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(20425) Roll No.

B.Sc. (Bio-tech.) - I Year

# 3462

# B.Sc. (Bio-Tech.)

# Examination, April-2025

## CHEMISTRY

## (B-108)

*Time : Three Hours ]* *[Maximum Marks :50*

**Note :** There are total **ten** questions in this question paper and candidate is to attempt any **five** questions. Each question carries **10** marks.

1. What are quantum numbers? Discuss the shapes of s, p and d orbitals. Explain Effective Nuclear charge with two examples. 2+4+4



2. Define ionic radii, ionization energy and electro negativity. Explain their trends in periodic table. 6+4

3. Discuss valence bond theory and its limitations. What is hybridization? Explain various types of hybridization. 4+2+4

4. With respect to VSEPR theory predict the molecular geometry and shape of following 2½×4

   (a) $H_2O$

   (b) $SF_4$

   (c) $NH_3$

   (d) $ICl_2$

5. Discuss Born-Haber Cycle. Explain radius ratio effect and coordination number. 5+5

6. Give the salient features of hydrides. Explain diagonal relationship. Discuss solvation and complexation tendencies of s block elements. 4+3+3

7. Give the postulates of kinetic molecular theory of gases. On the basis of this theory derive kinetic equation $PV = \frac{1}{3}mnu^2$ for gases. 5+5

8. (a) What are interhalogens? Discuss the structure of various types of interhalogens. 6

   (b) Discuss the oxyacids of nitrogen. 4

9. Define rate of reaction and rate constant of reaction. Discuss the factors affecting the rate of reactions. 10



10. Write notes on following: 2½×4

   (a) Heisenberg Uncertainty Principle

   (b) Pauli's exclusion principle

   (c) Hund's multiplicity rule

   (d) Fajan's rule