

**Code No: 131AG****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year I Semester Examinations, May - 2018****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) What is the role of buffer in the estimation of hardness of water. [2]
- b) Explain the cause of Caustic embrittlement in boiler and suggest how to control it. [3]
- c) Write applications of fuel cells. [2]
- d) Write the Nernst equation and explain the terms. [3]
- e) Name the two natural and two synthetic polymers which are used in textile industry. [2]
- f) PVC is soft and brittle whereas Bakelite is hard and brittle. Give reason. [3]
- g) Why should an ideal fuel have moderate ignition temperature? [2]
- h) Gasoline containing tetra ethyl lead is used in internal combustion engines. Give reasons. [3]
- i) How RUL test is performed for a refractory? [2]
- j) Name the raw materials necessary for the preparation of Portland cement. [3]

**PART-B****(50 Marks)**

- 2.a) Explain the steps involved in treatment of sewage water.
- b) Explain the principle involved in chlorination and ozonization and write its differences. [5+5]

**OR**

- 3.a) With neat diagram discuss Ion exchange process for softening of water.
- b) 100ml of a sample of hard water neutralizes exactly 12ml of 0.12N HCl using methyl orange as indicator. What kind of hardness is present? Express the same in terms of an equivalent of  $\text{CaCO}_3$ ? [5+5]

- 4.a) With neat diagram explain the principle, construction and applications of Glass electrode.
- b) Differentiate Lithium cell and lithium ion cell. [5+5]

**OR**

- 5.a) What is an Electrochemical cell? Explain the construction and reactions of calomel electrode.
- b) Explain the construction and functioning of Nickel- Cadmium cell. [5+5]

- 6.a) What is Co- polymerization? Explain preparation of Nylon 6:6 and Bakelite.
- b) Explain the concept of Biodegradable polymers. Discuss two examples and its applications. [5+5]

**OR**

- 7.a) Differentiate natural rubber and synthetic rubber with suitable examples.  
b) With suitable examples differentiate fibre, plastic and elastomer. [5+5]
- 8.a) What is cracking? Describe the process of moving bed catalytic cracking.  
b) The percentage composition of coal is C = 89%, O = 4%, N = 0.5%, S = 1%. Calculate HCV and percentage of hydrogen of the coal sample. [5+5]
- OR**
- 9.a) With neat diagram explain refining of petroleum.  
b) What is coal? Explain the proximate method for the analysis of coal. [5+5]
- 10.a) What are composite? Explain classification and applications of compost materials.  
b) What is lubricant? Explain viscosity and cloud and pour points of a lubricating oil. [5+5]
- OR**
- 11.a) Explain chemical reactions involved in setting and hardening of portland cement.  
b) Write short notes on  
i) Refractories                      ii) special cements [5+5]

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