Register Number: …………………..

B.E/B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2010

First Semester

CHY101: ENGINEERING CHEMISTRY

(Common to all Branches)

Time: Three Hours   **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The tendency of an electrode to gain electrons is called:

   A) Oxidation potential B) Over potential C) Reduction potential D) Decomposition potential

2. Daniel cell is an example for:

   A) An irreversible cell   B) A concentration cell   C) A primary cell   D) A reversible cell

3. In alkaline battery, the anode and cathode used respectively are:

   A) Lead and lead oxide   B) Zinc and graphite rod   C) Cadmium and NiO_2 D) Li and TiS_2

4. Which one of the following is responsible for converting a non-fissionable material into

   a fissionable material?

   A) Fuel rod   B) Control rod   C) Protective shield   D) Breeder reactor

5. Which one of the following is kept constant throughout an isochoric process?

   A) Pressure   B) Volume   C) Surface tension   D) Temperature

6. When the temperature of a system is increased, its entropy will:

   A) Increase   B) decrease   C) Remains constant   D) First decrease and then increase

7. The solid which takes up a gas or a solute on its surface is known as:

    A) Coolant   B) Adsorbate   C) Adsorbent   D) Moderator

8. Releasing one ion and adsorbing another like ion is known as:

   A) Desorption   B) Catalytic adsorption

   C) Ion exchange adsorption   D) Chromatographic adsorption

9. Which one of the following is not an example for a chromophore?

   A) - NH_2 B) $C = C$ C) – N = N -   D) – C = O

10. The number of IR bands (fundamental modes of vibration) for CO_2 molecule is:

    A) 8   B) 9   C) 4   D) 3

PART B (10 x 2= 20 Marks)

11. Calculate the standard emf of the cell, Zn / $ZnSO_4$ //$CuSO_4$ / Cu. Given, the standard reduction potentials of Zn and Cu are -0.761 V and +0.34 V, respectively.

12. Define the term polarization.

13. What is a primary battery? Give an example.

14. Define a nuclear chain reaction. Give an example.

15. What are isothermal and adiabatic processes?

16. Write the Clausius statement for Second law of thermodynamics.

17. Define the terms adsorption and sorption.

18. Write any two applications of adsorption chromatography.

19. State Beer-Lamberts' law.

20. What are auxochromes? Give two examples.

PART C (5 x 14 = 70 Marks)

21. a) (i) Derive Nernst equation for electrode potential. (7)

    (ii) Discuss any three types of conducto metric titrations. (7)

(OR)

   b) (i) Describe a glass electrode and explain how it can be used for determining the pH of a solution. (7)

   (ii) Describe any two applications of Kolhrausch's law of independent migration of ions. (7)

22. a) (i) Discuss the construction and working of Hydrogen-Oxygen fuel cell. (7)

    (ii) With a neat sketch, explain the working of light water nuclear power plant. (7)

(OR)

   b)(i)Describe the construction and working of nickel-cadmium battery along with the chemical reactions occurring during discharging and charging. (7)

   (ii) Explain the principle and working of photogalvanic cell. (7)

23. a) Derive an expression for the entropy change for an isothermal expansion of an ideal gas. (7)

(OR)

   b) (i) Discuss the applications of Gibbs-Helmholtz equation. (7)

   (ii) Derive an expression for vant Hoff's isochore. (7)

24. a) (i) Tabulate the differences between physical adsorption and chemisorption.   (7)

   (ii) Explain the role of adsorption in catalytic reactions.   (7)

(OR)

   b) (i) Discuss the factors influencing the adsorption of gases on solids.   (7)

   (ii) Derive Langmuir adsorption isotherm.   (7)

25. a) (i) Describe the estimation of concentration of a solution by colorimetry.   (7)

   (ii) Outline the applications of IR spectroscopy.   (7)

(OR)

   b)(i) Discuss the theory and instrumentation of flame photometry.   (7)

   (ii) Write briefly on the applications of UV spectroscopy.   (7)

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