Name:

Enrolment No:

UPES
End Semester Examination, December 2023

Course: Inorganic Chemistry-II | **Semester: III**
Program: B.Sc (H) Chemistry | **Time: 03 hrs.**
Course Code: CHEM 2020 | **Max. Marks: 100**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Describe the basic principle behind the van Arkel-de Boer process.		**CO1**
Q2	Explain the thermal decomposition of alkali metal peroxides.		**CO3**
Q3	What are crown ethers and cryptates? Give one example of each structure types.		**CO2**
Q4	Complete the following reactions: $Na + O_2 \rightarrow \mathbf{A}$ $K + O_2 \rightarrow \mathbf{B}$		**CO2**
Q5	Discuss factors that influence the Lewis acidity of metal chlorides, including the metal's oxidation state, electronegativity, and atomic size.		**CO3**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Explain how alkali hydrides are formed, emphasizing the reaction between alkali metals and hydrogen.		**CO2**
Q7	How do the free energy values for the formation of CO and CO_2 differ, and what factors contribute to these differences?		**CO1**
Q8	Complete the following reaction: $CuS \xrightarrow{\text{Roast in air}} \mathbf{A + B} \xrightarrow[\text{without air}]{\text{Roast}} Cu + SO_2$		**CO3**
Q9	Calculate the enthalpy of formation of a Lewis acid-base adduct for phenol (E = 2.27, C = 1.07) and pyridine (E = 1.78, C = 3.54). Or Discuss the electronic structure of diborane along with its non-planarity. How many valence electrons does it contain?		**CO2**

SECTION-C (2Qx20M=40 Marks)			
Q10	Discuss Thermite process and Kroll process with appropriate examples.		**CO1**
Q11	How can one interpret the information presented on the Ellingham diagram? Provide examples to illustrate the practical applications of this interpretation. Or How do boric acid, metaboric acid, and boron sesquioxide are related? Discuss the structure and chemistry of tetrahydridoborates. Draw chemical diagrams to substantiate your answers.		**CO1** **CO3**