

**R16**

Code No: 131AG

J. N. N. HARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

**ENGINEERING CHEMISTRY**

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**Part - A (25 Marks)**

- 1.a) What is hard water? What are the salts that cause hardness to water? [2]
- b) How are the salts from sea water removed? [3]
- c) Differentiate between primary and secondary cell. [2]
- d) Write the Nernst equation and mention its importance? [3]
- e) Write the structures of natural rubber and vulcanized rubber? [2]
- f) Write a brief note on compounding of plastics. [3]
- g) Define Cracking and knocking. [2]
- h) How the volatile matter content in coal is determined? [3]
- i) Define Refractory and Lubricant? [2]
- j) Write the composition of Portland cement? [3]

**Part - B (50 Marks)**

- 2.a) Explain about the ion exchange method of softening of water.
- b) A sample of water contains following dissolved salts per liter.  
 $\text{Ca}(\text{HCO}_3)_2 = 16.2\text{mg}$ ,  $\text{Mg}(\text{HCO}_3)_2 = 14.6\text{mg}$ ,  $\text{CaCl}_2 = 11.1\text{mg}$  and  $\text{MgSO}_4 = 12\text{mg}$ .  
Calculate the total, permanent and temporary hardness of water? [5+5]

**OR**

- 3.a) What is disinfection of water? Explain the chlorination method.
- b) Explain the steps involved in sewage treatment. [5+5]
- 4.a) Explain the construction and working of calomel electrode in the determination of pH of a solution
- b) Calculate the EMF of the following cell.  
 $\text{Zn}/\text{ZnSO}_4//\text{FeSO}_4/\text{Fe}$   
The standard electrode potentials of  $\text{Zn}^{+2}/\text{Zn} = -0.76\text{V}$  and  $\text{Fe}^{+2}/\text{Fe} = 0.44\text{V}$ . [7+3]

**OR**

- 5.a) What is electrochemical series? Give its five applications.
- b) Explain the construction and functioning of Nickel-Cadmium cell. [5+5]
- 6.a) Write the differences between thermoplastics and thermosetting plastics.
- b) Give preparation, properties and engineering applications of Bakelite. [5+5]

**OR**

- 7.a) Write preparation, properties and engineering applications of i) Buna-S and ii) Thiokol rubber?  
b) Explain the mechanism of conduction in conducting polymers with respect to transpolyacetylene? [5+5]
- 8.a) Explain the proximate analysis of coal and give its significance.  
b) A coal sample has 80% of carbon, 9% of hydrogen, 6% of oxygen and remaining is ash. Calculate the HCV and LCV of the coal sample? [5+5]

OR

- 9.a) What is Octane number and Cetane number? What is their significance?  
b) Explain about moving bed catalytic cracking. [5+5]
- 10.a) Write a note on special cements.  
b) What viscosity of lubricant? How is it determined? [5+5]

OR

- 11.a) What is Cloud point, Pour point, Flash point and Fire point of a lubricant? Give their significance.  
b) What are the characteristics of a good refractory? [6+4]

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