	Ulegh
Name:	
Roll No.:	To Change Carlo State Conference
Invigilator's Signature :	

## CS/M.TECH(LT)/SEM-2/MLT-201/2010 2010

## **COLLOID AND SURFACE CHEMISTRY**

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

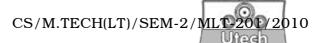
Answer any *five* questions.  $5 \times 14 = 70$ 

- 1. a) What are Colloids? Show how much the specific surface area of a colloidal dispersion increases as we subdivide a cubic cm of a substance into colloidal dimensions.
  - b) Discuss the properties that are unique to colloidal dispersion.
- 2. a) Define "Colloidal Sol".
  - b) Discuss the different methods used in the industry for the preparation and purification of Colloidal Sol.
- 3. a) What are Emulsions and what role does Emulsifiers play in the preparation of emulsions?
  - b) Discuss the different mechanisms of Emulsion break up.

30221 (M.TECH)

[ Turn over

- a) Define "Surface Tension". Explain the role surface tension plays in the creation of new surface area of a liquid.
  - b) Discuss the different methods available for the measurement of Surface Tension.
- 5. a) What are "Contact Angles"? Discuss the role contact angles play in the formation of meniscus in a capillary and explain the existence of different types of Meniscus.
  - b) For a Mercury filled glass tube in air at sea level, evaluate the capillary rise for a 100 nm glass tube using a contact angle of 140°. Use standard values of water and mercury properties.
- 6. a) How can you predict whether a particular material will spread over a surface ? Why is de-wetting important in surface coverage ?
  - b) What is the minimum pressure required to convert a liquid mass into spherical shape ? In water purification it is required that all micro-organisms of size larger than 0.1  $\mu$ m must be totally removed. Calculate the pressure required in an Ultra-Filtration Module to achieve this.



- 7. a) Differentiate between Absorption and Adsorption.

  Which operation is important in surface engineering and why?
  - b) Explain how the different Isotherms are derived, with specific reference to Freundlich Isotherm.
- 8. Write notes on any *two* of the following :

 $7 \times 2$ 

- a) Preparation and application of Nano-Emulsions
- b) Application of Colloids in Leather Technology
- c) Gold Number and its application
- d) HLB and its application
- e) Surface Excess Free Energy and definition of Surface Tension.