## Law of mass action

**1.** (b) According to law of mass-action, "at a given temperature, the rate of a reaction at a particular instant is proportional to the product of the active masses of the reactants at that instant raised to powers which are numerically equal to the numbers of their respective molecules in the stoichiometric equation describing the reaction".

**2** (a) Law of mass action

**Explanation:**
The **law of mass action** states that the rate of a chemical reaction is directly proportional to the product of the active masses (concentrations) of the reactants, each raised to a power equal to its stoichiometric coefficient in the balanced equation.

**3.** (d) $[HI] = \frac{64\,gm}{128 \times 2\,litre} = 0.25$

Active mass is the concentration in *moles/litre.*

*4* (b) Increases

**Explanation:**
According to the law of mass action, the rate of a chemical reaction increases with an increase in the concentration (active mass) of the reactants, as more reacting particles collide per unit time.

*5* (a) Guldberg and Waage

**Explanation:**
Cato Guldberg and Peter Waage formulated the **law of mass action** in 1864, which relates the rate of a reaction to the concentrations of the reactants.

*6* (d) Concentration of reactants

**Explanation:**
Active mass represents the effective concentration of a substance that takes part in a reaction. The rate of reaction increases with the active mass (concentration) of the reactants.

*7* (d) Active mass

**Explanation:**
The rate of a chemical reaction depends on the **active mass (concentration)** of the reactants, which determines how frequently the reacting molecules collide.

**8.** (a) As we increase the concentration of substance, then speed of the reaction increases.

**9.** (c) Chemical reaction quantitatively depend on the reactant and product molecule.

10 (a) Cannot be applied

**Explanation:**
The **law of mass action** applies only to **reversible reactions** where both forward and backward reactions occur simultaneously.
The thermal decomposition of potassium chlorate is an **irreversible reaction** (it goes to completion and does not re-form $KClO_3$), hence the law of mass action **cannot be applied**.