**1.3 Order of reaction** The order is the number of concentration terms on which reaction rates depends. Thus, if the rate of a reaction depends on the first power of the concentration of reactant, i.e. Rate = KC1 Thus the reaction is said to be of the first order. When the rate is proportional to the product of two reactant concentrations or the square of the concentration of a reactant, the reaction is of the second order.

For example, the decomposition of hydroiodic acid Rate = K C2HI

and the hydrogen - iodine reaction H2+I2 −→ 2H I

Rate = KCH2CI2

Here both are second order reactions.

If the reaction rate is experimentally found to be represented by – dC/ dt = KCn

The order of the reaction is n. If several reactants A, B, C, . . . . . . .etc are involved and it is observed experimentally that the rate of the process is given by, − dc/dt = KCAα CB β CC γ C....... Then the order of the reaction would be n = α+β+γ+....... The reaction is said to be α th order with respect to A, β th order with respect to B etc. But there are reactions in which the order is fractional i.e. n = 1/ 2 , 3 /2 etc.. For example, the ortho – para hydrogen conversion, its rate is expressed by − d[H2 ]/ dt = K CH2 3 /2

**1.4 Molecularity of a reaction** The molecularity of a reaction is defined as the number of molecules or atoms which take part in the process of a chemical change. The reaction is said to be unimolecular, bimolecular, termolecular according to one, two, or three molecules are involved in the process of a chemical change. The term unimolecular was used for all first order reactions, the term bimolecular for 2nd order reactions etc.

SKILL TEST

1. What do you mean by the order of a reaction?

2. What is the molecularity of a reaction?

3. Can order of a reaction be fractional?

4. Is it possible for a reaction to have identical values for molecularity and order?