PRN:		Course Code:	USS-302

Second Year **B. Sc.** End Semester Examination Winter 2023

Chemistry-III

Day and Date: Thursday, 30/11/2023 Max Marks: **100**

Time: 2.00 to 5.00 PM Duration: **03** hrs

Instructions: All questions are compulsory.

Use of scientific calculator is allowed.

		Marks	Bloom's Level	CLO
Q.1	**Attempt the following.**			
a)	Derive the Clausius Clapeyron equation with usual notation.	08	L3	CLO1
b)	What is true equilibrium? Calculate the number of phases, component and degree of freedom of Sulphur system with neat labelled phase diagram.	08	L2	CLO1
c)	Draw a neat labelled phase diagram of lead-silver system. Discuss the significance of it in de-silverization of lead.	09	L3	CLO1
	OR			
d)	Explain $FeCl_3$-H_2O system involving formation of solids having congruent melting point.	09	L2	CLO1
Q.2	**Attempt the following.**			
a)	State Boyle's law and explain how this law is derived using equation of kinetic theory of gases.	08	L3	CLO2
b)	Derive the relation between root mean velocity, most probable velocity and average velocity.	08	L3	CLO2
c)	Derive the relation between Boyle temp and van der waal's constant.	09	L3	CLO2
	OR			
d)	Explain root mean square velocity. Calculate root mean square velocity of H_2 at 100^0C.	09	L1	CLO2
Q.3	**Attempt the following.**			
a)	Explain the structure of CsCl on the basis of X-ray diffraction studies.	08	L1	CLO3
b)	Define unit cell. Discuss the classification of unit cell.	08	L3	CLO3
c)	Explain properties of miller indices. Calculate the miller indices of (a\2, b, c\3).	09	L1	CLO3
	OR			
d)	For a primitive cubic crystal with a= 3×10^{-10} m, what is the smallest diffraction angle θ for (110) plane. If wavelength of X-ray used is 1.50×10^{-10} m.	09	L2	CLO3

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Q.4 **Attempt the following.**

a)	State the Gibb's phase rule and discuss various terms involved in it with example.	08	L2	CLO1
b)	Discuss the postulates of kinetic theory of gases.	08	L3	CLO2
c)	Write the difference between crystalline and amorphous solids.	09	L2	CLO3
	OR			
d)	Derive an equation of kinetic theory of gases.	09	L3	CLO2

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