

Time: One Hour

Max. Marks: 25

Instruction:

- Solve any 25 questions

- The first law of thermodynamics states that energy can
 - be created only
 - be destroyed only
 - be converted
 - neither be created nor destroyed
- Isolated system is a system in which
 - heat can be exchanged with surrounding
 - matter can be exchanged with surrounding
 - neither matter nor heat can be exchanged with surrounding
 - matter and heat both can be exchanged with surrounding
- Example of extensive property is
 - Pressure
 - Temperature
 - Density
 - Volume
- Isobaric process is the process in which
 - temperature remains constant
 - volume remains constant
 - pressure remains constant
 - heat remains constant
- work is done on the system is represented as
 - positive sign
 - negative sign
 - no sign
 - none of these
- Which is not true about thermodynamics?
 - it involves the matter in bulk
 - it ignores the internal structure of atoms and molecules
 - it is concerned only with the initial and final states of the system
 - it is not applicable to macroscopic molecules
- Which of the following properties is not a function of state?
 - concentration
 - internal energy
 - enthalpy
 - entropy
- Which of the following is not correct?
 - $H = E + PV$
 - $H - E = PV$
 - $H - E - PV = 0$
 - $H = E - PV$
- In chemical process, the amount of total heat change is same. No matter by which method the change is brought about. This is statement of
 - Henry's law
 - Hess's law
 - law of thermo chemistry
 - none of these
- For exothermic reactions, change in enthalpy (ΔH) is ----- while for endothermic reactions it is -----
 - positive, negative
 - positive, positive
 - negative, positive
 - negative, negative
- Tendency of the process to occur naturally is called as
 - momentum of the reaction
 - spontaneity of the reaction
 - equilibrium of the reaction
 - none of these
- Entropy is a measure of ----- of the molecules of the system.
 - concentration
 - velocity
 - randomness or disorder
 - zig-zag motion
- Second law of thermodynamics states that
 - whenever a spontaneous process occurs, it is accompanied by an increase in the total energy of the universe
 - the entropy of the system is constantly increasing
 - neither of the above
 - both a and b
- The standard entropy (S_0) of a substance is
 - its entropy at 00 C and 1 atm pressure
 - its entropy at 250 C and 1 atm pressure
 - its entropy at 0 K and 1 atm pressure
 - its entropy at 25 K and 1 atm pressure
- Which of the following is true for cyclic process?
 - $\Delta E = 0$
 - $\Delta E = q - w$
 - $q = w$
 - all of these
- The cycle of processes which occurs under reversible conditions is referred to as
 - carnot cycle
 - reversible reaction
 - cyclic process
 - closed process
- The efficiency of heat engine operating between 400 K and 200 K is
 - 0.25
 - 0.50
 - 0.75
 - 1.00
- The free energy function G is defined as
 - $G = H + TS$
 - $G = H - TS$
 - $G = TS - H$
 - none of these
- which of the following is not a state function
 - free energy
 - work function
 - entropy
 - work done
- The work function (A) is defined as
 - $A = E - TS$
 - $A = E + TS$
 - $A = TS - E$
 - none of these
- Gibbs - Helmholtz equation is applicable to
 - all process chemical or physical
 - all process chemical or physical but in a closed system
 - all chemical process in a closed system
 - all physical process in a closed system
- for spontaneous process
 - $\Delta G < 0$
 - $\Delta G > 0$
 - $\Delta G = 0$
 - none of these
- Change in entropy of the reaction is given by
 - $\Delta S = \sum S_{\text{Reactants}} - \sum S_{\text{Products}}$
 - $\Delta S = \sum S_{\text{Reactants}} + \sum S_{\text{Products}}$
 - $\Delta S = \sum S_{\text{Products}} - \sum S_{\text{Reactants}}$
 - $\Delta S = \sum S_{\text{Products}} + \sum S_{\text{Reactants}}$
- Chemical system is at equilibrium

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- (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
- 25 Equilibrium constant for a reaction mixture will change by
(A) adding an inert gas (B) changing temperature (C) increasing pressure by decreasing volume (D) all of these
- 26 The yield of AB(g)
 $A(g) + B(g) = AB(g) + \text{heat}$
Would be increased by
(A) decreasing the pressure (B) adding additional AB to the reaction mixture (C) decreasing the temperature (D) increasing the temperature
- 27 The Clausius-Clapeyron equation helps to calculate
(A) latent heat of vaporization (B) boiling point or freezing point (C) vapour pressure at one temperature if at another temperature is given (D) all of the above
- 28 Catalyst will increase the rate of chemical reaction by
(A) shifting the equilibrium to the right (B) shifting the equilibrium to the left (C) lowering the activation energy (D) increasing the activation energy
- 29 If $\Delta G_0 = 0$ then
(A) the reaction is at equilibrium (B) reverse reaction is spontaneous (C) forward reaction is spontaneous (D) none of these
- 30 Consider the following reversible reaction
 $N_2 + 3H_2 \rightleftharpoons 2NH_3$
Its equilibrium constant K is expressed as
(A) $[NH_3] \div [N_2] [H_2]$ (B) $[NH_3]_2 \div [N_2] [H_2]^3$ (C) $[NH_3]^2 \div [N_2] [H_2]$ (D) $[NH_3] \div [N_2] [H_2]^3$