M.Sc. (Previous) Degree Examination
August 2009
Directorate of Correspondence Course
(Freshers)

CHEMISTRY
Physical Chemistry

Time : 3 Hours   Max. Marks : 85

Note : 1. Answer any ELEVEN question from Part-A, THREE questions from Part-B and any THREE full questions from Part-C.

2. Figures to the right indicate marks.

PART-A

1. Answer any ELEVEN of the following.   11x2=22

a) Write the rate expression on the basis of Collision theory and explain the terms involved.

b) State and explain steady state approximation with examples.

c) Distinguish between chemisorption and physisorption.

d) Explain elastic and inelastic scattering with examples.

e) What are isotopes and isobars? Give one example for each.

f) Mention the uses of radioactive isotopes.

g) State and explain coulombs law of electrochemistry.

h) Define the terms activity and activity coefficients.

i) What are electrolytes? Explain their different kinds with examples.

j) Give the difference between galvanic cell and electrolytic cells.

k) Represent nickel - cadmium battery and mention its applications.

l) Define and mention the significance of decomposition potential.

m) State and explain first law of thermodymamics.

n) Mention the limitations of Van't Hoff equation.

o) What is meant by residual entropy? Explain.

PART-B

Answer any THREE of the following questions.   3x8=24

2. a) Discuss the factors affecting the critical micellar concentration (CMC)s of Surfactants.

    b) Discuss about collision theory.   4+4=8

3. a) Show that half-life period of given radioactive substance in independent of the amount of the substance present initially but it depends upom decay constant.

    b) Give an account of Power reactors.   4+4=8

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4. a) Deduce Debye-Hackel-Onsagar conduction equation.

   b) Write a note on ion-selective electrodes. 4+4=8

5. a) Define and explain polarization. Mention the factors affecting polarization.

   b) Write a note on over-voltage. 4+4=8

6. a) Deduce Gibbs-Dubem equation.

   b) Describe variation of free energy with temperature. 4+4=8

PART-C

Answer any THREE of the following questions. 3x13=39

7. a) Obtain an expression for the rate constant on the basis of activated complex theory.

   b) Briefly discuss about Gibbs adsorption isotherm. 7+6=13

8. a) Show that radioactive disintegration follows first order kinetics.

   b) Explain nuclear fission and fusion reactions with examples. 7+6=13

9. a) Discuss the Debye-Huckel theory of strong electrolytes.

   b) Discuss in detail about biosensors. 7+6=13

10. a) What are fuel cells? How do you classify into different types? Explain the working of hydrogen-oxygen fuel cell.

    b) Describe construction, working and applications of dry cell. 7+6=13

11. a) Derive Duhem-Margules equation and mention its applications.

    b) Obtain Clausius Clapeyron equation. 7+6=13

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