Code No: 121AE **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May - 2016

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTE, CEE, MSNT)

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) Specific conductance decreases with dilution; while the equivalent conductance increases. Give reason. [2]
b) Why does part of a nail inside the Wood undergoes corrosion easily? [3]
c) Why does natural rubber need compounding? [2]
d) PVC is soft and flexible, where as Bakelite is hard and brittle. Give reason. [3]
e) Calgon treatment prevents scale formation in boilers. Give reasons. [2]
f) Write two balanced equations to describe when hard water is heated. [3]
g) Gasoline containing TEL is used in internal combustion engines. Give reason. [2]
h) What is LPG? Write its constituents. [3]
i) What is condensed phase rule? Explain the terms. [2]
j) What is the difference between solution and emulsion? [3]

PART-B

(50 Marks)

2.a) Discuss the working principle of secondary batteries? Explain construction and working of Ni-Cd battery.
b) Differentiate anodic and cathodic metal coatings of corrosion control? Explain any one anodic metal coating method with example. [5+5]

OR

3.a) What is corrosion? Explain cathodic protection of corrosion control method and comment on the use of aluminium in place of zinc for cathodic protection of iron from rusting.
b) Differentiate between the characteristics of an electrolytic cell and those of galvanic cell.
c) Define fuel cell. Explain construction and working of H_2-O_2 fuel cell and write its applications. [4+3+3]

4.a) Nylon the synthetic fiber forming polyamide. Write its preparation and applications.
b) Write the reactions involved in setting and hardening of cement.
c) How Nano materials are useful in medicine. [4+4+2]

OR

5.a) Differentiate compression and injection mouldings of plastics.

b) What are conducting polymers? Explain the mechanism of conduction in conducting polymers.

c) Write short notes on chemical vapour deposition of Nano materials. [4+4+2]

6.a) Explain the Principle involved in complexometric method for the determination of hardness of water.

b) What is zeolite? Explain the method for softening water.

c) Explain disinfection by chlorination. [4+3+3]

OR

7.a) Explain the Principle of Lime soda process for softening hard water.

b) What is Caustic embrittlement? Explain and also write its prevention.

c) 50ml of a standard hard water containing 1mg of pure $CaCO_3$ per ml consumed 20ml of EDTA. 50ml of a water sample consumed 25ml of same EDTA solution using EBT indicator. Calculate total hardness of water sample in ppm. [3+3+4]

8.a) Explain proximate analysis of coal? How is it carried out? What its significance.

b) What is HCV and LCV? How to determine calorific value by using Junker's gas calorimeter. [5+5]

OR

9.a) What are flue gases? Explain flue gas analysis by Orsat's apparatus with neat diagram.

b) What is synthetic petrol? Explain Fischer-Tropsch's process for the preparation of synthetic petrol. [5+5]

10.a) Discuss the applications of phase rule to water system.

b) Explain annealing and Normalization in Iron carbon phase diagram.

c) What is Micelles? Write the differences between micelles and colloids. [2+4+4]

OR

11.a) Explain the phase diagram of Pb-Ag system.

b) Explain electrical and optical properties of colloids.

c) Giving suitable examples explain the terms phase, degree of freedom. [4+3+3]

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