B.Sc. CHEMISTRY
FIRST SEMESTER
INORGANIC CHEMISTRY I
BSC – 102
[USE OMR SHEET FOR OBJECTIVE PART]

SET

A

Duration: 1.30 hrs.   Full Marks: 35

(**Objective**)

Time: 15 min.   Marks: 10

Choose the correct answer from the following: **1X10=10**

1. According to VSEPR Theory, the shape of the molecule PCl_5 is
    a. Trigonal plane
    b. Trigonal pyramid
    c. Trigonal bipyramid
    d. Square pyramid

2. The hybridization required to account for the bonding in BF_3 molecule is-
    a. sp^2
    b. sp^3
    c. dsp
    d. dsp^2

3. If on heating conductivity of a material increases, then the material is -
    a. Semiconductor
    b. Insulator
    c. Conductor
    d. Metal

4. The ionization energy of an element can be affected by the presence of
    a. Inner shell electrons
    b. Electron shielding
    c. Both a and b
    d. None of the above

5. The screening or shielding effect of d electrons is
    a. More than s electrons
    b. Less than s electrons
    c. Equal to p electrons
    d. None of the above

6. Allred Rochow's scale scale is related to
    a. Electronegativity, radius and Z_{eff}
    b. Ionization potential, electron affinity
    c. Bond polarity and periodicity
    d. None of the above

7. Consider order $O^{2-} < F^- < Na^+ < Mg^{2+}$, the incorrect statement is
    a. Increasing order of Z_{eff}
    b. Increasing order of ionization energy
    c. Increasing order of size
    d. Increasing order of electron affinity

8. Electron that are in different energy levels have
    a. Same probability distribution.
    b. Different probability distribution.
    c. Equivalent probability distribution.
    d. None of the above.

9. Electrons while travelling in an elliptical orbit would have in addition to its angular momentum have a component momentum along
    a. Radial direction.
    b. Tangential direction.
    c. X-axis.
    d. None of the above.

[1]

10. The Principal quantum number (n) gives
    a. The relative size of distribution.
    b. The general shape of distribution.
    c. The orientation of distribution
    d. None of the above.

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(__Descriptive__)

Time: 1 hrs 15 mins   Marks: 25

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

1. a. Draw the resonating structures of thiocyanate ion SCN^- 2+2+1
                                                                                 =5
    b. Give an account of the dual nature of electron.

    c. What do you mean by effective nuclear charge?

2. Draw the molecular orbital energy level diagram for Oxygen   6+2+2
    Molecule. Explain the bond order and the magnetic property of the   =10
    oxygen molecule.

3. a. Explain the structure of SF_4 and ClF_3 according to VSEPR theory.   5+3+2
                                                                                 =10
    b. What is the shielding constant experienced by a 3d electron in
       the bromine atom.

    c. Write a note on Heisenberg's uncertainty principle.

4. a. Write three applications of ionization enthalpy.   3+5+2
                                                                                 =10
    b. Describe how electronegativity is calculated by three different
       scales.

    c. What do you mean by group electronegativity.

5. a. Why and how did Sommerfield modify Bohr's model of atom ?   2+3+4
                                                                                 =10
    b. Evaluate the limitations of Schrodinger Wave equation.

    c. Give an account of the signs of wave functions.

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[3]