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Reg. No. : .....

Code No. : 20312 E **Sub. Code : AMCH 52**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2022.

Fifth Semester

Chemistry — Core

PHYSICAL CHEMISTRY – II

(For those who joined in July 2020 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions, choose the correct answer

1. The intensive property is

   (a) ΔV (b) ΔH

   (c) ΔG (d) C_P

2. For an ideal gas $\mu_{J.T}$ is

   (a) Positive (b) Negative

   (c) Zero (d) None of the above

3. For an adiabatic process

   (a) T = Constant (b) q = 0

   (c) q = Constant (d) w = 0

4. The Third law of thermodynamics states that limit $T \to 0$

   (a) $G = 0$ (b) $H = 0$

   (c) $E = 0$ (d) $S = 0$

5. At Equilibrium ΔG is

   (a) Positive (b) Negative

   (c) Zero (d) None of the above

6. Gibb's Phase rule is

   (a) $F = P - C + 2$ (b) $F = C - P + 2$

   (c) $P = F - C + 2$ (d) $P = F - C + 1$

7. Cell constant of conducting cell

   (a) Specific conductance × conductance

   (b) $\frac{\text{Specific conductance}}{\text{Conductance}}$

   (c) $\frac{\text{Conductance}}{\text{Specific conductance}}$

   (d) $\frac{1}{\text{Specific conductance}}$

8. The conductance of a strong electrolyte is high on the application of high potential. This is known as

(a) Wien effect

(b) Falken Hagen effect

(c) Debye – Falken hagen effect

(d) A symmetric effect

9. The concentration of hydrogen ion could not be determined by using

(a) Glass electrode

(b) Calomel electrode

(c) Hydrogen electrode

(d) Quinhydrone electrode

10. The chemical reaction takes place at the cathode of a galvanic cell is

(a) Oxidation

(b) Reduction

(c) Hydrolysis

(d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the type of system with example.

Or

(b) Describe the jouce-thomson experiment. Bring out its significance of the liquefaction of gas.

12. (a) Derive an expression for the variation of entropy with pressure at constant temperature.

Or

(b) Derive Clausius – Clapeyron equation.

13. (a) Explain k_p and k_x and show their relationship.

Or

(b) State the law of mass action and derive the equilibrium. Constant of an equilibrium.

14. (a) How will you determine the solubility of a sparingly soluble sat by conductance?

Or

(b) Derive Henderson's equation for the pH of a buffer solution.

15. (a) Write a note on Weston Standard Cell.

Or

(b) Write a note on polarization.

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) State and explain Zeroth law of thermo dynamics.

Or

(b) Deduce an expression for the change in internal energy and change in temperature during the reversible adiabatic expansion of an ideal gas.

17. (a) Derive the entropy change in isothermal expansion of a ideal gas.

Or

(b) (i) What do you understand from the sign of free energy of a reaction? (2)

(ii) Describe the relationship between k_p and k_C.

18. (a) Derive an expression for the variation of entropy with volume at a constant temperature.

Or

(b) Describe the phase diagram of water system.

19. (a) Discuss the Debye Huckel Onsagor theory for strong electrolyses.

Or

(b) State Ostwald's dilution law and derive the relation between degree of dissociation and dissociation constant.

20. (a) What are concentration cells? Derive expression for the emps of concentration cell with transference.

Or

(b) Derive an expression for the determination of liquid junction potential using concentration cell.