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Reg. No. :.....

Code No. : 20282 E **Sub. Code : JMCH 41/ SMCH 41**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Fourth Semester

Chemistry — Core

PHYSICAL CHEMISTRY — II

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The work differential *dw* is

   (a) a static function

   (b) an exact differential

   (c) an inexact differential

   (d) none of the above

2. For an ideal gas μ_{JT} is

(a) Positive (b) Negative

(c) Zero (d) None of the above

3. Trouton's rule is

(a) $\Delta G_V / T_b \approx 88$ $Jmol^{-1}K^{-1}$

(b) $\Delta H_V / T_b \approx 88$ $Jmol^{-1}K^{-1}$

(c) $\Delta E_V / T_b \approx 88$ $Jmol^{-1}K^{-1}$

(d) $\Delta S_V / T_b \approx 88$ $Jmol^{-1}K^{-1}$

4. All natural process are

(a) reversible (b) irreversible

(c) zero (d) constant

5. At equilibrium, ΔG is

(a) Positive (b) Negative

(c) Zero (d) None of the above

6. ΔG° is

(a) $-RT \ln E$ (b) $RT \ln K_P$

(c) $RT \ln E$ (d) $-RT \ln K_P$

7. Molarity is

(a) mole/litre (b) mole/kg

(c) kg/mole (d) litre/mole

8. $N(C_2H_5)_3$ – Water system has

(a) UCST (b) LCST

(c) UCST and LCST (d) None of these

9. Cell constant is

(a) $\frac{a}{l}$ (b) $\frac{l}{a}$

(c) $\frac{\rho}{a}$ (d) $\frac{K}{C}$

10. Kohlrausch's law is

(a) $\Lambda^{\circ}_m = \lambda^{\circ}_+ - \lambda^{\circ}_-$ (b) $\Lambda^{\circ}_m = \frac{\lambda^{\circ}_+}{\lambda^{\circ}_-}$

(c) $\Lambda^{\circ}_m = \frac{\lambda^{\circ}_-}{\lambda^{\circ}_+}$ (d) $\Lambda^{\circ}_m = \lambda^{\circ}_+ + \lambda^{\circ}_-$

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Write note on Extensive and Intensive Properties.

Or

(b) Define and C_P and C_V.

12. (a) Derive an expression for the entropy of mixing of ideal gas.

Or

(b) What are the applications of Gibbs Helmholtz equation?

13. (a) Define K_P and K_C and give the relationship between K_P and K_C.

Or

(b) State Le-Chatelier's principle and explain with example.

14. (a) Draw and explain the CST curve of Triethylamine-Water system.

Or

(b) What are the applications of liquid crystals?

15. (a) State and explain the Kohlrauch's law.

Or

(b) Write notes on Wien Effect.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Derive Kirchhoff's equation for the effect of temperature on heat of reactions.

Or

(b) Derive the expression for Joule Thomson Coefficient.

17. (a) Derive the expression for entropy as function of T and V.

Or

(b) Derive the Gibbs-Helmholtz equation.

18. (a) What are the applications of Le Chatelier's Principle?

Or

(b) Derive and explain the Van't Hoff isochore.

19. (a) Draw and explain the Phenol-Water and Nicotine-Water system with diagram.

Or

(b) Explain the various types of liquid crystals.

20. (a) What is meant by transport number of an ion? How is it determined by moving boundary method?

Or

(b) Explain the different types of conducto metric titrations with examples.

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