

Exam.Code:0039
Sub. Code: 17993

2125
B.Sc. (Hons.) Bio-Informatics
First Semester
BIN-1006: Chemistry – I

Time allowed: 3 Hours

Max. Marks: 60

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

x-x-x

1. (a) Define ionization energy and ionic radii.
(b) Explain hyperconjugation and inductive effect.
(c) Write the IUPAC name of the following compounds:
(i) $[\text{PtClBr}(\text{NH}_3)(\text{py})]$ (ii) $\text{K}_2[\text{HgCl}_4]$
(d) Depict the concept of activation energy.
(e) What do you understand by dipole moment and ferromagnetic substances?
(f) Explain HSAB principle.

(6×2=12)

UNIT-I

2. (a) Electron affinities of elements having exactly half-filled and completely filled orbitals are essentially zero. Discuss with suitable examples.
(b) Using valence bond theory, predict the geometry of $[\text{CoF}_6]^{3-}$.
(c) How will you prove the intermediacy of carbocation in $\text{S}_\text{N}1$ reaction? (4, 4, 4)
3. (a) Draw the molecular orbital diagram for O_2^{2-} ion & C_2 molecule. Also predict the bond order.
(b) How does valence bond theory explain that $[\text{Ni}(\text{CO})_4]$ is diamagnetic and tetrahedral? (6, 6)
4. (a) Describe the benzyne mechanism with appropriate example.
(b) Explain the geometrical isomerism shown by the compound $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$.
(c) Depict the structure of carbocations with its stability. (5, 4, 3)

UNIT-II

5. (a) Define polarizing power, polarizability and polarization. How do these influence ionic character of a compound?
(b) Elaborate osmotic pressure, its law and measurements. (6, 6)
6. (a) Explain potential energy barrier, Arrhenius equation and collision theory.
(b) Describe the factors affecting the hardness and softness of acids and bases. (6, 6)
7. (a) Differentiate between ideal and non-ideal solutions.
(b) Elaborate the various factors which influence the rates of reaction.
(c) Calculate the boiling point of a solution containing 0.4650 g of camphor (mol wt = 152) dissolved in 31.4 g of acetone (b. p. = 56.30°C) if the molecular elevation per 100 g of acetone is 17.2°C .

(3, 6, 3)

x-x-x