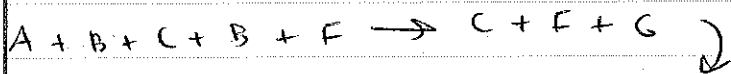


X c1) write overall rxn and rate eqns that correspond to following mechanisms

- 1)  $A + B \rightleftharpoons C$  (fast, equilibrium)
- 2)  $C + B \rightleftharpoons F$  (fast, equilibrium)
- 3)  $F \rightarrow G$  (slow)

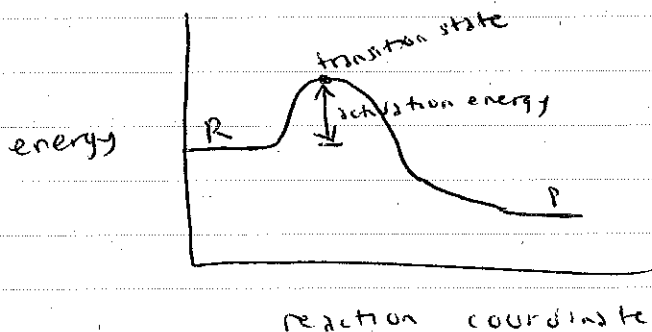


$$\text{rate} = k[A][B]^2$$

What factors affect the speed of a reaction)

- concentration / amt
  - medium
  - catalysts
  - temperature
- inc temp, reaction goes faster
- more collisions
  - molecules have more energy

### Arrhenius picture



✓ (2) ~~(part)~~

At a given temp, the molecules in a sample  
- have a distribution of energies

### Arrhenius Law

rate constant  $k$  is a function of temp

$$k = A e^{-E_a/RT} \quad \text{- energy barrier affects rate}$$

-  $\uparrow$  higher the temp, more molecules that have  
enough energy to make it over barrier

What is  $A$ ?

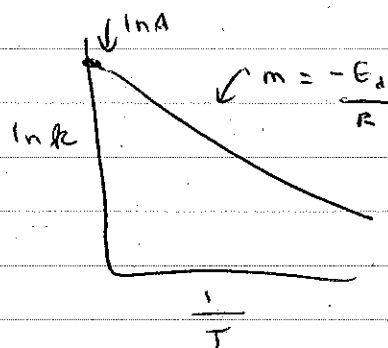
- the rate at infinite temperature

- must have correct orientation and enough  
energy to overcome barrier

$$k = A e^{-E_a/RT}$$

$$\ln k = \ln A - E_a/RT$$

$$\ln k = \ln A - \frac{E_a}{R} \cdot \frac{1}{T}$$



$$\ln k_2 - \ln k_1 = \frac{E_a}{R} \left( \frac{1}{T_1} - \frac{1}{T_2} \right)$$

(3) (part)

What is activation energy for this reaction?

$$\boxed{1 \times 10^5 \text{ J mol}^{-1}}$$

$$m = -1.2 \times 10^4 = \frac{E_a}{R} \quad R = 8.314 \frac{\text{J}}{\text{mol} \cdot \text{K}}$$

(4) (p11)  
Mechanism will have 3 steps

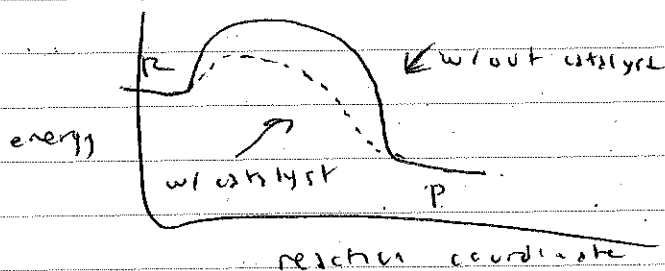
(5) (p11)  
Reaction will have 2 intermediates

(6) (p11)  
The slow step will be 2

(3) (p11) Which of the following factors affect the rate of a reaction due to changing the activation energy?

- Adding a catalyst to reaction mixture

Change barrier (mechanism)



Decomposition of hydrogen peroxide

