Che 201 Physical Chemistry

Updated Mid Term 2018

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Q.No.1 Define Gibbs Free Energy.

The Gibbs free energy of a system at any moment in time is defined as the enthalpy of the system minus the product of the temperature times the entropy of the system.

$$G = H - TS$$

Q.No.2 Diff b/w mass percent and volume percent.

Mass Percent	Volume Percent
The mass percent is used to express concentration of solution when mass of solute and mass of solution is given $\text{m. p} = \frac{mass\ of\ solute}{mass\ of\ solution} * 100\%$	The volume percent is used to express concentration of solution when volume of a solute and volume of solution is given $\text{Volume Percent} = \frac{Volume\ of\ solute}{Volume\ of\ solution} * 100\%$

Q.No.3 Diff b/w latent heat of vaporization and fusion.

latent heat of vaporization	latent heat of fusion
latent heat of vaporization is defined as the quantity of heat energy that is necessary to raise one unit of weight (pounds or grams) with no change of temperature in the surroundings.	The specific heat of fusion is the quantity of heat that is necessary to raise one unit of weight without any change in temperature.

Q.No.4 Just define Henry's Law.

Henry's law is one of the gas laws formulated by William Henry in 1803;

"At a constant temperature, the amount of a given gas that dissolves in a given type and volume of liquid is directly proportional to the partial pressure of that gas in equilibrium with that liquid."

Q.No.5 Write Application of Equilibrium Constant.

1. The magnitude of the equilibrium constant, K, indicates the extent to which a reaction will proceed;

- If K is a large number, it means that the equilibrium concentration of the products is large. In this case, the reaction as written will proceed to the right.
- If K is a small number, it means that the equilibrium concentration of the reactants is large. In this case, the reaction as written will proceed to the left.

2. Predicting the Direction of a Reaction;

- If Q = Kc, then the system is already at equilibrium
- If Q > Kc, then essentially, we have too much product and the reaction will proceed to the left
- If Q < Kc, then essentially, we have too little product and the reaction will proceed to the right.

3.Calculation of the Equilibrium Concentration of a Reactant or Product

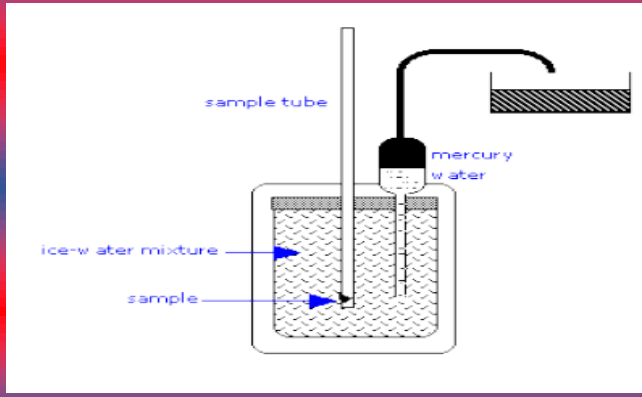
Many types of equilibrium problems deal with determining how much of a product (or reactant) we will have once a reaction reaches equilibrium.

4. Solving equilibrium concentrations of all components in a reaction

Sometimes an equilibrium problem will provide the value for the equilibrium constant and the initial concentration of all species.

Q.No.6 Describe about Ice calorimetr.

The ice calorimeter is an important tool for measuring the heat capacities of liquids and solids, as well as the heats of certain reactions. This simple yet ingenious apparatus is essentially a device for measuring the change in volume due to melting of ice. To measure a heat capacity, a warm sample is placed in the inner compartment, which is surrounded by a mixture of ice and water. The heat withdrawn from the sample as it cools causes some of the ice to melt. Since ice is less dense than water, the volume of water in the insulated chamber decreases. This causes an equivalent volume of mercury to be sucked into the inner reservoir from the outside container. The loss in weight of this container gives the decrease in volume of the water, and thus the mass of ice melted. This, combined with the heat of fusion of ice, gives the quantity of heat lost by the sample as it cools to 0°C



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