

Code: 15A51101

**R15**

B.Tech I Year II Semester (R15) Regular &amp; Supplementary Examinations May 2018

**ENGINEERING CHEMISTRY**  
(Common to CE, EEE and CSE)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Boiling of water removes temporary hardness. Why? Write the reactions.
  - (b) What is Calgon conditioning?
  - (c) Define functionality of a monomer. What is the functionality of vinyl chloride?
  - (d) Write the monomers of Bakelite.
  - (e) Write the cell reaction of lead-acid battery during charging process.
  - (f) What is electroless plating?
  - (g) Distinguish between gross and net calorific values.
  - (h) Write the compositions of water gas and producer gas.
  - (i) Define setting and hardening of cement.
  - (j) What are greases?

**PART – B**  
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 Explain the methods of estimation of permanent, temporary and total hardness of water by EDTA method.

**OR**

- 3 (a) Describe the process of reverse osmosis for purification of water.  
(b) The hardness of 50,000 liters of a water sample was removed by passing through a zeolite which required 200 liters of NaCl solution containing 120 g per litre of NaCl for regeneration. Calculate the hardness of water.

**UNIT – II**

- 4 Write a brief note on preparation, properties and uses of silicones.

**OR**

- 5 Providing an example for each, discuss the mechanism involved in free radical polymerization and anionic polymerization.

**UNIT – III**

- 6 Derive Nernst's equation. Calculate the potential of Daniel cell at 30°C when the concentration of Zinc and Copper electrodes are 0.5M and 0.04M respectively. The standard potential of the cell is 1.10 V.

**OR**

- 7 Define corrosion. Explain the process of rust formation using electrochemical theory. What is the effect of dissolved oxygen in this process?

**UNIT – IV**

- 8 How metallurgical coke is manufactured by Otto Hoffman's by-product oven?

**OR**

- 9 (a) What is power alcohol? Mention its advantages and disadvantages.  
(b) Calculate the minimum amount of oxygen and air by weight required for complete combustion of 1 kg of coal which have the following percentage composition by weight: C = 75; H = 5.2; O = 12.1; N = 3.2 and ash 4.5.

**UNIT – V**

- 10 Write a short note on:

- (a) Carbon nanotubes.
- (b) Solid lubricants.

**OR**

- 11 Briefly discuss the properties of refractories.