

FACULTY OF ENGINEERING & INFORMATICS

B.E. I Year (Common to all branches) Examination, May/June 2012

ENGINEERING CHEMISTRY

Time : 3 Hours]

[Max. Marks : 75

Answer **all** questions from Part-A.Answer any **five** questions from Part-B.**Part A** — (Marks : 25)

1. Describe the construction of standard hydrogen electrode. 3
2. Explain the principle involved in the conductometric titration of strong acid with a strong base. 2
3. Differentiate between reversible and irreversible processes. 3
4. A heat engine working between 0°C and 100°C takes up 840 Joules from the high temperature reservoir. Calculate the work done and the efficiency. 2
5. In a structure, two dissimilar metals should not be allowed to come in contact with each other. Why? 2
6. What is reverse osmosis? How is this process help in softening of water? 3
7. Differentiate between addition and condensation polymerisation with suitable examples. 3
8. Write any two advantages of composite materials. 2
9. What is octane number? What is its significance? 2
10. What is Rocket Propellant? Write any four characteristics of a good propellant. 3

Part B – (Marks: 50)

11. (a) Describe the construction of lead-acid battery with the reactions occurring during discharging and charging. 6
- (b) Derive Nernst equation for single electrode potential. What are its applications? 4

12. (a) Explain change of entropy in reversible and irreversible processes. 4
(b) Derive Gibbs-Helmholtz equation. What are its applications? 6
13. (a) What is Cathodic protection? Explain sacrificial anode method. 4
(b) What is disinfection of drinking water? Explain break point chlorination. 4
(c) 50 ml. of a standard hard water consumed 15 ml. of 0.01 M EDTA solution. 50 ml. of a water sample consumed 25 ml. of same EDTA solution. Calculate the total hardness of water sample. 2
14. (a) Write preparation, properties and uses of : 6
(i) Teflon
(ii) Buna-5
(b) What are conducting polymers ? Discuss the classification of conducting polymers. 4
15. (a) What is Cracking? Describe the catalytic cracking by fixed bed method. 5
(b) What is CNG? What is its composition? What are the advantages of CNG as a fuel? 5
16. (a) Draw and explain phase diagram for water system. 6
(b) Calculate the EMF of a Daniel cell at 25°C , when the concentration of ZnSO_4 and CuSO_4 are 0.001 M and 0.1 M respectively. The standard electrode potential of copper and zinc electrodes are 0.34 V and - 0.76 V respectively. 4
17. (a) What are the factors affecting the rate of corrosion? 5
(b) What is Vulcanization? What is its significance? 3
(c) Give any four important applications of nanomaterials. 2