INVESTIGATION OF REACTION MECHANISM

- Actual pathway of reaction is called reaction mechanism
- Mechanism is only suggestive not conclusive
- Mechanism is based on available evidences

TYPES OF MECHANISMS

1. **HETEROLYTIC MECHANISMS**

   If a bond breaks in such a way that both electrons remain with one fragment

   - Nucleophilic Reactions
   - Electrophilic Reactions

2. HOMOLYTIC OR FREE-RADICAL MECHANISMS

If a bond breaks in such a way that each fragment gets one electron
Free radicals are formed

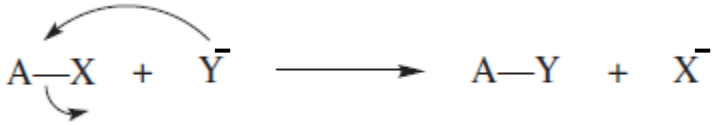
3. PERICYCLIC MECHANISMS

Electrons move in a closed ring
No intermediates, ions or free radicals are formed

TYPES OF REACTIONS

1. **SUBSTITUTIONS**

(i) Nucleophilic substitution

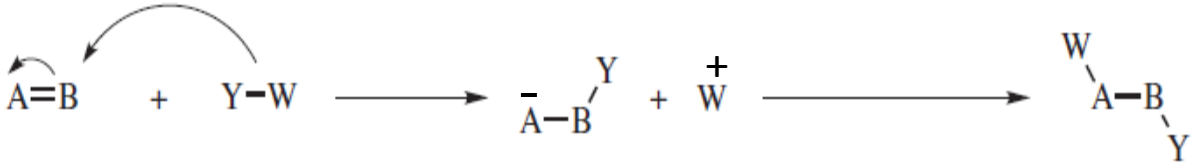


(ii) Electrophilic substitution

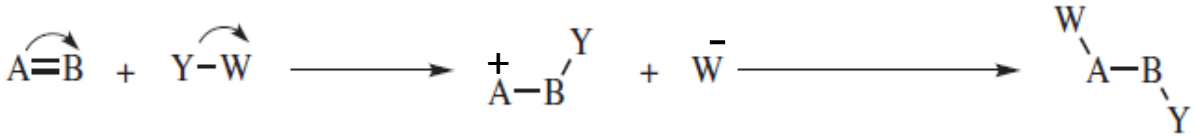
(iii) Free-radical substitution

2. **ADDITIONS**

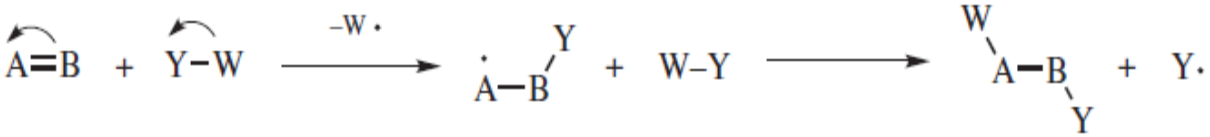
(i) Nucleophilic addition



(ii) Electrophilic addition



(iii) Free-radical addition

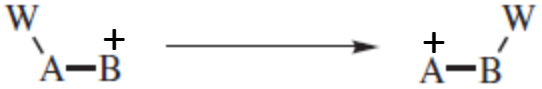


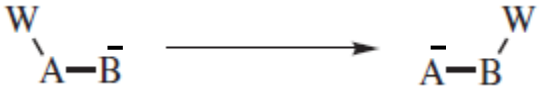
(iv) Simultaneous addition

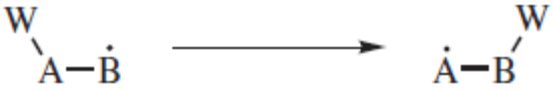
3. ELIMINATIONS

Heterolytic or Pericyclic mechanisms

4. REARRANGEMENTS

(i) Nucleophilic 

(ii) Electrophilic 

(iii) Free-radical 

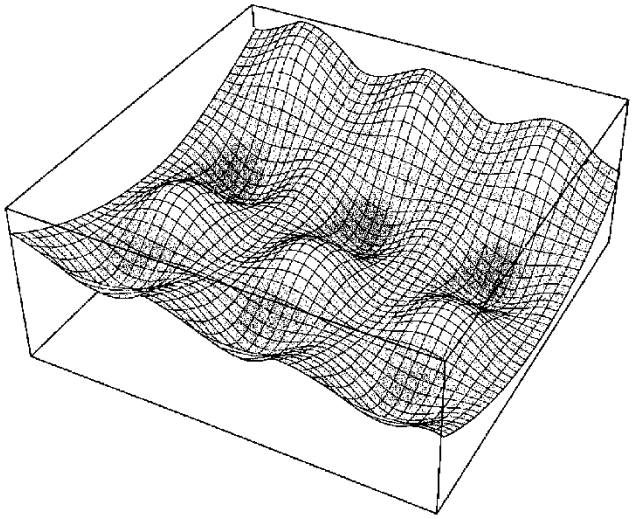
5. REDOX REACTIONS

May be substitutions, eliminations, additions, rearrangements types
May be of some other type

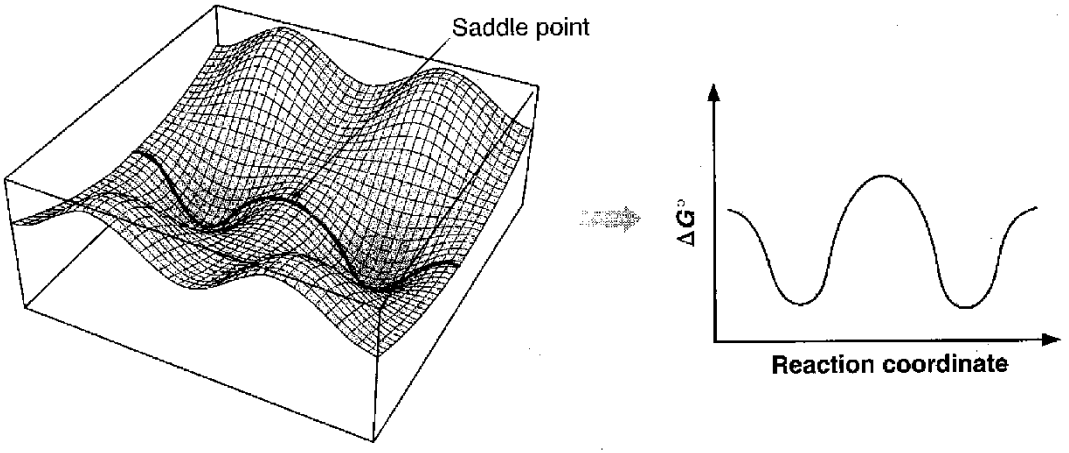
6. COMBINATIONS OF THE ABOVE

Addition-Elimination, Oxidative-Addition, Reductive-Elimination etc.

POTENTIAL ENERGY SURFACE



1. Saddle Points
2. Transition State
3. Intermediate
4. Reaction Coordinate diagrams



REACTION COORDINATE DIAGRAM