Roll No…….. **Total No. of Printed Pages: [1]**

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B.Sc.-M. Sc. (Forensic Science) (Semester – 1st)

INORGANIC CHEMISTRY-I

Subject Code: BSNMS1103

Paper ID: [23480104]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Draw the shape of orbital corresponding to n = 3 and l = 2.
b) What is Aubau principle? Discuss its limitations also.
c) Out of 1s, 2s, 3d, 3f which orbitals are not possible? Explain with reasons.
d) What do you understand by successive ionization energy?
e) Distinguish between electron affinity and electronegativity.
f) Give reason for higher boiling point of H_2O than H_2S.
g) Why He_2 does not exist?
h) A compound consisting of cation radius 0.97 Å and anion radius 2.51 Å will probably crystallize as NaCl form, if correct justify your answer.
i) CuCl and AgCl are insoluble in water whereas NaCl is highly soluble in water, why?
j) How does solubility of ionic solid depend upon the lattice energy?

Section – B **(5 marks each)**

Q2. Write the wave equation defining the orbital, which part of the wave equation governs the shape of the orbital? Also draw the radial distribution curve for 3s and 3d orbitals.

Q3. Define electronegativity. How it varies along group and period in periodic table.

Q4. How Slater rules are used for calculating shielding constant for Z effective? Calculate the effective nuclear charge for 4s and 3d orbital of Cr.

Q5. What do you understand by hybridization? Explain with one example of sp hybridization.

Q6. Explain polarizations power and polarizability.

Section – C **(10 marks each)**

Q7. Derive Schrödinger wave equation and explain how this equation support Bohr's theory of hydrogen atom?

Q8. With the help of molecular orbital diagram for O_2, O^{2+}, O^{2-} and O_2^{2-}. Find out the bond order and arrange the molecules in terms of increasing bond length.

Q9. What is meant by radius ratio? How will you determine the ionic radius ratio of crystal in which the central metal ion, A^+ is surrounded octahedrally by six B^-?