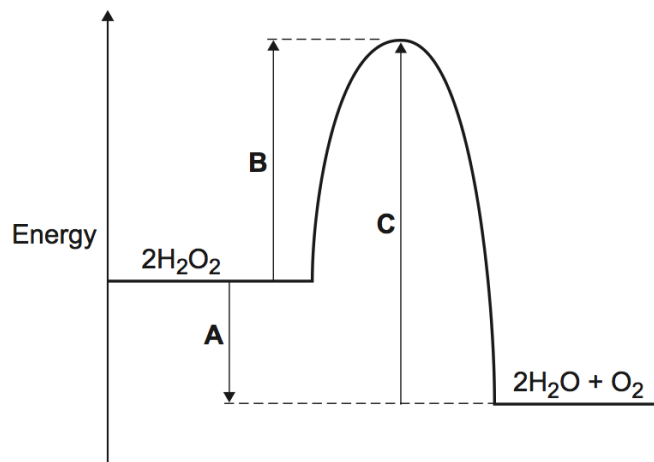


|   |   |
|---|---|
| 0 | 1 |
|---|---|

The energy level diagram for the decomposition of hydrogen peroxide into water and oxygen is shown below:



|   |   |   |   |
|---|---|---|---|
| 0 | 1 | . | 1 |
|---|---|---|---|

Which letter represents activation energy?

[1 mark]

B

|   |   |   |   |
|---|---|---|---|
| 0 | 1 | . | 2 |
|---|---|---|---|

Explain, in terms of energy, how a catalyst can make the reaction happen more quickly.

[2 marks]

lowers activation energy or needs less energy to start reaction [1]

alternative route / less energetic route [1]

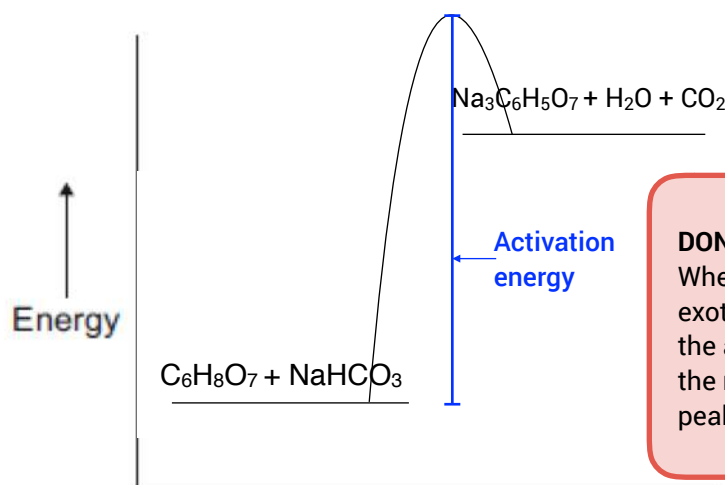
|   |   |
|---|---|
| 0 | 2 |
|---|---|

In the presence of water, citric acid ( $C_6H_8O_7$ ) and sodium bicarbonate ( $NaHCO_3$ ) react to form sodium citrate ( $Na_3C_6H_5O_7$ ), water, and carbon dioxide ( $CO_2$ ) in an endothermic reaction.

|   |   |   |   |
|---|---|---|---|
| 0 | 2 | . | 1 |
|---|---|---|---|

On the axes below, draw the reaction profile diagram for this reaction, and clearly label the activation energy.

[3 marks]



**DON'T FORGET :**  
Whether the reaction is exothermic or endothermic, the activation energy is from the reactants line to the peak of the reaction curve

products higher than reactants  
reaction curve correctly drawn  
activation energy labelled

[1]  
[1]  
[1]

End

(Total 6 marks)