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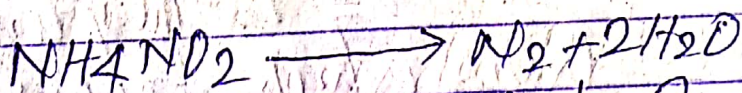
18-07-20

Doc-I (H/S) Physical Chemistry
(Paper-II)
Chapter - Chemical Kinetics
Topics - Molecularity ~~of reaction~~
of Reaction.

Molecularity of Reaction :- The number of reacting species (atoms, molecules & ions) taking part in an elementary reaction which must collide simultaneously in order to bring about chemical rxn is called their molecularity.

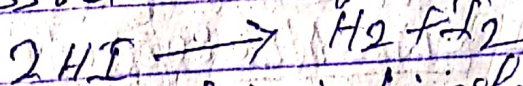
The molecularity of a rxn is one, two or three.

Examp: (i) Decomposition of NH_4NO_2 .



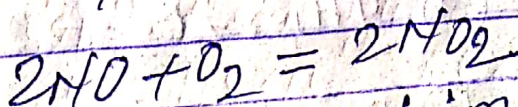
It is unimolecular rxn.

(ii) Dissociation of HI.



It is bimolecular.

(iii) Rxn b/w NO & O_2 .



It is trimolecular rxn.

In all the above rxns, molecularity

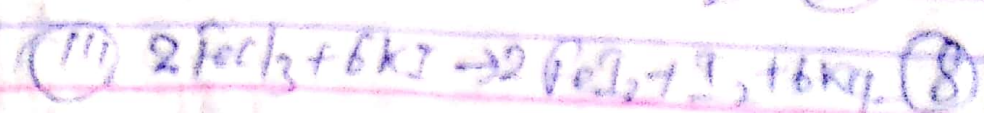
different
Simply sum of reactants molecule
represented by balanced chemical
Rxn.

Elementary Rxn: Such Rxn which follows
in only one step are
called Elementary Rxn.

MOM Chemical Rxn Molecularity
does not exceeds more than three
because the chances of simultaneous
Collision b/w three or more particles
are rare.

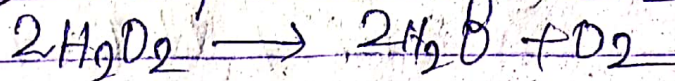
Complex Rxn: - There are a large
numbrs of chemical reactions
shows that in balanced equation
it may contain four or more
reactant species.

They are called Complex
Rxn which proceeds through more
than one step called Complex Rxn.
Each step have their
own Molecularity.

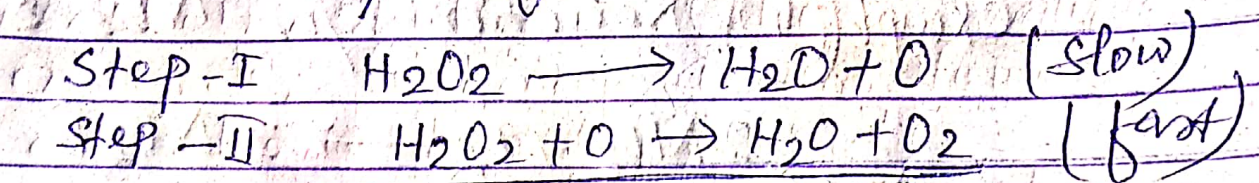


Rate determining step — During mechanism of the Rxn, Only slowest step is rate determining step which indicates their molecularity.

Examp: (i) Decomposition of H_2O_2 .

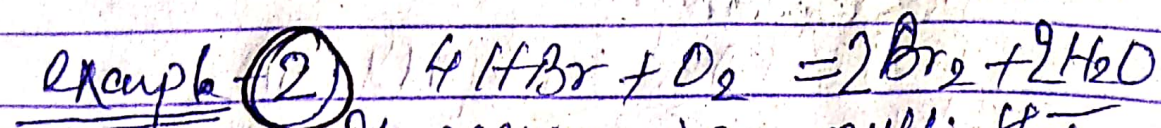


It seems to be bimolecular, But actually it is a unimolecular Rxn.
Mechanism of the above Rxn.

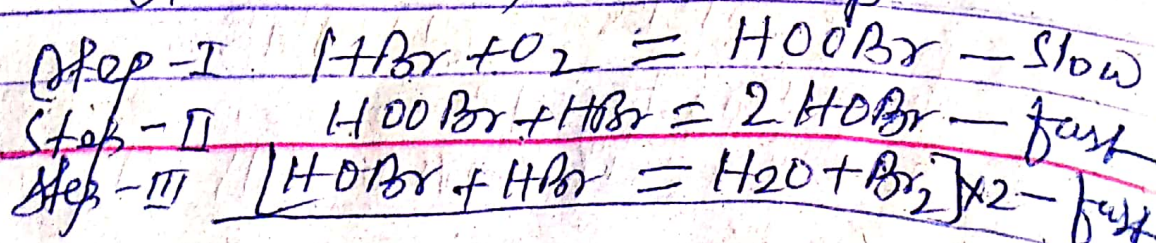


In step-I, which is slow involves only one reactant molecule. Thus it is a unimolecular Rxn.

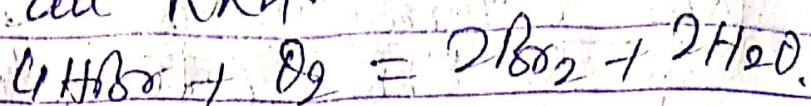
Remembers: (i) Molecularity is a theoretical concept.
(ii) It can not be zero, fraction, -ve, infinite & imaginary.
(iii) It cannot be greater than three.



It occurs in multi-step.

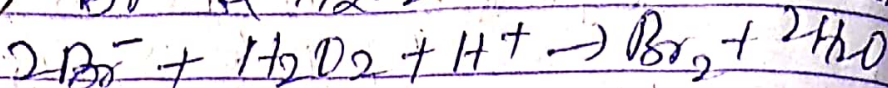


The ones all RKN.

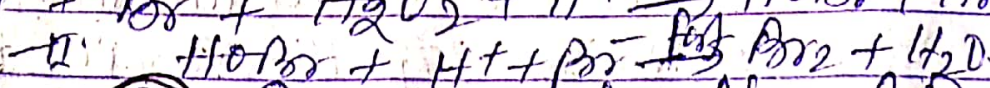
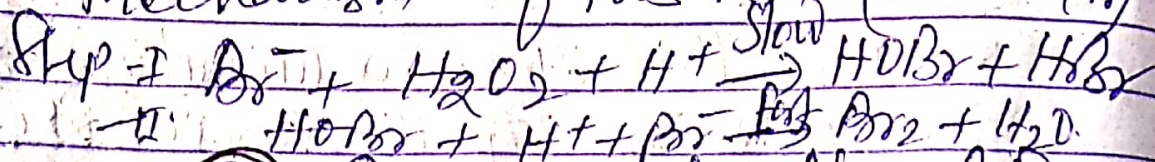


It is bimolecular RKN

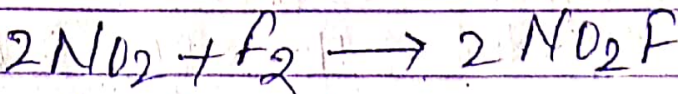
Exaple (3) Br^- & H_2O_2 in acidic medium



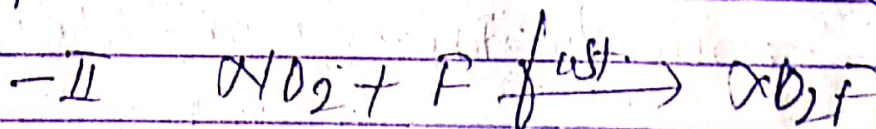
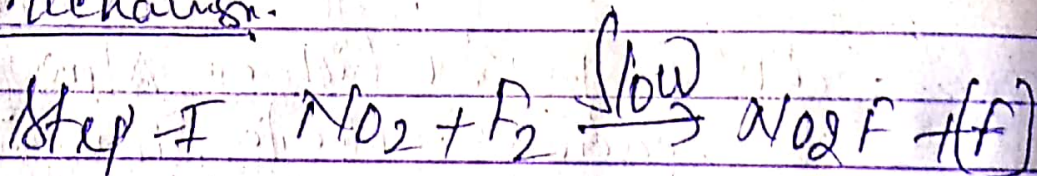
Mechanism of this RKN (Bimolecular)



Exaple (4) Reaction b/w NO_2 & F_2



Mechanism.



In slowest-Step, only two reactant molecules are involved in above RKN. Thus it is a bimolecular Reaction.