

**B.E. CHEMICAL ENGINEERING FOURTH YEAR FIRST SEMESTER SUPPLEMENTARY  
EXAMINATION 2023  
INTERFACIAL SCIENCE AND ENGINEERING**

Time – 3 hrs

FM-100

CO-1	1. A spherical particle suspended in water is placed in a centrifugal field. The diameter of the particle is $7^{\circ}A$ . What should be the rotational speed so that the particle moves from 6 cm to 7 cm in 3 minutes? Density of the particle is $8000 \text{ kg/m}^3$	10
	2. Write short notes on: Cocervation, Peclet Number Donnan Equilibrium	15
CO-2	1. The Lennard-Jones parameters for argon are: $A = 2 \times 10^{-77} \text{ J m}^6$ and $B = 1.5 \times 10^{-134} \text{ J m}^{12}$ . Draw the energy profile. Calculate the distance at which the energy will be minimum. Calculate the minimum energy.	10
	2. Write short notes on: Hamaker Constant, Effect of salt on Debye length, Stern Layer	15
CO-3	1. How pressure difference across a curved surface is related with radii of curvature?	10
	2. Define radius of curvature and curvature. Explain the principal radii of curvature. Explain how the variation of radius of curvature on a curved surface can be determined.	15
CO-4	1. What is the significance of Harkins-brown correction factor.	5
	2. Describe the effect of temperature on surface tension.	5
	3. Define CMC. How Ionic conductivity and turbidity alters after CMC?	5
	4. The aggregation number of sodium dodecyl sulfate micelle in water is 100. Calculate the packing parameter, and predict the shape of the SDS micelles. Explain contact angle hysteresis.	10