

R09

Code No: 09A1BS03

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech I Year Examinations, May/June-2013

ENGINEERING CHEMISTRY

(Common to all Branches)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

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- 1.a) What are reference electrodes? Explain the construction and functioning of Quinhydrone electrode?
- b) What are batteries? How are they classified? Explain the construction and functioning of the Lead-Acid Cell.
- 2.a) What is oxidation corrosion and how does it takes place? Explain the mechanism of oxidation corrosion.
- b) Explain the process of galvanizing and tinning.
- 3.a) Write brief account on
  - i) Conducting polymers
  - ii) Liquid Crystal polymers
- b) What is vulcanization of rubber? How does it improves the properties of natural rubber?
- c) Differentiate thermoplastic resins from thermosetting resins.
- 4.a) Write short notes on the following
  - i) Calgon conditioning
  - ii) Carbonate conditioning
- b) Describe the causes and effects of scale formation.
- c) A sample of hard water contains the following dissolved salts per liter.  $\text{CO}_2 = 44$  mg,  $\text{Ca}(\text{HCO}_3)_2 = 16.4$  mg,  $\text{Mg}(\text{HCO}_3)_2 = 14.6$  mg,  $\text{CaCl}_2 = 111$  mg,  $\text{MgSO}_4 = 12$  mg, and  $\text{CaSO}_4 = 13.6$  mg. Calculate the temporary and permanent hardness of water in  $^\circ\text{Fr}$  and  $^\circ\text{Clarke}$ .
- 5.a) What are colloids? Discuss their optical and electrical properties.
- b) Differentiate between physisorption and chemisorption.
- 6.a) Explain the ultimate analysis of a solid fuel and its significance.
- b) What is cracking? How gasoline is obtained from fixed bed catalytic cracking.
- 7.a) What is meant by heat treatment of steel? Explain the different heat treatment processes carried out with relevant applications.
- b) Distinguish between the triple point and eutectic point.
- 8.a) Distinguish between hydrodynamic lubrication and boundary lubrication.
- b) How Portland cement manufactured by dry process? What is the role of gypsum in cement?

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