Reg. No. : | | | | | | | | | | | |

Question Paper Code : P 1584

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

First Semester

Civil Engineering

CY 1101 — CHEMISTRY — I

(Common to all branches expect Marine Engineering)

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is electrode potential?

2. Define Kohlrausch's law.

3. State the first law of thermodynamics and write its limitations.

4. Calculate the change in entropy when one gram mole of water is converted to vapour at its boiling point. Latent heat vapourization is 540 cals/gm.

5. What are opposing reactions? Give one example.

6. What is steady state principle?

7. Define adsorption and adsorbate.

8. What is auto catalysis?

9. What are the types of electronic transitions involved in organic molecules?

10. What are chromophores and auxochromes?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the Nernst equation for the single electrode potential. (10)

(ii) What are the galvanic cells? Illustrate with a suitable example. (6)

Or

(b) (i) Discuss in detail the construction and working calomel electrode. (10)

(ii) Calculate the emf of a concentration cell at 25°C consisting of two Zn electrodes immersed in a solution of Zn ions of 0.1M and 0.01M concentrations. (6)

12. (a) (i) Derive the Gibb's Helmholtz equation. Write any two applications? (10)

(ii) ΔG and ΔH for a reaction at 300K are 15 Kcals and –12Kcals respectively. What is the entropy of the reaction and what will be ΔG at 325 K. (6)

Or

(b) (i) Write briefly about thermodynamic equilibrium. (8)

(ii) Derive the expression for entropy change for the isothermal expansion of an ideal gas. (8)

13. (a) (i) What are the characteristics of second order reactions? Discuss. (8)

(ii) In a second order reaction studied at 25°C, the following data were obtained. (8)

Time (sec)	1200	1800	2400	3600
Concn. of reactant reacted (mol/dm³)	0.00876	0.01066	0.01208	0.01392

Or

(b) (i) Derive the expression for rate constant of a reaction using absolute reaction rate theory. (12)

(ii) Write a short note on parallel reactions. (4)

14. (a) (i) Differentiate physisorption from chemisorption. (8)

(ii) Derive an expression for the Langmuir adsorption isotherm. (8)

Or

(b) (i) Explain the various steps involved in the process of adsorption chromatography. (12)

(ii) Explain the concept of acid base catalysis using suitable examples. (4)

15. (a) Give a detailed account of the principle, instrumentation and applications of flame photometry. (16)

Or

(b) (i) Derive the Bee-Lambert's law. (6)

(ii) Give any six important applications of IR spectroscopy. (10)

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