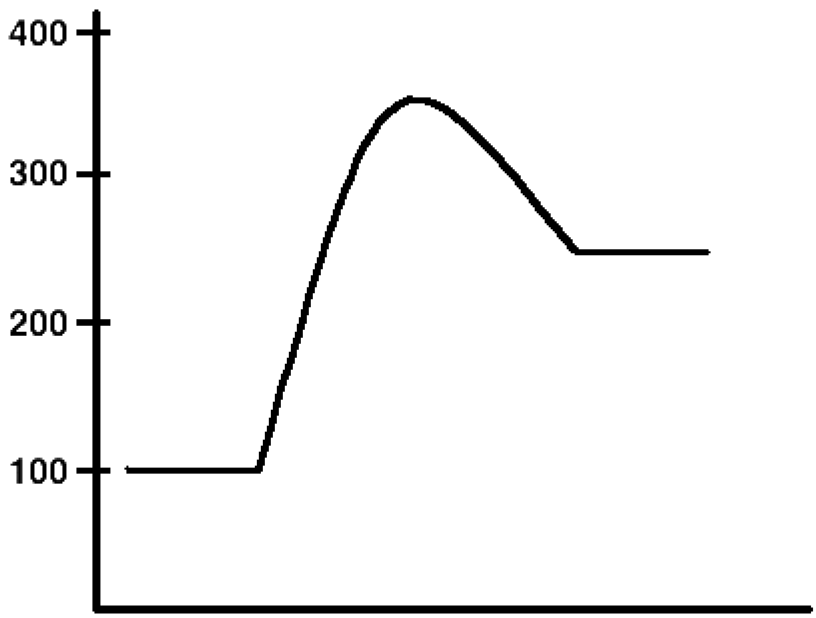
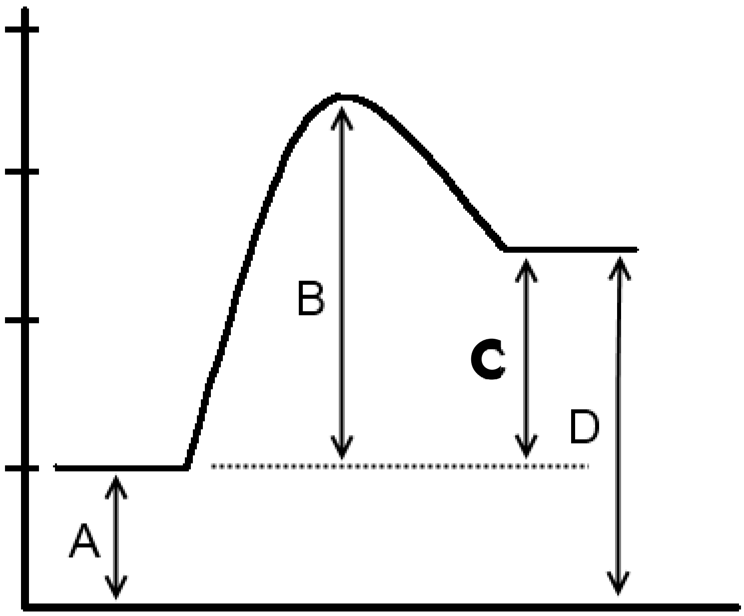
Answers are in **bold**.

From the energy profile diagram below, what is the value of the activation energy?

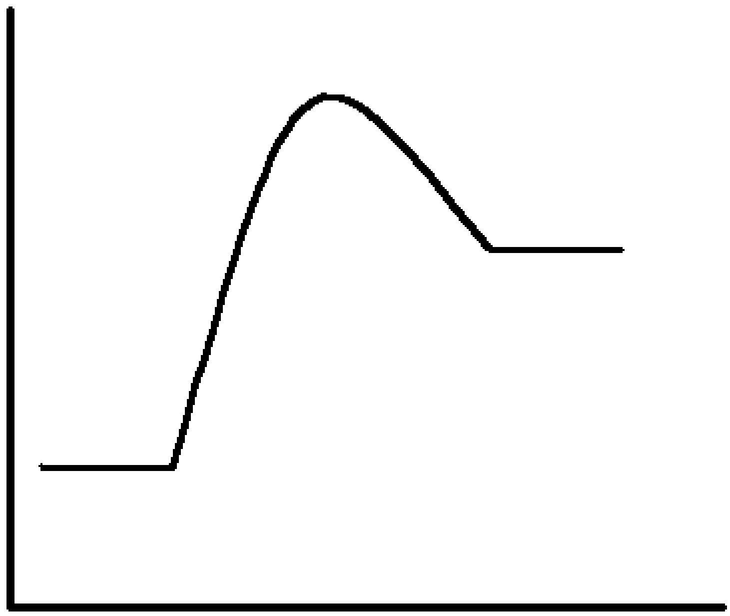


- 100
- 200
- **250**
- 350

Which measurement on the energy profile diagram below represents the enthalpy change?



Which of the following statements about the energy profile diagram below is *true*?



- The reaction is exothermic
- The enthalpy change is negative
- The x-axis represents time
- **This reaction makes the surroundings colder**

The enthalpy (internal energy) increases because the chemicals absorb surrounding energy.

Which of the following does *not* affect the frequency of collisions?

- Temperature
- Pressure
- **Catalyst**
- Surface area
- Concentration

Which of the following does *not* affect the productivity of collisions?

- Temperature
- Catalyst
- Enzymes
- **Concentration**

Which of the following about enzymes is *not* true?

- They decrease the activation energy
- **They decrease the enthalpy change**
- They are biological catalysts
- They provide an alternate reaction pathway

For which of the following sets of graph axes would slope represent rate of reaction?

- "Enthalpy" against "Course of reaction"
- **"Concentration" against "Time"**
- "Yield" against "Temperature"
- "Kinetic energy" against "Temperature"

Which of the following conditions is *not* required for dynamic equilibrium?

- Closed system
- Fixed temperature
- Reversible reaction
- **Equal amount of reactants and products**

If temperature is *increased* for an equilibrium system, the net reaction to oppose the change will:

- Increase the temperature
- Decrease the temperature
- **Absorb energy**
- Release energy

An equilibrium system is kept at a fixed temperature, so it's like the reaction is 'trying' to decrease the temperature but is not able to.

If temperature is *increased* for an exothermic reaction at equilibrium, the net reaction will be:

- Forwards
- **Backwards**
- In the exothermic direction
- Zero

In an exothermic reaction, the forward reaction releases energy, therefore the backward reaction absorbs energy (opposes the change).

If pressure is *increased* for an equilibrium system, the equilibrium position will shift in the direction that:

- Increases the molecules of gas
- **Decreases the molecules of gas**
- Increases the number of total particles
- Decreases the number of total particles

Any particles that are not gas (i.e. solid or liquid) are not affected by pressure.

If reactant concentration is increased for an equilibrium system, the net reaction will favour:

- The formation of reactants
- **The formation of products**
- The side with the least particles
- The side with the most particles

Formation of products will use up reactants, therefore opposing the change.

If reactant concentration is decreased for an equilibrium system, the net reaction will be:

- Forwards
- **Backwards**
- Left-to-right
- Zero

The backwards reaction increases reactant concentration, therefore opposing the change.

If a reaction is at equilibrium, increasing the concentration of a reactant will:

- Increase Kc
- Decrease Kc
- Temporarily alter Kc, but it will return to the original value over time
- **Not affect Kc at all**

Kc is only changed by changing temperature or by having a completely different reaction. Increasing the concentration of a reactant will make the fraction of concentrations smaller than Kc, so a net reaction will occur until the fraction once again is equal to Kc.

If an endothermic reaction is at equilibrium, increasing the temperature will:

- **Increase Kc**
- Decrease Kc
- Temporarily alter Kc, but it will return to the original value over time
- Not affect Kc at all

Kc is only changed by changing temperature or by having a completely different reaction. Increasing the temperature for an endothermic reaction will increase Kc (it becomes larger than the fraction of concentrations), so the net reaction will occur until the fraction once again is equal to Kc.

An industrial reaction which is exothermic and has more reactant gas molecules than product gas molecules will have highest yield when:

- Temperature is high and pressure is high
- Temperature is high and pressure is low
- **Temperature is low and pressure is high**
- Temperature is low and pressure is low

Low temperature favours the exothermic reaction, and high pressure favours the direction that decreases molecules of gas. Both of these conditions favour the forward reaction, therefore increasing yield.