**Chemistry**

**Smart Syllabus**

**Short Questions Notes**

**K.m. School System**

**Chapter no: 1**

1. **Why most chemical reaction do not go to completion or What are irreversible reactions?**

**Answer:**

# Most chemical reaction do not go to completion because these reactions are irreversible reaction. They never go to completion because reactants react to form products and then at the same time products decompose to form reactants.

1. **Differentiate between irreversible and reversible reaction.**

**Answer:**

**Irreversible reaction Reversible reaction**

“The reactions in which the “The reactions in which the

Products do not recombine products can recombine to

to form reactants are called form reactants is called ***Irreversible reaction.”***  ***Reversible Reaction.***”

They are supposed to These reaction never goes to complete. completion. They are represented by They are represented by double single arrow. arrow. These reactions proceed in These reaction proceed in two one way. ways: (1) Forward Reaction (2)Reverse Reaction

Example: Example: 2H2 + O2→2H2O H2 +I2 2HI

1. **What is the forward reaction of H2and I2?**

**Answer:**

H2 + I2→2HI

1. **What is equilibrium state?**

**Answer:**

When the rate of forward reaction takes place at the rate of reverse reaction but in opposite direction, the composition of mixture remains constant, it is called an ***Equilibrium State.***

**Rate of forward reaction=Rate of reverse reaction**

1. **Differentiate between Static and Dynamic Equilibrium with example.**

**Answer:**

**Static Equilibrium Dynamic Equilibrium**

“When reaction ceases to “When reaction does not stop, proceed, it is called ***Static***  only the rates of forward and ***Equilibrium.***” reverse reactions become equal to each other but take place in opposite directions. This is called ***Dynamic Equilibrium.***”

This occur mostly in This occur mostly in chemical physical phenomena. phenomena. **Example:**

**Example:**

A building remains H2 +I2 2HI 2HI

standing rather than falling

down because all the forces

acting on it are balanced.

1. **What is the difference between Forward and Reverse reaction?**

**Answer:**

**Forward Reaction Reverse Reaction**

**“**The reaction in which reactants **“**The reaction in which products

react to form products is called react to form reactants is called

***Forward reaction” Reverse Reaction”***

It takes place from left to right. It takes place from right to left.

At initial stage, the rate of In the beginning, the rate of forward reaction is very fast. reverse reaction is negligible.

It slows down gradually. It speeds up gradually.

1. **Define Law of Mass action and active mass.**

**Answer:**

**Law of Mass Action:**

“The rate at which substance react is directly proportional to its active mass and the rate of reaction is directly proportional to the product of the active masses of the reacting substances”.

**Active Mass:**

“Active mass is a mass that is active in the reaction”.

It is considered as the molar concentration having unit of **moldm-3**

It is expressed as square brackets [ ].

1. **N2 + 3H2 2NH3  2NH3**

**Give the equilibrium constant of this equation.**

**Answer:**

Kc= [NH3]2

[N2][H2]3

1. **Define equilibrium constant. Also give it formula.**

**Answer:**

**Equilibrium Constant:**

Equilibrium constant is defined as:

**“*Equilibrium Constant*** is the ratio of product of concentration of products raised to the power of coefficient to the product of the concentration of reactants raised to the power of coefficient as expressed in the balance chemical equation**”**.

**Kc=** Product of concentration of products raised to the power of coefficient

Product of concentration of reactants raised to the power of coefficient

1. **On which factor the value of Kc depends and on what factors it does not depend (Independent)?**

**Answer:**

The value of Kc depends only on **“Temperature”.** The value of Kc does not depend upon **“the initial concentrations of reactants and products”.**

1. **H2 + I2 2HI 2HI**

**Write the unit of equilibrium constant (Kc).**

**Answer:**

**Kc=** [HI] 2

[H2] [I2]

**Kc=** [moldm-3]2

[moldm-3][mol dm-3]

**Kc= No Unit**

1. **What is the importance of equilibrium constant?**

**Answer:**

Equilibrium constant has great importance. By knowing the numerical value of equilibrium constant of a chemical reaction, direction as well as extent of the reaction can be predicted.

1. **What is reaction quotient? What is its use?**

**Answer:**

**Reaction Quotient:**

**“**When we put the concentrations of reactants and products into the equilibrium constant expression at a particular subscript “t”, we obtain a value that is called “***Reaction Quotient”***

**Use:**

Use of Reaction Quotient is given below:

1. Reaction quotient is used to predict the direction of reaction by comparing the value of QC with Kc.
2. **If QC is lesser than Kc (QC<Kc), then what will be the direction of reaction?**

**Answer:**

If QC is lesser than Kc (QC<Kc); the reaction moves from left to right, i.e., in forward direction to attain equilibrium. **QC Kc**

Forward reaction

1. **If QC is greater than Kc(Qc >K), then what will be the direction of a reaction?**

**Answer:**

If QC is greater than Kc (QC>Kc); the reaction goes from left to right, i.e. in reverse reaction to attain equilibrium.

**QC Kc**

Reverse reaction

1. **What is the prediction of the extent of the reaction? How you can predict the extent of reaction?**

**Answer:**

**Prediction of the extent of the reaction:**

***“Prediction of the extent of the reaction*** means to which extent reactants are converted into products***”***. In fact, it measures how far a reaction proceeds before establishing equilibrium state.

**Procedure:**

We can predict the extent of a reaction by using the numerical value of Kc.

1. **What is the relation of large numerical value of Kc with equilibrium?**

**Answer:**

The large value of Kc indicates that at equilibrium position the reaction mixture consists of almost all the products and reactants are negligible. It also indicates the reaction has almost gone to completion.

**Example:**

Oxidation of carbon monoxide goes to completion at 1000K.

**2CO + O2 2CO2 (g) Kc=2.2\*1022**

1. **What is the relation of small numerical value of Kc with equilibrium?**

**Answer:**

When the Kc value is small, it indicates that the equilibrium has established with very small conversion of reactants to products.

At equilibrium position, almost all reactants are present but amount of product is negligible. Such type of reaction never go to completion.

**Example:**

**2NH3 (g) N2 (g) + 3H2 (g) Kc=3.0\*10-9**

1. **When the numerical value of Kc is neither small nor large, what is it meant?**

**Answer:**

When the numerical value of Kc is neither small nor large, it means that the reaction have comparable amount of reactants and products at equilibrium position.

**Example:**

**N2O4  2NO2 Kc=0.211**

1. **Which type of reactions never go to completion?**

**Answer:**

The reactions that never go to completion are “***Reversible Reactions”***

1. **Write the uses of atmospheric gasses in the manufacture of chemicals.**

**Answer:**

The two major components of atmosphere are Nitrogen and Oxygen gasses. Both of these gasses constitute 99% of the atmosphere. These gasses are being used to manufacture chemicals since the advent of 20th century.

**Nitrogen:**

Nitrogen is used to prepare ammonia, which is further used to manufacture nitrogenous fertilizer.

**Oxygen:**

Oxygen is used to prepare sulphur dioxide, which is further used to manufacture the king of chemicals “Sulphuric Acid”

1. **Why reaction mixture does not have 50% reactants and 50% products at equilibrium position?**

**Answer:**

At equilibrium state reaction mixture does not have 50% reactants and 50% product because of different number of moles of reactants and products.