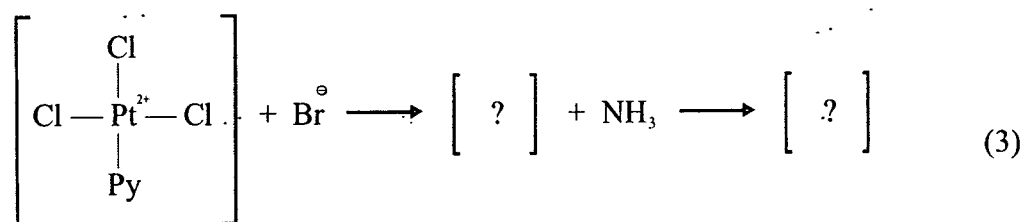


2. (a) Show diagrammatically splitting of d – orbitals in tetrahedral field. (3)
- (b) Draw M.O. diagram me of NO molecule or HCl molecule. (2½)
- (c) How is intramolecular bonding different from intermolecular hydrogen bonding ? (2)
- (d) Why low spin tetrahedral complexes are not known to exist ? (2)
3. (a) State John Teller Theorem. What are the conditions for : No distortion, slight distortion and strong distortion in octahedral complexes ? (4)

- (b) What is trans effect ? On the basis of trans effect complete the following reaction



- (c) How does π – bonding affect Δ_o in coordination complexes ?

OR

Explain briefly the electrostatic polarization theory and π – bonding theory of Trans effect. (2½)

4. (a) Give the hybridization of the central atom and predict the shape of any two of the following :
- (i) NO_3^- ion (ii) XeF_4 (iii) ClF_3 (2×2=4)
- (b) Which complex in each pair will have higher Δ_o value and why ?
- (i) $[\text{Cr}(\text{CN})_6]^{3-}$ or $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
- (ii) $[\text{Cr}(\text{CN})_6]^{3+}$ or $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ (4)
- (c) Calculate CFSE of d^8 ion in weak octahedral field. (1½)
5. (a) Explain any four of the following : (4×2=8)
- (i) Why is N_2 molecule diamagnetic and O_2 , paramagnetic ?
- (ii) Sugar is covalent in nature but is soluble in water while BaSO_4 although ionic is insoluble in water. Explain.

- (iii) Although hydrogen bonding in HF is stronger than present in water; why does water have much higher boiling point ?
- (iv) Although F_2 and Br_2 are gases; why is bromine liquid and iodine exist as solid at room temperature ?
- (v) Pure HCl does not conduct electricity but its aqueous solution does ?
- (b) How is thermodynamic stability different from kinetic stability of a substance ?

OR

How are instantaneous dipole – induced interactions different from dipole – dipole interactions ? (1½)

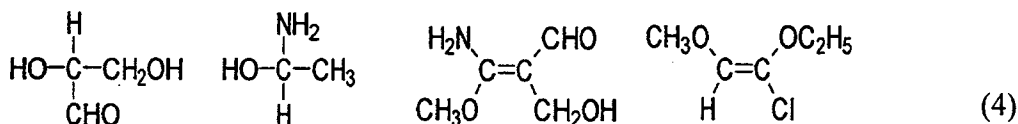
SECTION B (Max. Marks : 37)
(Organic Chemistry)

(Attempt Three questions including Question No. 1 which is compulsory.)

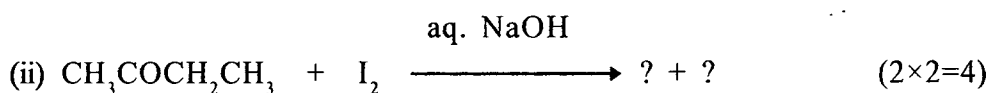
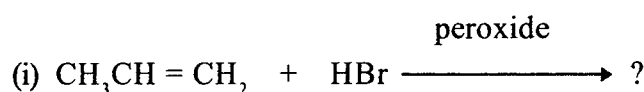
1. (a) Answer any six of the following : (6×2=12)
- (i) Draw Newmann conformations of n – butane. Which of these is the most and the least stable ? Explain.
- (ii) Why 2,4,6 trinitrophenol is strongly acidic in nature ? Explain.
- (iii) Draw one each meso and enantiomeric forms of tartaric acid.
- (iv) Explain the directive influence of the following groups when present in benzene nucleus :
- (i) –CHO (ii) –OH
- (v) In what respect natural rubber differ from synthetic rubber ? Draw their respective structures.
- (vi) Explain the terms Enantiomers and Distereoisomers with examples.
- (vii) Give one example each of reactions involving carbene and aryne as an intermediate.
- (viii) Why is benzyl cation more stable isopropyl carbocation ?
- (b) What is chirality ? (1)

P.T.O.

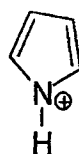
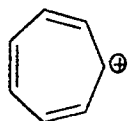
2. (a) What happens when methyl magnesium bromide reacts with the following :
 (i) carbon dioxide (ii) methanal (iii) propanone (iv) ethyl acetate (4)
- (b) Assign R / S or E / Z configuration (as the case may be) to any two of the following :



- (c) Complete the following giving the name of the reaction



3. (a) Why is it necessary to carry out diazotisation at 0–5°C ? Write equation for azo – dye test for aromatic primary amines. (4)
- (b) What happens when phenol is heated with chloroform and alkali ? Name the product formed after acidification. Name the reaction involved. (4)
- (c) Using Huckel's Rule, explain which of the following are aromatic ?



(2)

- (d) What are the differences between E1 and E2 elimination reactions ? Explain giving example of each type. (2)

4. (a) Give the structures of any two nucleophiles. (2)
- (b) Discuss the mechanism of Cannizzaro reaction with suitable example. (4)
- (c) Write short notes on any two of the following name reactions :
 (i) Mannich reaction
 (ii) Dieckmann Reaction
 (iii) Claisen condensation
 (iv) Darzen Reaction (4)

(1000)