

CLASS - B.Sc (Hons) PART-III

PAPER - V

TOPIC - Activation energy

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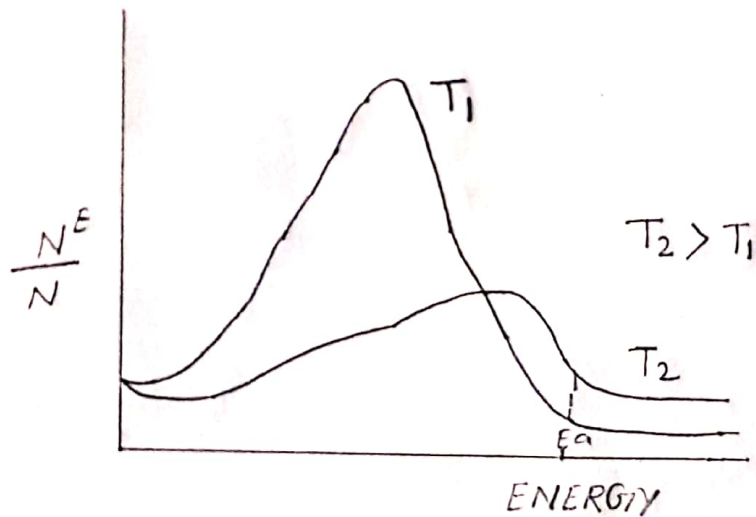
Q Explain activation energy

Ans Activation energy: we know that a chemical reaction involves redistribution of atoms in molecules. It requires breaking of bonds in reactant molecules. Thus molecules react by collision only when they acquire enough energy to break all these bonds. The amount of energy in excess to the average energy possessed by reactant molecules to form the activated complex is called activation energy (E). E is the path function and not the state function. It depends on the nature of chemical bonds undergoing rupture. For a reaction to occur, the energy of the molecules is either equal to or greater than E but not lesser than E . The fraction of molecules having E is greater at high temperature. This explains the increase of reaction rate with the rise of temperature.

Q Discuss the dependence of reaction rates on temperature.

Ans The reaction rates which are slow at low temperature becomes very fast at high temperature. The rates of many reactions in the neighbourhood of room temperature increase 2 or even 3 times for a 10° rise in temperature. Actually, all reactants do not participate in a reaction but only a certain fraction of total number of molecules react. These molecules are called active molecules. The effect of temperature is primarily to increase the number of active reactant molecules.

The large increase in the reaction rate with rise in temperature is due to the increase in the number of such molecules. From the study of fraction of number of molecules vs the



Effect of temperature on the number of molecules increasing

velocity or K.E of molecules, the fraction of the molecules having energy equal to or greater than E is greater at higher temperatures.