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 changing.   6

    (b) Derive Nernst equation for single electrode potential. What are its
         applications?   4

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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

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