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SUBJECT CODE NO: - Y-2006
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y (SEM-III)
Examination March / April - 2023
Chemistry Paper-VIII (Physical Chemistry)

[Time: 1:30 Hours] **[Max. Marks: 50]**

Please check whether you have got the right question paper.
N. B   1) Attempt all questions.
         2) Illustrate your answer with suitable diagram.

Q1   a) State intensive and extensive properties with suitable examples.   10
        One mole of an ideal gas at 25 °C is allowed to expand reversibly at constant
        temperature from a volume of 10 litres to 20 litres. Calculate the work done by the gas
        in Joules. (R = 8.314 J/mol-K)
     b) Explain Gibbs Function (G) as criteria for thermodynamic equilibrium and   10
        spontaneity.

OR

     c) Define molar heat capacity at constant pressure and volume. Prove that $C_P - C_V = R$ 10
     d) write various statements of second law of thermodynamics.   10

Q2   a) Derive an expression for total work done in the Carnot Cycle.   10
     b) Derive Clausius-Clapeyron equation and give its applications.   10

OR

     c) write short notes on any four of the following.   20
        a) Concept of maximum work done.
        b) Hess's law of constant heat summation with its application.
        c) Define entropy with physical significance.
        d) Helmholtz work function
        e) Law of mass action.
        f) State and Explain Le- Chateliers principle.

Q3 Multiple choice questions.   10
     1) The efficiency of heat engine operating between 400 K and 200 K is
        A) 0.25   B) 0.50   C) 0.75   D) 1.00

     2) In an exothermic reaction Δ H is
        A) Positive   B) Zero   C) Negative   D) None of these

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3) A measure of the degree of disorder of a system is known as
   A) Entropy   B) Enthalpy   C) Efficiency   D) Isotropy

4) The Clausis-Clapeyron equation helps to calculate
   A) Latent heat of vaporization   B) Boiling point or freezing point
   C) Vapour pressure at one temperature if another temperature is given
   D) All of the above

5) Which of the following expression is true
   A) $G = E + TS$ B) $G = E - TS$ C) $G = H - TS$ D) $G = H + TS$

6) The first law of thermodynamics states that energy can
   A) be created   B) be destroyed
   C) be converted   D) Neither be created nor be destroyed

7) The term $R \ln K_P^\circ$ is equal to
   A) $-\Delta G/T$ B) $-\Delta G^\circ/T$ C) $-\Delta G$ D) $-\Delta G^\circ$

8) In a Carnot cycle, heat is transferred at
   A) constant pressure   B) constant volume
   C) constant temperature   D) constant enthalpy

9) Catalyst increases rate of reaction by
   A) Shifting the equilibrium to right   B) shifting the equilibrium to left
   C) increasing activation energy   D) lowering activation energy

10) Chemical system is at equilibrium
    A) When the rate of Forward reaction becomes zero
    B) When the rate of forward and reverse reaction are equal
    C) When all the reactants having used up
    D) When the rate of forward and reverse reaction are both zero

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