

**B.E./B.TECH. DEGREE EXAMINATIONS: DECEMBER -2008**

2007 Batch - First Semester

**CYCLOIC CHEMISTRY-I****Time: Three Hours****Maximum Marks: 100****Answer ALL Questions:-****PART-A (20 x 2 = 40 Marks)**

1. Daniell cell is

- A. an electrolytic cell                      B. an electrochemical cell  
C. a concentration cell                      D. an irreversible cell

2. The potential of the cell,  $\text{Ag} / \text{Ag}^+ (0.1\text{M}) // \text{Ag}^+ (1\text{M}) / \text{Ag}$  is

- A. 0.0591 V                      B. -0.0591 V                      C. 0.1182 V                      D. 0.591 V

3. Which one of the following metals liberates hydrogen from acid?

- A. Copper                      B. Silver                      C. Iron                      D. Gold

4. Copper electrode is an example for

- A. Primary reference electrode                      B. Metal – metal salt- ion electrode  
C. Gas electrode                      D. Metal – metal ion electrode

5. Which one of the following expressions is the mathematical form of first law of thermodynamics?

- A.  $\Delta H = q + w$                       B.  $\Delta E = q - w$                       C.  $q = \Delta H + w$                       D.  $\Delta G = \Delta H - T\Delta S$

6. All natural processes proceed spontaneously in a direction that leads to

- A.  $\Delta H > 0$                       B.  $\Delta S < 0$                       C.  $\Delta E > 0$                       D.  $\Delta G < 0$

7. The entropy change when 100 g of solid ice at  $0^\circ\text{C}$  is transformed to liquid at  $0^\circ\text{C}$  and 1 atmosphere pressure if the latent heat of fusion of ice is 336 J/g is

- A. 123.08 J  $\text{g}^{-1}$                       B. -123.08 J  $\text{g}^{-1}$                       C. 112.0 J  $\text{g}^{-1}$                       D. 971.28 J  $\text{g}^{-1}$

8. Equilibrium constant for the reaction,  $A \leftrightarrow B$  is  $10^4$  at  $25^\circ\text{C}$ . The Gibbs free energy change for the reaction is

- A.  $4.2 \times 298 \times \ln 10^4$                       B.  $-4.2 \times 298 \times \ln 10^4$                       C.  $-4.2 \times \ln 10^4$                       D.  $298 \times \ln 10^4$

9. An ideal gas is one that obeys

- A. Boyle's Law only at all temperatures  
B. Charle's Law only at all pressures  
C. Boyle's Law and Charle's Law at all temperatures and pressures  
D. Gibbs – Helmholtz equation



**PART-B (5 x 12 = 60 Marks)**

21. a (i). Explain the experimental determination of single electrode potential with a neat sketch. (6)
- (ii). Write a note on the construction and working of saturated calomel electrode. (6)

**OR**

- b (i). State Kohlrausch's law of independent migration of ions and explain any three applications of the same. (3+4)
- (ii). Write a note on over voltage and polarization. (6)

22. a. Explain the following.
- (i) Thermodynamic equilibrium
  - (ii) Isothermal process
  - (iii) Isochoric process
  - (iv) Thermodynamically reversible and irreversible processes. (1x3)

**OR**

- b. Derive Gibbs-Helmholtz equation and explain its applications. (6+6)

23. a. (i) What are nanoparticles? Give an account of their characteristic properties. (6)
- (ii) Discuss the applications of carbon nanotubes. (6)

**OR**

- b. (i) Write a note on the kinetics of opposing reactions. (6)
- (ii) Discuss the theory of absolute reaction rate. (6)

24. a (i) Derive Langmuir adsorption isotherm giving the assumptions involved. (6)
- (ii) Write a note on the role of adsorbents. (6)

**OR**

- b. Discuss in detail the kinetics of enzyme catalysed reactions. (12)

25. a (i) Discuss the principle involved in flame photometric technique with a neat sketch. (6)
- (ii) How is ferric iron estimated colorimetrically? (6)

**OR**

- b. (i) Explain the instrumentation of UV studies outlining the principle involved. (6)
- (ii) Write an account of the applications of IR spectroscopy. (6)

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