Code No: 131AG

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year I Semester Examinations, December - 2017
ENGINEERING CHEMISTRY
(Common to EEE, ECE, CSE, EIE, IT, ETM)

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) Write various units of hardness and the relationship between them. [2]
b) Write short notes on Caustic Embrittlement. [3]
c) What is the role of salt bridge in constitution of an electrochemical cell? [2]
d) Write down the cell reaction of methanol-oxygen fuel cell and its applications. [3]
e) What is functionality of a monomer? What is its significance in polymer chemistry? [2]
f) What is tacticity? How polymers are classified based on tacticity of polymers? [3]
g) Describe the composition and applications of LPG. [2]
h) Define Gross and Net calorific values of a fuel and their units. [3]
i) What are the characteristics of a good refractory? [2]
j) What is viscosity index of a lubricant? Explain. [3]

PART-B

(50 Marks)

2.a) What is mean by Defluoridation of water? Give an account about Nalgonda technique.
b) Write a brief note on "Reverse Osmosis".
c) Calculate the Total hardness of a water sample which shows following analysis: $Ca(HCO_3)_2$ = 4.86 mg/L; $Mg(HCO_3)_2$ = 5.84 mg/L; $CaSO_4$ = 6.8 mg/L and $MgSO_4$ = 8.4 mg/L. [4+3+3]

OR

3.a) What are the steps involved in the treatment of Potable water? Explain.
b) Explain the Ion-Exchange method of purification of hard water. [6+4]

4.a) Describe the construction and functioning of Ni-Cd battery with relevant chemical reactions involved in the charging and discharging.
b) What is reference electrode? Explain the construction and working principle of calomel electrode with a neat diagram.
c) What is Nernst equation? What are its applications? [4+4+2]

OR

5.a) Describe the Working principle of lead acid battery with relevant chemical reactions involved during charging and discharging processes.
b) Write an account on lithium ion batteries. [5+5]

6.a) Describe the methods of preparation and Engineering applications of Dacron and Poly vinyl chloride.
b) Write short note on polylactic acid and polyvinyl alcohol.
c) Give an account on FRP's. [4+4+2]

OR

7.a) Discuss about free radical chain and step-growth polymerization with appropriate examples.
b) Describe the preparation, properties and applications of butyl rubber and thiokol rubber. [6+4]

8.a) Give an account of Ultimate analysis of coal and state its significance.
b) Write short on cetane rating. [6+4]

OR

9.a) Give an account about production of gasoline from crude oil.
b) What is cracking? Explain Moving Bed catalytic cracking in detail. [5+5]

10.a) Write a short note on flash and fire point of a lubricant.
b) What is lubrication? Explain boundary lubrication briefly.
c) What are the advantages of composites? [5+3+2]

OR

11.a) Write the chemical reactions that are taking place during the setting of cement.
b) What are extreme pressure additives? Why these additives are used for lubrication.
c) What is role of gypsum in the manufacturing of cement? [4+3+3]

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