

FACULTY OF ENGINEERING

B.E. Ist Year (Common to all Branches) Regular (Main) Examination,

May/June, 2009

ENGINEERING CHEMISTRY

Time : 3 Hours]

[Max. Marks : 75

Answer **all** questions of Part A at One Place in the answer book.Answer **five** questions from Part B.**Part A** – (Marks : 25)

1. What is an extensive property? Give an example? 2
2. Give any two statements of second Law of Thermodynamics. 2
3. The specific conductivity of 0.5 N solution of an electrolyte at 25° C is 0.02 ohm cm^{-1} . Calculate the resistance offered by this solution when taken in a conductivity cell with two platinum electrodes 2.1 cm apart and 4.2 cm^2 in area. 3
4. What is ^{absolute ionic} 10m^2 mobility? Give its units? 2
5. Write a brief note on galvanic corrosion. 3
6. Define hardness of water? Why do we express hardness in terms of Ca CO_3 . 3
7. Give equations for the preparation of
 - (i) Buna S
 - (ii) Butyl Rubber
8. Distinguish between thermoplastics and thermosettings with examples. 2
9. Calculate the weight of air (23% oxygen by weight) required for the complete combustion of 16kg of methane. 3
10. What is octane number? What is its significance? 2

Part B – (5 × 10 = 50 Marks)

11. (a) Differentiate between
 - (i) Reversible and Irreversible process
 - (ii) Isothermal and Adiabatic process.
- (b) A given was of perfect gas at 0°C is compressed suddenly to a pressure of 20 times the initial value, calculate the final temperature of the gas (Given $\gamma = 1.42$)

12. (a) Define the terms.
- (i) Specific conductance
 - (ii) Equivalent Conductance.
- (b) What is the effect of dilution on them of an electrolyte calculate the single electrode potential of copper metal in contact with 0.1 molar copper sulphate solution. The standard electrode potential for $\text{Cu}^{+2} / \text{Cu}$ is 0.34 V.
13. (a) Describe briefly the estimation of hardness of water sample by the EDTA method.
- (b) Explain how the rate of corrosion of a metal is affected by the following factor
- (i) Nature of the corrosion product
 - (ii) Ratio of anodic to cathodic areas.
14. (a) Write notes on the structure, method of preparation, properties and uses of the following
- (i) Bakelite.
 - (ii) Teflon.
- (b) Why natural rubber needs vulcanization.
15. (a) Describe the determination of calorific value of solid fuel by Bomb calorimeter
- (b) Write short notes on
- (i) Classification of fuels.
 - (ii) Cracking and its significance.
16. (a) Describe the construction of Lead-acid battery with the reaction occurring during discharging and charging.
- (b) Derive the Gibbs- Helmholtz equation.
17. (a) What is electrochemical series ? Discuss its application.
- (b) What are the limitations of first law of thermodynamics?