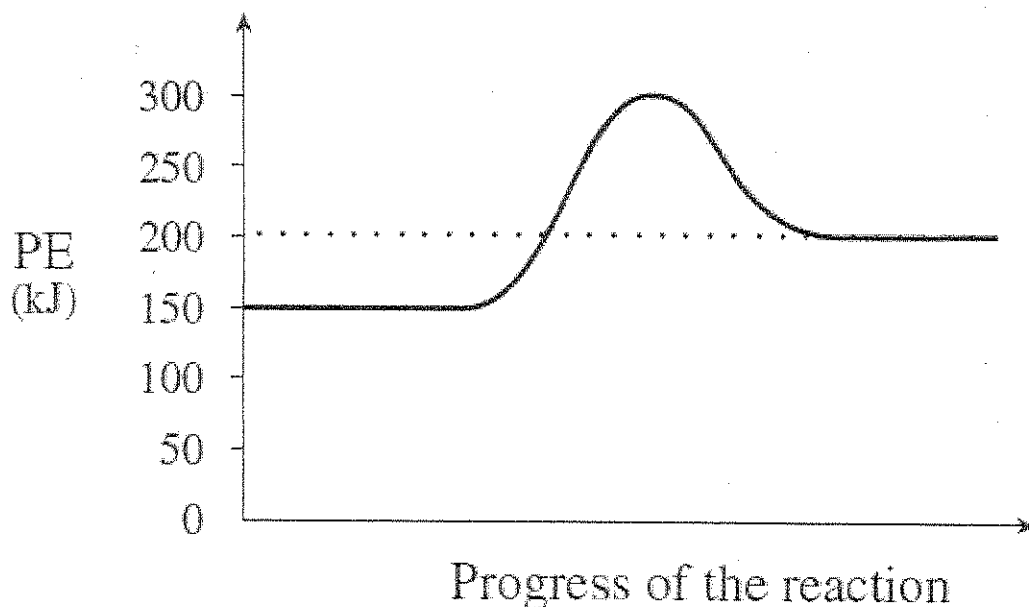


Part II: Interpreting energy diagrams

- A. endothermic reactions - absorb energy, hence the energy content of the products formed is greater than the reactants.



1. The activation energy for the forward reaction (E_a)
2. The threshold energy for the forward reaction
3. The change in heat energy of the system (ΔH). Referred to as the ENTHALPY
4. The activation energy for the reverse reaction ($E_{a \text{ rev}}$)
5. The activated complex (*)
6. Label reactants (R) and products (P)

Activation energy is the minimum energy requirement for a reaction to start, but we can also quantify E_a as the energy difference between the top of the energy barrier created by colliding particles (i.e., the activated complex) and the original reacting particles.

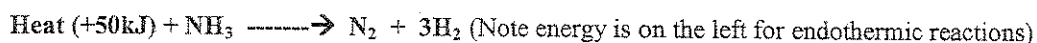
$$E_a = \text{Energy of activated complex} - \text{Energy of Reactants} =$$

$$\text{Threshold energy} = \text{Energy of activated complex} - \text{Zero} =$$

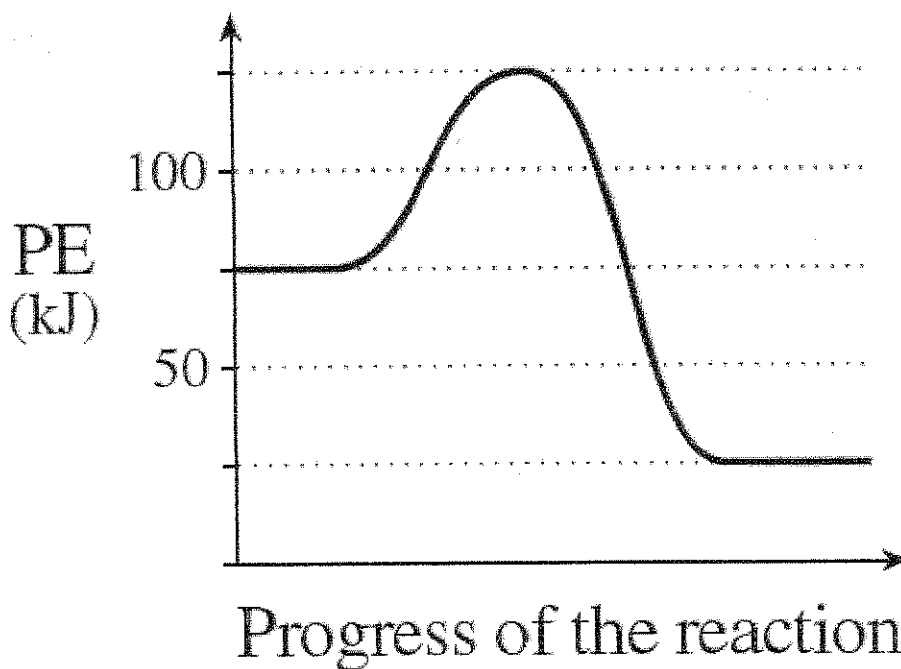
$$\Delta H = \text{Energy of Products} - \text{Energy of Reactants} =$$

$$E_a (\text{rev}) = \text{Energy of activated complex} - \text{Energy of Products} =$$

e.g., the P.E. profile above could be for the following reaction:



B. Exothermic reactions – reactions release heat energy, hence the energy content of the products formed is less than the reactants.



Exercise: Label and/or calculate each of the following for the diagram above.

1. The activation energy for the forward reaction (E_a)
2. The threshold energy for the forward reaction
3. The change in heat energy of the system (ΔH). Referred to as the ENTHALPY
4. The activation energy for the reverse reaction ($E_{a \text{ rev}}$)
5. The activated complex (*)
6. Label reactants (R) and products (P)

e.g., the P.E. profile above could be for the following reaction:



(Note energy is on the right for exothermic reactions and is always ADDED in the equation)