PRN:		Course Code:	USS-302

Second Year **B. Sc.** Semester End Examination Winter 2024

Chemistry-III

Day and Date: 24 MAY 2024 Friday Max Marks: **100**

Time: 10-30 am to 1-30 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)	Write the equation of phase rule and explain the terms involved in this equation with examples.	08	L2	CLO1
b)	Draw phase diagram of sulphur system. Discuss all possible true and metastable equilibrium involving in the 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)	What is triple point? Discuss with neat phase diagram the water system.	09	L3	CLO1
Q.2	**Attempt the following.**			
a)	Write the assumptions of kinetic theory of gases. Using equation of kinetic theory show that, PV= constant	08	L2	CLO2
b)	Explain the average velocity of a gas. Derive mathematical relation between average velocity and root mean square velocity.	08	L2	CLO2
c)	What is Boyle temperature? Deduce the relation between Boyle temp and van der waal's constant 'a' and 'b'	09	L2	CLO2
	Or			
d)	Explain root mean square velocity. Calculate root mean square velocity of H_2 at 373 K.	09	L2	CLO2
Q.3	**Attempt the following.**			
a)	Explain the structure of CsCl on the basis of X-ray diffraction studies.	08	L2	CLO3
b)	What is the Bravais lattice? Discuss the classification of Bravais lattice systems.	08	L2	CLO3

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c)	Discuss law of rational indices. Calculate the miller indices of the plane having intercepts on crystallographic axis (a, 2b, ∞c).	09	L3	CLO3
	Or			
d)	Derive an equation of Bragg's X-ray Diffraction law. For a primitive cubic crystal with a= 3×10^{-10} m, what is the smallest diffraction angle Θ for (100) plane. If wavelength of X-ray used is 1.50×10^{-10} m.	09	L3	CLO3
Q.4	**Attempt the following.**			
a)	What is reduced phase rule? Describe phase diagram of the two component $FeCl_3$-H_20 system.	08	L2	CLO1
b)	What is most probable velocity? Derive an equation for the most probable velocity of a gas.	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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