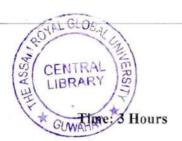
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The Assam Royal Global University, Guwahati
Royal School of Applied and Pure Sciences
Programme: M.Sc Chemistry Semester = 2nd
Semester End Examination, June 2023
Course Title: Inorganic Chemistry I
Course Code: CHY014C202

Maximum Marks: 70

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

Section - A

1. Attempt all questions. (N	Maximum word limit 50)
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2 x 8

- a. Why water contracts when heated between 0 °C 4 °C?
- b. Discuss the geometry of I₃ ion w.r.t VSEPR theory.
- c. What is Irving Williams series?
- d. Arrange the following in the increasing order of crystal field stabilization energy. Give reason for your answer: [Rh(NH₃)₆]³⁺, [Ir(NH₃)₆]³⁺, [Co(NH₃)₆]³⁺
- e. Justify the statement "All Arrhenius acids are Bronsted acids but all Arrhenius bases are not Bronsted bases".
- f. What are Pourbaix diagrams?
- g. Draw the structure of one metalloborane.
- h. How is iodine number determined?

Section - B

2. Attempt any two of the following:

6 x 2

- a. Define Walsh diagram. How can you predict the geometry of triatomic molecule like H_3^+ ion? 2+4
- b. Discuss the modified molecular orbital diagram for CO molecule. Give the electron charge density diagram for bonding and anti-bonding molecular orbital.
- c. What do you know about the London forces? Apply the concept of Bent's rule to PCl₃F₂ molecule.

3. Attempt any two of the following:

7 x 2

- a. Discuss the magnetic property of $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ with the help of MOT.
- b. What is the significance of formation constant? Show that overall formation constant is equal to the multiplication of stepwise formation constants. Write a note on steric effects and electron delocalization effecting stability of complexes.
- a. Discuss the σ and π -bonding molecular orbital diagram of a complex with tetrahedral geometry.