Code No. : **6005**

FACULTY OF ENGINEERING AND INFORMATICS
B.E. I Year (Common to all Branches) (Supplementary) Examination, Dec. 2009/Jan. 2010
ENGINEERING CHEMISTRY

Time: 3 Hours] [Max. Marks: 75

Note : *Answer **all** questions of Part **A**.*
*Answer **five** questions of Part **B**.*

PART – A **(25 Marks)**

1. What happens to the internal energy of a system, if work is done i) by the system, ii) on the system ? **2**

2. Calculate the change in entropy accompanying the isothermal expansion of 5 moles of an ideal gas to 6 times to its initial volume at 330 K. **3**

3. Why does the equivalent conductance increases with dilution ? **2**

4. Describe the construction of standard hydrogen electrode. **3**

5. Why does corrosion of water filled steel tanks occur below the waterline ? **3**

6. What are the salts responsible for the temporary and permanent hardness of water ? **2**

7. Differentiate between homopolymer and copolymer. **2**

8. Why does raw rubber need vulcanization ? **3**

9. What is octane number ? What is its significance ? **2**

10. Calculate the minimum weight of air required for comple combustion of 1 kg of fuel containing : C = 90%, H = 3.5 % ; O = 3% and rest is ash. **3**

PART – B (50 Marks)

11. a) Derive a Clausius-Clapeyron, equation. What are its applications ? 7

    b) An ideal gas expands reversibly and isothermally from a volume of 10 lit. to 20 lit. at 27°C. Calculate the ΔE, q and w. 3

12. a) Describe the construction of calomel electrode. 4

    b) What is the effect of dilution on specific conductance and equivalent conductance ? 2

    c) A zinc rod is placed in 0.01 m $ZnSO_4$ solution at 298 K. Write the electrode reaction and calculate the potential of the electrode $E^0_{zn^{2+}/zn} = -0.76V$. 4

13. a) What is corrosion ? Describe the mechanism of electrochemical corrosion. 6

    b) Describe the softening of water by ion-exchange method. 4

14. a) Write preparation, properties and uses of (a) PVC (b) Buna-N. 6

    b) Differentiate between thermoplastics and thermosetting resins. 4

15. a) Describe the analysis of coal by proximate analysis. 6

    b) Describe the determination of calorific value by Bomb colorimeter. 4

16. a) Differentiate between isothermal process and adiabatic process. 2

    b) Discuss the entropy change in reversible and irreversible processes. 4

    c) Write a note on break point chlorination. 4

17. a) Describe the construction of lead-acid battery with the reactions occurring during charging and discharging. 6

    b) Describe the principle of strong acid-strong base conductometric titration. 4
