

Code No: 132AG

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year II Semester Examinations, May - 2019****ENGINEERING CHEMISTRY****(Common to CE, ME, MCT, MMT, AE, PTM, 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) What are the permanent hardness causing substances? [2]
- b) How Caustic embrittlement can be prevented? [3]
- c) Differentiate Primary and Secondary battery. [2]
- d) Write anode and cathode reactions of MeOH oxygen cell. [3]
- e) Differentiate plastic and resin. [2]
- f) Why natural rubber should be vulcanized? [3]
- g) What do you understand by cracking? [2]
- h) What is the significance of proximate analysis? [3]
- i) How composites are classified? Give examples. [2]
- j) List characteristics of good refractory material. [3]

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

- 2.a) Write in detail an account on Scale and Sludge formation in boilers.
- b) One litre of water from an underground reservoir in Tirupathi Town in Andhra Pradesh showed the following analysis for its contents:  
Mg(HCO<sub>3</sub>)<sub>2</sub>=42mg; Ca(HCO<sub>3</sub>)<sub>2</sub>=146mg; CaCl<sub>2</sub>=71mg; NaOH=40mg; MgSO<sub>4</sub>=48mg;  
organic impurities = 100mg; Calculate temporary, permanent and total hardness of this sample of water in degree French and Clark. [5+5]

**OR**

- 3.a) Why is Ion exchange process preferred for the softening of water for use in boilers?
- b) Write a note on disinfection of water. [5+5]
- 4.a) How pH of a solution is determined by Glass electrode? Discuss.
- b) Describe the charging and discharging process of Lithium ion cell. [5+5]

**OR**

- 5.a) Give a brief account on concentration cell.
- b) Describe a Lead acid battery with cell reactions. [5+5]

- 6.a) Give preparation, properties and applications of Nylon and Buna-s-rubber.  
b) Describe the compression moulding process. [5+5]

**OR**

- 7.a) Describe the preparation, properties and applications of Polylactic acid and poly vinyl alcohol.  
b) Differentiate between thermoplastic polymers and thermosetting polymers. [5+5]

- 8.a) Give an account on moving bed catalytic cracking.  
b) Illustrate composition and uses of Natural gas and LPG. [5+5]

**OR**

- 9.a) Explain the analysis of coal by ultimate analysis.  
b) A coal sample having the following composition.  
C=88%, O=5% S=0.5%, N=0.5% and ash=2.5%.  
The net calorific value was found to be 500.5kcal/kg. Calculate percentage of hydrogen and high calorific value of the fuel. [5+5]

- 10.a) Describe any one mechanism of lubrication.  
b) Write the chemical reactions involved in setting and hardening of cement. [5+5]

**OR**

- 11.a) What do you understand by refractoriness under load? Explain.  
b) Explain Viscosity of lubricants and its determination. [5+5]

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