Code No. : 3315/N

FACULTY OF ENGINEERING & INFORMATICS

B.E. I Year (New) (Common to all branches) (Main) Examination, June 2011

ENGINEERING CHEMISTRY

Time : 3 Hours] **[Max. Marks : 75**

Note : Answer **all** questions from Part – **A**. Answer any **five** Questions from Part – **B**.

PART – A (Marks : 25)

1. What is Quinhydrone electrode ? Write the reduction electrode reaction of it. 2
2. Write a short note on Ni-Cd battery. 3
3. Differentiate between Gibb's and Helmholtz free energy. 2
4. State phase rule and explain the terms involved. 3
5. What are boiler troubles ? How are they prevented ? 3
6. Write a short note on differential aeration corrosion. 2
7. Distinguish between addition and condensation polymerization. 3
8. Write the applications of Carbon nanotubes. 2
9. What are the requirements of a good fuel ? 3
10. Define octane and cetane number of a fuel. 2

PART – B (Marks : 50)

11. (a) What is electrochemical series ? Give its applications with suitable examples. 5
    (b) Describe the construction of lead-acid battery with the reactions occurring during discharge. 5

12. (a) What is Carnot cycle ? Derive an expression for the efficiency of Carnot engine. 6
    (b) The temperature of 1 mole of an ideal gas increases from 18 °C to 55 °C as the gas is compressed adiabatically. Calculate the work done and ΔH for this process assuming that $C_v = \frac{3}{2}R$. 4

13. (a) Differentiate between chemical and electrochemical corrosion. 4
    (b) Discuss the various factors that influence the rate of corrosion. 6

14. (a) What are plastics, fibres and elastomers ? Give one example to each. 4
    (b) What is vulcanization of rubber ? What are its advantages over raw rubber ? 3
    (c) Give the applications of conducting polymers. 3

15. (a) Differentiate between High and Low calorific value of a fuel. 2

(b) Explain proximate analysis of coal. What is its importance ? 4

(c) Write a short note on LPG and CNG. 4

16. (a) Explain the principle and procedure involved in potentiometric acid-base titrations. 4

(b) 2 mole of an ideal gas expands isothermally from a volume of 10 litres to 20 litres at 27 °C. Calculate the entropy change in the process. 3

(c) Distinguish between temporary and permanent hardness of water. 3

17. (a) Give the preparation, properties and uses of the following : 4

(i) PVC

(ii) Perlon-U

(b) What is the principle of Rocket propulsion ? 2

(c) 100 ml of a water sample required 20 ml of $\frac{N}{50}$ H_2SO_4 for neutralization to phenolphthalein end point. After this, methyl orange indicator was added to this and further acid required was 15 ml. Calculate the type and amount of alkalinity of water. 4