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Total No. of Printed Pages: 02

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B.Sc. – M.Sc. (Forensic Science) (Semester – 3rd)

INORGANIC CHEMISTRY-II

Subject Code: BSNMS1303

Paper ID: [23480120]

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. What are crown ethers? Give its one example.
- b. What do you mean by levelling effect of solvents?
- c. Why Al forms AlF_6^{3-} but boron does not form BF_6^{3-} ?
- d. Using VSEPR theory, explain the structure of SF_4 molecule.
- e. What are silicones? Give their basic structure.
- f. What are interhalogen compounds? Why they are more reactive than parent halogens?
- g. Explain briefly covalent carbides with one example.
- h. Why complexes of transition metals are generally coloured?
- i. Write basic difference in magnetic properties of first and second transition series elements?
- j. Calculate crystal field stabilisation energy for $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$.

Section – B

(5 marks each)

- Q2. What is diagonal relationship? What is its cause? Write important characteristics of diagonal relationship between Li and Mg.
- Q3. a) What is borazine? Why is it called inorganic benzene? Draw its structure.
b) Why are alkali metals strong reducing agents? Explain. (2, 3)
- Q4. Draw and discuss the structure and bonding of diborane.
- Q5. What are silicates? Explain their different types.
- Q6. Write basic assumptions of crystal field theory. Explain crystal field splitting of d- orbitals in octahedral field.

Section – C

(10 marks each)

- Q7. a) Discuss Lewis concept of acids and bases with examples. Why Lewis concept is unable to explain strong acidic nature of HCl?
b) Write differences between bonding and antibonding molecular orbitals.
c) Give evidences for basic nature of chlorine and bromine. (5, 3, 2)
- Q8. a) Why CCl_4 cannot be hydrolysed while SiCl_4 can be easily hydrolysed?
b) Name two peroxyacids of S and give their structure also.
c) What are phosphazenes? Discuss bonding in triphosphazenes. (2, 3, 5)
- Q9. a) Out of NH_3 and NF_3 , which is a weaker base and why?
b) Among Fe^{2+} and Fe^{3+} , which has higher magnetic moment and why?

c) Compare first transition series with second and third transition series in terms of oxidation states. Why do Zr and Hf display similar properties? (2, 2, 5)