4+}$ ?
6. What are chelate compounds? Give two examples.
7. Give the IUPAC names of the following:
  - i.  $\text{K}_4[\text{Ni}(\text{CN})_4]$
  - ii.  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl}$
  - iii.  $[(\text{H}_2\text{O})_4\text{Fe}^{\text{OH}}\text{Fe}(\text{H}_2\text{O})_4](\text{SO}_4)_2$
8. Discuss the geometrical isomerism in square planar coordination complexes.
9. What is meant by e.m.f of a cell? How is it measured?
10. Predict whether the following redox reaction takes place:  
$$\text{Sn}^{2+} + \text{Cu} \rightarrow \text{Sn} + \text{Cu}^{2+} \quad \text{Given } E^0_{\text{Sn}^{2+}/\text{Sn}} = -0.136 \text{ volts}, E^0_{\text{Cu}^{2+}/\text{Cu}} = 0.34 \text{ volts}$$
11. Explain by M.O diagram why  $\text{O}_2$  is paramagnetic?
12. Show graphical representation of electron probable density of bonding and antibonding molecular orbitals.
13. Draw the shapes of i)  $\text{SOCl}_2$  ii)  $\text{F}_2\text{O}$  iii)  $\text{H}_2\text{O}$  according to VSEPR theory.
14. Draw the possible isomers of  $[\text{Co}(\text{en})_2\text{Cl}_2]$ . Which one is optically active and why?
15. Draw the shape of a  $\text{C}_2\text{H}_2$  molecule explaining the types of bonds and hybridisation.
16. Name one metal indicator and draw its structure.
17. Draw the M.O diagram of  $\text{CO}$ ,  $\text{NO}^+$ .

18. Cu (I) is diamagnetic, whereas Cu (II) is paramagnetic. Explain why?
19. Draw the molecular orbital energy diagram of He<sub>2</sub> molecule and comment on its stability.
20. Discuss the shape of CO<sub>3</sub><sup>2-</sup> ion.
21. Give the IUPAC names of the following:
- K<sub>4</sub>[Mo (CN)<sub>8</sub>]
  - [Cr(H<sub>2</sub>O)<sub>4</sub>Cl<sub>3</sub>]

