

**Code No: 111AE****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD****B.Tech I Year Examinations, December-2014/January-2015****ENGINEERING CHEMISTRY****(Common to all Branches)****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) Define specific conductance and mention its units. [2m]
- b) Explain Chemical theory of corrosion. [3m]
- c) Write the preparation and two applications of Thiokol rubber. [2m]
- d) What are the Characteristics of a good lubricant? [3m]
- e) What is the inter relation of units of Hardness? [2m]
- f) Write the specifications of potable water. [3m]
- g) Why TEL is added to internal combustion engine? Explain. [2m]
- h) What is CNG and LPG? Write its composition. [3m]
- i) Identify the number of phases and components involved in the dissociation of calcium carbonate. [2m]
- j) What is Brownian movement? Explain. [3m]

**Part-B****(50 Marks)**

- 2.a) What are batteries? Explain the charging and discharging of lead acid battery.
- b) Define Corrosion. Discuss the mechanism of Wet corrosion.

**OR**

- 3.a) What is electrochemical series? Give its applications.
  - b) What is organic paint? Write its constituents and functions.
- 4.a) Write the preparation, properties and engineering applications of Bakelite.
  - b) Write the chemical reactions involved in setting and hardening of portland cement.

**OR**

- 5.a) What is natural rubber? Write its properties and Vulcanisation.
- b) What are Conducting polymers? Write its preparation and applications.

- 6.a) What is the Principle of EDTA method ? Describe the estimation of hardness of water by EDTA method.
- b) Calculate the quantity of lime and soda required for softening 60,000 litres of water containing
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|--|---|----------------------------|
| CO <sub>2</sub> = 20mg/L,                    | Ca(HCO <sub>3</sub> ) <sub>2</sub> = 20mg/L;              | HCl = 8.4mg/L;             |
| Mg(HCO <sub>3</sub> ) <sub>2</sub> = 25mg/L; | Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> = 40mg/L; | MgCl <sub>2</sub> = 12mg/L |

**OR**

- 7.a) What is breakpoint chlorination? Explain its significance.
- b) Write the chemical reactions involved in lime soda process.
- c) A water sample on analysis gives the following data Ca<sup>+2</sup> = 20ppm, mg<sup>2+</sup> = 25ppm, CO<sub>2</sub> = 30ppm, HCO<sub>3</sub><sup>-</sup> = 150ppm, K<sup>+</sup> 10ppm. Calculate temporary and permanent hardness.
- 8.a) What is Calorific value? How do you determine Calorific value by Junker's gas Calorimeter?
- b) Explain the analysis of flue gas by Orsat's apparatus.

**OR**

- 9.a) Explain the Proximate analysis of coal and Write its significance.
- b) Calculate Gross and Net Calorific value of a gaseous fuel from the following data. Volume of gaseous fuel burnt at STD is 0.09m<sup>3</sup>. Weight of Water used for cooling 25kg. Temperature of inlet water is 25<sup>0</sup>C, temperature of outlet H<sub>2</sub>O is 30<sup>0</sup>C. Weight of water produced by steam condensation is 0.02kg. Latent heat of steam is 587kcal/kg.
- 10.a) What is phase rule? Draw and explain phase diagram for one component system.
- b) Explain Langmuir adsorption isotherm and write the applications of adsorption.

**OR**

- 11.a) Explain the terms hardening, annealing and normalization from iron-Carbon phase diagram.
- b) What is Colloid? Explain the classification and industrial applications of Colloids.

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