SET A

B.Sc. CHEMISTRY
FIRST SEMESTER
INORGANIC CHEMISTRY I
BSC – 102

[USE OMR FOR OBJECTIVE PART]

Duration: 1:30 hrs. **Full Marks: 35**

(PART-A: Objective)

Time: 15 mins. **Marks: 10**

Choose the correct answer from the following: ***1×10=10***

1. The intensity of electromagnetic radiation is determined by the
   a. number of neutrons striking a unit area in unit time
   b. number of photons striking a unit area in unit time
   c. the number of protons striking a unit area in unit time.
   d. the number of electrons striking a unit area in unit time

2. Electrons that are in different levels have
   a. same probability distribution
   b. different probability distribution
   c. equivalent probability distribution
   d. negative probability distribution

3. Principal quantum number gives
   a. the relative size of distribution
   b. general shape of distribution
   c. orientations of the distribution
   d. different radial distribution

4. Sodium chloride dissolves in water due to
   a. ion dipole interaction
   b. dipole dipole interaction
   c. dipole induced dipole interaction
   d. instantaneous dipole induced dipole interaction

5. Intermolecular hydrogen bonding
   a. Increases the boiling point of a liquid
   b. decreases the boiling point of a liquid
   c. decreases melting point of a solid
   d. breaks the original bond

6. Crystals with Frankel Defects are having
   a. one type of hole
   b. two types of holes
   c. three types of holes
   d. four types of holes

7. Boron has lesser ionization enthalpy than beryllium, because
   a. Ionization enthalpy decreases with an increase in atomic number
   b. The s electron can be removed easier than the p electron
   c. Ionization enthalpy increases along the period
   d. It is easier to remove electrons from p subshell than a filled s subshell

8. Which of the following is changeable?
   a. Ionization energy
   b. Electron affinity
   c. electronegativity
   d. Both b and c

9. The correct order of the electron affinity for one electron gain of the elements is
   a. F > Cl > Br
   b. P > N > As
   c. S > Se > O
   d. K > Li > Na

10. The correct increasing order of ionic radii is
   a. $S^{2-} < Cl^{-} < Ca^{2+} < K^{+}$
   b. $Ca^{2+} < K^{+} < Cl^{-} < S^{2-}$
   c. $K^{+} < S^{2-} < Ca^{2+} < Cl^{-}$
   d. $K^{+} < Ca^{2+} < Cl^{-} < S^{2-}$

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Descriptive

Time : 1 hr. 15 mins. Marks: 25

[Answer question no.1 & any two (2) from the rest]

1. a. Give a brief account of dual nature of electron. 2+3=5
   b. Write the applications of ionization energy?

2. a. What is Line Spectra ? How is it produced ? 3+4+3 =10
   b. What is Zeeman Effect? How this led to the concept of Magnetic quantum number.
   c. Give the mathematical description of the wave associated with the electronic motion about a nucleous, as first suggested by Schrodinger in his Wave Equation.

3. a. Explain the term Dipole Dipole interaction with suitable example. 3+4+3 =10
   b. What is Intermolecular hydrogen bonding ? How does it differ from Intramolecular hydrogen bonding ?
   c. Explain why ortho-nitro phenol has lower melting point as compared to para-nitro phenol.

4. a. Give an account of Heisenberg' s Uncertainty Principle. 3+4+3 =10
   b. What is Schottky Defect ? How does it differ from Frankel Defect?
   c. What do you mean by positive and negative electron gain enthalpy? Give example.

5. a. What are the factors that affect electron gain enthalpy? 3+3+4 =10
   b. Define electronegativity and how it is measured? What is the periodic trend of electronegativity?
   c. Why Slater's rule is important? Find effective nuclear charge of a outermost electron in Ca atom.

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