Code No: 121AE **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, May/June - 2017
ENGINEERING CHEMISTRY
(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, AE, MIE, PTM, CEE)
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) How pitting corrosion can be controlled? [2]
b) The equivalent conductance of NaCl, HCl and CH3COONa at infinite dilution are 49.45, 357.14 and 86.23 $\Omega^{-1}cm^2eq^{-1}$ respectively at 25^0C. Calculate the equivalent conductance of acetic acid at infinite dilution. [3]
c) Write the structure of Bakelite. [2]
d) What are the essential requirements of good refractory materials? [3]
e) What are the specifications of portable water? [2]
f) What is Caustic embrittlement? [3]
g) What is octane and cetane rating? [2]
h) Define Gross and Net calorific value and give their inter relation. [3]
i) What is eutectic point? [2]
j) What are micelles? Give examples. [3]

Part-B (50 Marks)

2.a) Describe the construction and working of standard calomel electrode.
b) What is Cathodic Protection? Explain Sacrificial anodic method. [5+5]

OR

3.a) What are the advantages of Electro plating? Describe the Electro plating of copper.
b) Explain the different constituents of paint and their functions. [5+5]

4.a) What are Biodegradable polymers explain preparation and applications of polylactic acid.
b) Discuss the various steps involved in setting and hardening of cement with chemical equations. [5+5]

OR

5.a) How does Fiber reinforced plastics made? Explain their applications.
b) How to prepare Nanomaterials by chemical vapour deposition method. [5+5]

6.a) Describe the Reverse Osmosis process for softening of hard water.

b) Calculate the amount of lime and soda required in kg for softening 5,000 lt of water containing following impurities.

$Ca(HCO_3)_2$=162mg/L, $CaSO_4$=68mg/L, $MgSO_4$=84mg/L, $MgCl_2$=130mg/L. [5+5]

OR

7.a) Explain the disinfection of water by Chlorination and Ozonisation.

b) What is the principle involved in the estimation of hardness of water by EDTA method. [5+5]

8.a) What is cracking? What are the advantages of catalytic cracking?

b) What is petrol? How is it synthesized by Bergius process? [5+5]

OR

9.a) Calculate the Gross and Net Calorific value of coal sample having the following composition. C = 82%, H = 7%, O = 3%, S = 3.5%, N = 2.2% and ash 2.3%.

b) How does Carbon and Hydrogen determined in the ultimate analysis of coal. [5+5]

10.a) Draw the phase diagram of iron-carbon system.

b) Derive Langmuir adsorption isotherm. Explain its advantages. [5+5]

OR

11.a) Discuss optical properties of colloids.

b) Describe the phase diagram of one–component water system. [5+5]

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