BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : VII**
BRANCH: CHEM. ENGG. / CEP&P **SESSION : MO/18**

SUBJECT: CL7035 COLLOID AND INTERFACE ENGINEERING

TIME: 3:00 HRS. **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	What is craft point? What is cloud point?	[2]
Q.1(b)	Calculate surface tension of ethyl acetate at 293K having the parachor value 38.196 $X10^{-6}$ $kg^{1/4}$ m^3mol^{-1}. (Given density 0.9g/cc).	[4]
Q.1(c)	Classify different surfactants with examples.	[6]
Q.2(a)	What is the significance of second virial coefficient?	[2]
Q.2(b)	What is elastic scattering, Inelastic Scattering and Quasi elastic Scattering?	[4]
Q.2(c)	What is Rayleigh equation and explain how molecular weight is determined?	[6]
Q.3(a)	What is Hamaker constant?	[2]
Q.3(b)	What is electrophoresis? What is sedementation potential?	[4]
Q.3(c)	Calculate HLB values of a mixture containing 25% (w) potassium oleate and 75% (w) Tween 80.	[6]
Q.4(a)	What is terminal velocity?	[2]
Q.4(b)	What are the advantages of centrifugal sedimentation over the gravitational sedimentation?	[4]
Q.4(c)	The aggregation number of SDS micelle in water is 80. Compute v and l . From these vales calculate packing parameter and shape of the micelle in water.	[6]
Q.5(a)	What is electrophoresis?	[2]
Q.5(b)	Define wash burn equation and explain its significance.	[4]
Q.5(c)	What are non DLVO forces? Why are they called for? Give two examples.	[6]
Q.6(a)	What is electro osmosis?	[2]
Q.6(b)	Calculate surface tension of ethyl acetate at 293K having the parachor value 38.196 $X10^{-6}$ $kg^{1/4}$ m^3mol^{-1}. (Given density of ethyl acetate=0.9g/cc).	[4]
Q.6(c)	What is the formula for determination of surface tension by du Nouy ring method? Give the expressions for Harkins Jordan correction factor.	[6]
Q.7(a)	Discuss the main differences of emulsion and microemulsions.	[2]
Q.7(b)	Calculate the value of the London dispersion force constant for methane using the constants of van-der waals equation of state. $a=0.228m^6Pamol^{-2}$, $b=4.3x10^{-5}$ m^3/mol.	[4]
Q.7(c)	Calculate the equilibrium radius of the microemulsion droplets at 298K if the interfacial tension between oil and water is 50mN/m, volume fraction of the droplets is 0.03, and the surfactant concentration in the microemulsion is 100mol/m3.	[6]

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