

First Semester Internal Examination, October 2024
Minor Course in Chemistry
Basic Inorganic Chemistry and Nuclear Chemistry
CHE1MN105

Time: 1 Hr

Max Marks: 35

| | | | | |
|---------------|---------------------|------------------|--|--------------------|
| Name: | Marks Scored | Section A | | Total Marks |
| Class: | | Section B | | |
| | | Section C | | |

Section A

(Each question carries 3 marks, Max marks for section – 7)

1. Explain the significance of Heisenberg uncertainty principle?
2. Write the electronic configuration of Fe and Fe³⁺. Explain the difference. (Fe, Z = 26).
3. Explain why the first ionization enthalpy of B is less than Be?

Section B

(Each question carries 6 marks, Max marks for section – 18)

4. Discuss the factors that influences the electron affinity of elements.
5. State the postulates of VSEPR theory and use it to predict the shapes of H₂O, NH₃, and SF₆.
6. Explain hydrogen bonding and discuss the unusual behaviour of water due to hydrogen bonding.
7. Explain the concept of hybridization. Discuss the type of hybridization and shape in CH₄ and PCl₅ molecules.

Section C

(Answer any one question, Each question carries 10 marks)

8. (a) Discuss the limitations of Bohr atom model.
(b) State and explain Heisenberg's uncertainty principle. What is its significance in our daily life?
(c) Calculate the uncertainty in the velocity of a particle of mass 1×10^{-6} Kg whose uncertainty in position is 9.54 angstroms.
(d) Write a short note on wave particle duality of matter.
9. Draw the MO energy diagram for the O₂ molecule. Compare the bond length, magnetic behaviour and bond energy of O₂, O₂⁻, O₂²⁻ and O₂²⁺ on the basis of MOT.