


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023 Course: s&p-Block Element, States of Matter, Chemical Kinetics Semester: IV Program: B.Sc (Physics) & Int B.Sc/M.Sc Physics; B.Sc (H) Mathematics & Int B.Sc/M.Sc Mathematics; B Sc. (H) Geology			
Course Code: CHEM 1010G		Time: 03 hrs.	
		Max. Marks: 100	
Instructions:			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	What is Ellingham diagram? What kind of information one can extract from these diagrams?	4	CO2
Q 2	Complete the following reaction: $\text{NH}_3 + \text{CO}_2 \xrightarrow[\text{High P}]{180-200^\circ\text{C}} \text{A} \xrightarrow[\text{High P}]{180-200\text{C}} \text{B} + \text{C}$	4	CO3
Q 3	Highlight the significance of pressure correction factor (P_a) and volume correction factor (b) of the van der Waal equation.	4	CO2
Q 4	What is hydroboration reaction? Provide the details of this reaction with appropriate examples.	4	CO1
Q 5	How many crystal systems exist in solids? Define essential conditions of their classification.	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	Differentiate ideal and real gases. Compare their distinct properties.	10	CO2
Q 7	Define Andrews isotherms of CO_2 .	10	CO2
Q 8	Define hydrometallurgy. Discuss hydrometallurgy process by giving two examples.	10	CO1
Q 9	What is Bragg's law? Derive the Bragg's equation for the reflection of X-rays from crystalline solids. OR Name the following products A, B, C, and D in a given chemical reaction:	10	CO3

	$\text{CuS} \xrightarrow[\text{in air}]{\text{Roast}} \text{A} + \text{B} \xrightarrow[\text{without air}]{\text{Roast}} \text{C} + \text{D}$		
SECTION-C (2Qx20M=40 Marks)			
Q 10	Discuss the postulates of kinetic theory of gases. Derive the kinetic gas equation.	20	CO2
Q 11	Derive the van der Waal equation. Highlight the fundamental assumptions of kinetic theory of ideal gas and the van der Waal equation. <p style="text-align: center;">OR</p> Discuss the method of preparation, chemical/physical properties, and applications of hydrazic acid (HN ₃). Give appropriate chemical reactions to justify your answers.	20	CO3