

**R16**

Code No: 132AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to CE, ME, MCT, MMT, MIE, 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) Describe Calgon conditioning method shortly. [2]
- b) How the water is desalinated by reverse osmosis? Explain. [3]
- c) Construct the dry cell. Write the working principle and applications of dry cell. [2]
- d) Explain the functioning of Hydrogen gas electrode. [3]
- e) Write the synthesis of Nylon-6, 6. [2]
- f) What are biodegradable polymers? Explain by taking poly lactic acid as an example. [3]
- g) Write the composition, calorific value and applications of LPG. [2]
- h) Define Octane number of Gasoline. What is the significance of finding Octane number? [3]
- i) Give the definition and classification of Composite materials. [2]
- j) Write the applications of refractory materials. [3]

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

- 2.a) What are boiler troubles? How water is softened by Ion-Exchange process? Write the advantages and disadvantages of Ion-Exchange method.
- b) Calculate the temporary, permanent and total hardness of a water sample containing the following impurities in mg/lit  
 $\text{Ca}(\text{HCO}_3)_2 = 1.62$ ,  $\text{MgCl}_2 = 0.76$ ,  $\text{MgSO}_4 = 1.80$ ,  $\text{CaSO}_4 = 0.68$ ,  $\text{CaCO}_3 = 1.77$ ,  
 $\text{NaCl} = 3.55$ ,  $\text{Ca}(\text{NO}_3)_2 = 1.64$ . [5+5]

**OR**

- 3.a) Illustrate the process of disinfection of potable water by Ozone treatment and De-fluoridation process.
- b) Describe the steps involved in the sewage treatment. What is significance of the treatment? [5+5]
- 4.a) Define battery. Write the composition, discharging, recharging cell reactions of Lead-Acid battery.
- b) What are ion selective electrodes? Write the working principle and applications of glass electrode. [5+5]

**OR**

- 5.a) What is electrochemical series? Discuss its important applications.  
b) What is Fuel cell? Construct Hydrogen- Oxygen fuel cell. What are the advantages and applications of this cell? [5+5]
- 6.a) Explain classification, mechanism and applications of conducting polymers.  
b) Write the structure of natural rubber. What are its disadvantages? Explain how these can be overcome by vulcanization. What are the advantages of vulcanization of rubber? [5+5]

**OR**

- 7.a) What are the various methods for the synthesis of fiber-reinforced plastics? Write their applications.  
b) Differentiate addition polymerization from condensation polymerization. Give the suitable examples for both the polymerization methods. [5+5]
- 8.a) Write the steps involved in the transformation of wood into coal. Discuss the Process and significance of ultimate analysis of coal.  
b) What is the composition of Petrol? Describe the process of fractional distillation with neat diagram. [5+5]

**OR**

- 9.a) Describe the ultimate analysis of coal. Write the significance of each constituent.  
b) Write the definition of cracking. Discuss the method and advantages of moving bed catalytic cracking. [5+5]
- 10.a) Indicate the important characteristics of good lubricant. Explain about the mechanism of lubrication with special reference to thick film and thin film lubrication.  
b) What is the chemical composition of Portland cement? Write the chemical reactions involved in the setting and hardening of Portland cement. [5+5]

**OR**

- 11.a) Define refractory. Write a short note on following properties of refractory.  
i) Refractoriness under load  
ii) Porosity.  
b) Write short notes on the following:  
i) Water proof cement                      ii) High alumina cement  
iii) Acid resistant cement                  iv) White cement [5+5]

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