

Code No: 51005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, June - 2015

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, ETM, AE, BT, AME, MIE, PTE, MSNT)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) What is composition of a Portland Cement? Explain the steps involved in the manufacturing of Portland cement.
- b) What is lubricant? Explain the mechanism of lubrication and explain about flash and fire point. [8+7]
- 2.a) Define Phase rule. Explain the terms involved in the Phase rule with suitable examples.
- b) Describe the salient features of Fe-C system and its relevance to heat treatment of steel. [8+7]
- 3.a) Explain the terms Knocking, octane number and Cetane number.
- b) Explain Junkers gas Calorie meter to determine Calorific value.
- c) A Sample of coal was found to have the following compositions
C = 75%; H = 52%; O = 12.1%; N = 3.2%; and ash = 4.5%.
Calculate the minimum air required for the complete combustion of 1 kg of coal. [6+5+4]
- 4.a) What are Nano materials? Explain any two methods of preparation of Nano materials.
- b) What is adsorption? Discuss Langmuir adsorption isotherm and explain advantages and limitations of Langmuir adsorption isotherm. [7+8]
- 5.a) Explain the Principles involved in the estimation of hardness by EDTA method.
- b) Explain the Principle involved in the softening of water by Reverse Osmosis and Electrodialysis.
- c) Calculate temporary hardness and total hardness of a water sample containing
Mg(HCO₃)₂ = 9.3mg/L; Ca(HCO₃)₂ = 17.4 mg/L; MgCl₂ = 8.7 mg/L and CaSO₄ = 12.6 mg/L. [5+6+4]
- 6.a) What are surface coatings? Write an account on hot dipping, cladding methods of application of coating on metals.
- b) How do the nature of environment affect corrosion?
- c) Write notes on sacrificial anodic protection explain with examples. [6+4+5]
- 7.a) What are the characteristics of conducting polymers? Explain the conduction mechanism in poly acetylene.
- b) Explain about vulcanization by giving its advantages. [8+7]
8. Write notes on the following:
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|------------------------------|------------------------|
| a) Hydrogen-oxygen fuel cell | b) Concentration cells |
| c) Fibre-reinforced plastics | d) Bakelite. |
- [4+4+4+3]