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B.E./B.Tech. 1st Semester Examination,

December-2013

CHEMISTRY

Paper-CH-101-E

*Time allowed : 3 hours ] [ Maximum marks : 100*

*Note : Attempt any five questions. All questions carry equal marks.*

1. (a) Derive an integrated form of Clausius-Clapeyron equation and discuss two applications of it. 12
- (b) At 373.6 K and 372.6 K the vapour pressure of water are 1.018 and 0.982 atm. respectively. Calculate the heat of vapourization of water. 4
- (c) Define and explain the term chemical potential. 4
2. (a) What do you understand by Congruent melting point? Discuss Zn-Mg system in detail. 12
- (b) Define the terms used in phase rule and derive Gibb's Phase Rule Equation. 8
3. (a) Write short notes on : 12
  - (i) Alkalinity of water
  - (ii) Calgon conditioning
  - (iii) Ca. carbonate conditioning.

(2)

1985

- (b) What is the principle of EDTA titration ? How hardness is determined by this method ? 8
4. (a) Explain Zeolite process for water softening. 10  
(b) Write short notes on : 5×2  
(i) Reverse osmosis  
(ii) Ion-exchange process.
5. Write short notes on the following : 20  
(i) Galvanic corrosion  
(ii) Electrochemical theory of corrosion  
(iii) Differential aeration corrosion  
(iv) Protective coatings.
6. (a) Discuss the mechanism of hydrodynamic lubrication. Under what conditions are gases preferred to lubricating oils ? 12  
(b) Define and give significance of :  
(i) Iodine value  
(ii) Acid value. 8
7. (a) What are silicones ? Discuss their important properties and uses. 10

(b) What are elastomers ? Discuss preparation, properties and technical applications of SBR. 10

8. (a) Explain the principle and application of IR spectroscopy. What is the importance of finger print region in this technique ? 10

(b) Write down the principle, working and applications of DSC. 10