

Code No: 131AG

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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:
 $\text{Ca}(\text{HCO}_3)_2 = 4.86 \text{ mg/L}$; $\text{Mg}(\text{HCO}_3)_2 = 5.84 \text{ mg/L}$; $\text{CaSO}_4 = 6.8 \text{ mg/L}$ and $\text{MgSO}_4 = 8.4 \text{ mg/L}$. [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]

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- 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]

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- 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.

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- b) Write short on cetane rating. [6+4]

- 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.

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- b) What is lubrication? Explain boundary lubrication briefly.

- c) What are the advantages of composites? [5+3+2]

- 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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