

CHEMISTRY Paper-XXI

(Inorganic Chemistry-B)

Time Allowed : Three Hours

Maximum Marks : 22

Note : Attempt five questions in all, selecting one question from each Unit and Unit V is compulsory.

UNIT-I

- (a) What are Silicones ? Discuss the structure and important properties of silicones.
(b) Name and explain three major classes of silicones elastomers. 2,2
- (a) Discuss the Island Model of structure and bending in cyclic $(\text{NPCI}_2)_3$.
(b) Write brief notes on the following :
 - Silicone oil
 - Silicone rubber 2,2

UNIT-II

- (a) What are hard and soft acids and bases ? Explain HSAB principle with suitable examples.
(b) Hard-hard interactions are generally ionic while soft-soft interactions are covalent. Why is it so ? 2,2
- (a) How electronegativity can be used to explain hardness and softness of acids and bases ?
(b) What is Symbiosis ? Give examples. What are its applications ? 2,2

UNIT-III

- (a) Draw and discuss the Orgel energy level diagrams for d^1 and d^9 tetrahedral systems. What are its limitations ?
(b) Determine ground state term symbols for Cu^{2+} and Ni^{2+} ions. 2,2
- (a) Discuss under what conditions, the selection rules for electronic spectra of transition metal complexes are relaxed. Give examples.
(b) Write a brief note on spectro-chemical series. What are its applications ? 2,2

UNIT - IV

7. (a) What is Magnetic Susceptibility ? How does it vary with temperature ?
- (b) What is meant by quenching of orbital angular momentum ? What are its consequences ? 2,2
8. (a) Give two main advantages and disadvantages of Gouy's method for measuring magnetic susceptibility.
- (b) What is temperature independent paramagnetism (TIP) ? Explain with examples. 2,2

UNIT - V

(Compulsory Questions)

9. (a) Draw the structure of repeating unit in silicone.
- (b) Which of the two Cu(I) or Cu(II) is diamagnetic ?
- (c) Why is pyridine a border line base while ammonia is a hard base ?
- (d) Write Mulliken symbols for spectroscopic terms in octahedral field.
- (e) Define Hard acid with example.
- (f) Why BeF_2 is more stable than BeI_2 ? 1×6=6