

Roll No.

24005

**B. Tech. 1st Semester "F Scheme"
Examination – December, 2009**

ENGINEERING CHEMISTRY

Paper : CH-101-F

Time : Three hours]

[Maximum Marks : 100

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question *one* is *compulsory*. All questions carry equal marks. Answer *five* questions in total. Attempt at least *one* question from Sections : I, II, III & IV.

1. (a) Define triple point of water system.
- (b) What is a promotor ? Can it alone act as a catalyst ?
- (c) What are the salts responsible for temporary and permanent hardness of water ?
- (d) Define co-ogulation.
- (e) What is the effect of CO_2 on electrochemical corrosion ?
- (f) Explain flash & fire point of lubricants.
- (g) Define functionality.

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- (h) Define thermoplastic polymer and give *two* examples.
- (i) What is the difference between atomic & molecular spectra ?
- (j) What finger print region in IR spectroscopy ?

2 × 10 = 20

SECTION – I

2. (a) What do you mean by congruent melting point ? Discuss *Zn-Mg* system in detail. 12
- (b) Determine the no. of component, no. of phases and degree of freedom in following equilibrium :
- (i) $N_2O_4(s) \rightleftharpoons 2NO_2(g)$
- (ii) $NH_4Cl(s) \rightleftharpoons NH_3(s) + HCl(g)$ $P_{NH_3} = P_{HCl}$
- (iii) $H_2O(s) \rightleftharpoons H_2O(l)$
- (iv) $Fe(s) + H_2O(s) \rightleftharpoons FeO(s) + H_2(s)$. 8
3. (a) What is meant by catalysis ? Discuss the general characteristic of a catalyst. 10
- (b) Describe the adsorption theory of heterogeneous catalysis with suitable example. 10

SECTION – II

4. (a) Discuss principle and procedure of EDTA method for determination of hardness. 10
- (b) 100 ml of water sample requires 20 ml of N/50 H_2SO_4 for neutralization to phenolphthalein end

point and another 25 ml is required for complete neutralisation. Calculate the type and amount of alkalinity. 5

(c) Write short note on :

(i) Phosphate conditioning,

(ii) Carbonate conditioning. 5

5. (a) What are natural and synthetic zeolites ? Explain the zeolite process for softening of hard water. 10

(b) Write short note on :

(i) Mixed Bed demineralization,

(ii) Reverse osmosis. 10

SECTION - III

6. (a) Define the term corrosion and discuss the factor that effect corrosion. 10

(b) Discuss the following :

(i) Soil corrosion,

(ii) Sacrificial anodic protection. 10

7. (a) What are greases ? Mention their uses. 5

(b) Define and explain the term emulsion. Why graphite and MoS_2 are preferred as solid lubricant ? 5

(c) Define the term lubrication and lubricants. What are different type of lubricants ? Discuss the basic principle of lubricants. 10

SECTION – IV

8. (a) What are elastomer ? Give preparation, properties and application of :
- (i) GR-S 10
 - (ii) GR-N Rubber. 10
- (b) Write detailed note on biodegradation of polymer. 10
9. (a) Discuss the principle and working of a flame photometer. 10
- (b) Explain the principle of U.V. Spectroscopy. 6
- (c) Write short note on TGA. 4