

Roll No. ....

Total Pages : 03

**BT-2/M-17**

**8211**

**CHEMISTRY**

**CH-101-E**

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

- 1. (a) Discuss the relevance of second law of thermodynamics.
- (b) Draw the following thermodynamic relationship based on second law :
  - (i) Energy as a function of T and V.
  - (ii) Relationship between  $C_p$  and  $C_v$ . 6,14
- 2. (a) Derive the condition of thermal, mechanical and chemical equilibria for a two-phase system.
- (b) Discuss the phase diagram of water system.
- (c) Define briefly :
  - (i) Eutectic point
  - (ii) Incongruent m. p.t. 7,7,6

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**Unit II**

- 3. Write short notes on the following : 7,6,7
  - (a) Reverse osmosis
  - (b) Coagulation
  - (c) Zeolites.
- 4. (a) Discuss the process of sludge formulation along with its composition and properties. How it can be prevented ?
- (b) How many types of hardness of water are there ? Explain, why hard water is unfit for washing and industrial purpose ? Explain *one* method to remove hardness of water.
- (c) Calculate temporary hardness and total hardness of a sample of water containing  $Mg(HCO_3)_2 = 7.3$  mg/L;  $Ca(HCO_3)_2 = 16.2$  mg/L,  $MgCl_2 = 0.5$  mg/L;  $CaSO_4 = 13.6$  mg/L. 8,8,4

**Unit III**

- 5. (a) Define Corrosion. Discuss the process of galvanization of iron. How does it prevent the corrosion of iron ?
- (b) State and explain Pilling Bedworth rule.
- (c) Discuss the mechanism of electrochemical corrosion.
- (d) Comment on the use of aluminium in place of Zn for cathodic protection of iron from rusting. 6,6,4,4

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6. Write short notes on the following terms with their significance :
- (a) Water line corrosion
  - (b) Graphite as solid Lubricant
  - (c) Flash point
  - (d) Lubricant Emulsion. 5,5,5,5

#### Unit IV

7. (a) Differentiate between the following :
- (i) Elastomers and thermosets
  - (ii) Addition and condensation polymer.
- (b) Write the structural monomer unit and structural formulae of the following : <http://www.kuonline.in>
- (i) SBR
  - (ii) PVR
  - (iii) PF
  - (iv) Silicones. 12,8
8. Write self explanatory note on the following Analytical methods/ techniques :
- (a) Thermogravimetric analysis
  - (b) Conductometric Titrations
  - (c) Flame Photometry. 7,7,6