Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Non Medical) (2018 & Onwards)   (Sem.–1)
INORGANIC CHEMISTRY
Subject Code : BSNM-102-18
M.Code : 75743

Time : 3 Hrs.   Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Define the following :**

   a) Why are half filled orbitals are more stable?

   b) What are the maximum number of hydrogen bonds that a molecule of water can have?

   c) Out of LiCl and LiF which has more covalent character and why?

   d) Give the shape and geometry of XeF_4.

   e) What is the packing efficiency of NaCl?

   f) How do we assign angular quantum number if n=4?

   g) Give the trend of ionisation enthalpy as we go down the group.

   h) Define ion-dipole forces.

   i) Discuss the shielding effect in while going down in a group in a periodic table.

   j) What is the hybridisation of PCl_5?

SECTION-B

2. Differentiate between the following :

   a) Normalised and Orthogonal wave function

   b) Valance band theory and VSEPR theory

3. a) Define Heisenberg uncertainty principle with its mathematic expression.

    b) A cricket ball weighing 100gm is to be located within 0. 1Å. What is the uncertainty and its velocity. (h = 6.626×10^{-34} JS).

4. Differentiate between the following :

    a) Frankel defect and Schotky defect

    b) Dipole-dipole and induce dipole interaction

5. Calculate the effective nuclear charge of following using Slater's rule :

    a) 4s e^- in potassium atom

    b) Last electron with configuration $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^5$

    c) One of the 3d electron of Vanadium (Atomic No.-23)

6. a) Explain Born Haber cycle and give its applications.

    b) Explain semiconductors, conductors and insulators on the basis of band theon with diagram.

SECTION-C

7. Draw the molecular diagram of O_2, O_2^{2-} and O^{2+} Compare them on the basis of its bond order and magnetic behaviour. Also calculate its bond length and bond dissociation energy .   (10)

8. a) Determine the following for the FCC structure :   (6)

        i)   Packing efficiency

        ii) Radius ratio

        iii) Relation between radius and length

    b) Derive the Born-Lande equation.   (4)

9. a) Illustrate the Schrodinger wave equation in one dimensional box.   (6)

    b) Give brief description of following :   (4)

        i)   Hund's Rule

        ii) Pauli's Exclusive principle

        iii) Afbau principle

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.