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- (b) NF_3 has a dipole moment, while BF_3 has zero dipole moment. Explain it. 5
- (c) Inability to synthesize transferrin may result in anemia as well as overload of iron. Explain. 5
6. (a) Explain the role of magnesium in chlorophyll & in energy production? 5
- (b) Arrange and explain the following molecules in the increasing order of their solubility in water. 5
 LiF , LiCl , LiBr , LiI .
- (c) Explain the role of calcium in the process of blood clotting. 5

This question paper contains 4 printed pages]

Your Roll No. :

Sl. No. of Q. Paper : **2933** I

Unique Paper Code : 2172521201

Name of the Paper : DSC- Chemical
Bonding and Elements
in Biological Systems

Name of the Course : **B.Sc. (Prog.) Life
Science**

Semester : II

Time : 2 Hours **Maximum Marks : 60**

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt any **four** questions.
1. (a) Calculate the heat of formation of CsF from its elements from the following data using Born-Haber cycle. 5
Electron gain enthalpy of $\text{F} = -328 \text{ kJmol}^{-1}$
Ionization energy of $\text{Cs} = +357.7 \text{ kJmol}^{-1}$
Heat of Sublimation of $\text{Cs} = +76.1 \text{ kJmol}^{-1}$
Bond dissociation energy of $\text{F}_2 = +158 \text{ kJmol}^{-1}$
Lattice energy of $\text{CsF (s)} = -740 \text{ kJmol}^{-1}$

- (b) Draw the Molecular orbital energy level diagram of NO molecule and also calculate the bond order of NO, NO²⁺. 5
- (c) What is meant by active transport in Na/K pump? Give the diagrammatic representation of the process and explain the mechanism involved in it. 5
2. (a) The dipole moment of LiF is 6.32 D and the bond distance is 156 pm. What will be the % of ionic character in LiF? (ID = 3.336×10^{-30} C.m, charge on one electron = 1.6×10^{-19} C) 5
- (b) Write down the main postulates and Limitations of Valence Bond Theory. 5
- (c) Explain essential and non-essential elements in the bio-system with examples? Draw the Dose-response curve for essential elements in a human body. 5
3. (a) Write a short note on: 5
- (i) Application of Fajan's rule
- (ii) Born-Landé equation and explain the meaning of various terms involved in it.

- (b) Compare the HNH bond angle in NH₃ and FNF bond angle in NF₃. Which bond angle is higher and why? 5
- (c) Where and in what form iron is stored in human body? How is it taken from the storage sites to the sites for incorporation into hemoglobin? 5
4. (a) Explain inter and intramolecular hydrogen bonding with suitable examples. How it affects the melting/boiling point of compounds. 5
- (b) Draw the Lewis structure of and. Also find out the hybridization and molecular geometry. 5
- (c) Discuss the toxic effects of Cadmium (Cd) and explain the reasons for its toxicity. What are the available methods for its treatment? 5
5. (a) Draw the Molecular orbital energy level diagram of O₂ molecule and arrange the following in increasing order of their bond length, , , , O₂. 5