Code No. : 10322 E   Sub. Code : AMCH 52

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023

Fifth Semester

Chemistry — Core

PHYSICAL CHEMISTRY — II

(For those who joined in July 2020 only)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The gas expands adiabatically, the heat absorbed is
    (a) Positive
    (b) Negative
    (c) Zero
    (d) Can't be calculated

2. During isothermal expansion of an ideal gas its enthalpy
    (a) increases
    (b) decreases
    (c) no change in enthalpy
    (d) none of the above

3. When solid ice melts to liquid water at 0°C the entropy?
    (a) Increases
    (b) Decreases
    (c) Remains constant
    (d) Zero

4. Free energy is
    (a) an intensive property
    (b) an extensive property
    (c) an electrical property
    (d) a colligative property

5. In an equilibrium reaction for which $\Delta G° = 0$, the equilibrium constant should equal to
    (a) 0   (b) 1
    (c) 2   (d) 10

6. How many phases are present at the eutectic point of Pb – Ag system?
    (a) 1   (b) 2
    (c) 3   (d) 4

7. During the titration of a weak acid against NaOH, the conductance of the solution, after the neutralisation point
    (a) increases
    (b) decreases
    (c) varies irregularly
    (d) is constant

8. Aqueous solution of NH_4Cl is
    (a) Neutral   (b) Acidic
    (c) Basic   (d) Amphoteric

9. In salt bridge, KCl is largely used because
    (a) forms a good jelly
    (b) K^+ and Cl^- have same transport number
    (c) K^+ and Cl^- are isoelectronic
    (d) KCl is an electrolyte

10. For a cell reaction to occurs spontanedisly, the emf of the cell should be
    (a) positive   (b) negative
    (c) zero   (d) none of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Explain with examples what is meant by cyclic process.

Or

(b) Compare exact and inexact differentials with examples.

12. (a) Write a note on Nernst heat theorem.

Or

(b) What are the merits and limitations of second law of thermo dynamics?

13. (a) Derive Van't Haff reaction isotherm.

Or

(b) Explain phase diagram of sulphur system.

14. (a) Derive Ostwald dilution law. Mention its applications and limitations.

Or

(b) Discuss the conductometric titration of HCl vs NaOH.

15. (a) What are reversible cells? How do you measure its emf?

Or

(b) Explain electrochemical series and its significance.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Derive an expression for work done during reversible isothermal expansion of a real gas?

Or

(b) Derive expression for Joule Thomson co-efficient.

17. (a) Explain the following :

(i) activity

(ii) activity co-efficient

(iii) std states.

Or

(b) Define partial molal free energy and derive Gibb's Duhem equation.

18. (a) Draw and discuss the phase diagram of Mg – Zn system.

Or

(b) Derive Van't Haff reaction isochore of a reaction.

19. (a) (i) Explain Metallic and electrolytic conductance.

(ii) Measurement of conductance and cell constant.

Or

(b) Explain Debye Hackel Onsagar theory.

20. (a) Derive an expression for liquid junction potential.

Or

(b) Determine pH of a solution using quinhydrone electrode.

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