

**Code No: 131AG****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year I Semester Examinations, May/June - 2019****ENGINEERING CHEMISTRY****(Common to EEE, ECE, CSE, EIE, IT)****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 break point chlorination? Give its advantages. [2]
- b) What is meant by reverse osmosis process? Write the advantages of this process. [3]
- c) Give the chemical reactions involved in the functioning of Hydrogen-Oxygen fuel cell. [2]
- d) Give the construction and cell reactions of standard hydrogen electrode. [3]
- e) Give the synthesis and applications of PVC. [2]
- f) What are bio-degradable polymers? Give two examples. [3]
- g) What is knocking? Mention an anti knocking agent. [2]
- h) Write the composition characteristics and applications of compressed natural gas. [3]
- i) What are the main components of water proof cement and high alumina cement? [2]
- j) How the composite materials have been classified? Give suitable examples. [3]

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

- 2.a) Explain the principle, process, advantages and limitations of ion exchange method of softening of water.
- b) A sample of hard water contains the following dissolved salts per liter.  
NaCl = 58.5 mg/L, Ca(HCO<sub>3</sub>)<sub>2</sub> = 16.4 mg/L, Mg(HCO<sub>3</sub>)<sub>2</sub> = 14.6 mg/L,  
CaCl<sub>2</sub> = 111 mg/L, MgSO<sub>4</sub> = 12 mg/L and CaSO<sub>4</sub> = 13.6 mg/L. Calculate temporary, permanent and total hardness of water in ppm and degree French. [5+5]

**OR**

- 3.a) What is Caustic embrittlement? What are the causes and preventive methods of it?
- b) What are the specifications of potable water? Write the steps involved in the treatment of potable water. [5+5]
- 4.a) Explain how the Glass electrode is used to determine the pH of a given solution. What are the limitations of glass electrode?
- b) What is secondary battery? Explain the discharging and recharging process of lead- acid battery. [5+5]

**OR**

- 5.a) What is concentration cell? Explain its functioning with suitable example.
- b) What is an electrochemical cell? Explain the working principle of Zn-Cu electrochemical cell. [5+5]

- 6.a) Explain the mechanism involved in the conduction of trans poly acetylene. Give the applications of conducting polymers.  
b) Why natural rubber is vulcanized? What are the advantages and applications of vulcanized rubber? [5+5]

**OR**

- 7.a) Write the preparation, properties and applications of Bakelite.  
b) Explain about fiber reinforced plastics and their applications. [5+5]

- 8.a) Explain the ultimate analysis of coal? Write its significance.  
b) Explain how gasoline is synthesized by Fischer-Tropsch's process. [5+5]

**OR**

- 9.a) What is cracking? Explain fluid bed catalytic cracking.  
b) Write a short note each on Octane number and Cetane number. [5+5]

- 10.a) What is the composition of Portland cement? Write the steps involved in setting and hardening of Portland cement.  
b) What are the characteristics of a good lubricant? Give the mechanism of thin film lubrication. [5+5]

**OR**

- 11.a) What are flash point and fire point of lubricant? Explain their significance.  
b) Define refractory. Explain about refractoriness, porosity and chemical inertness of refractory. [5+5]

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