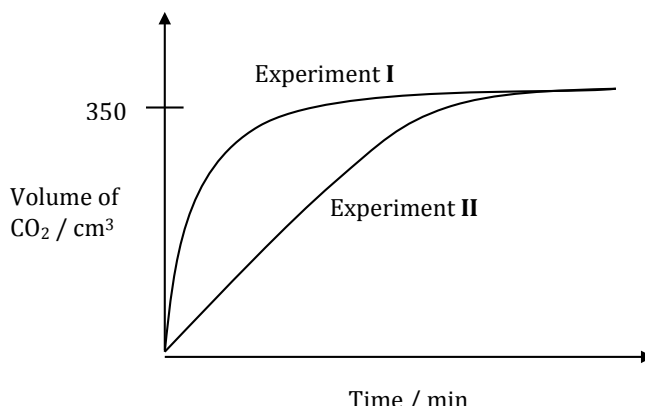
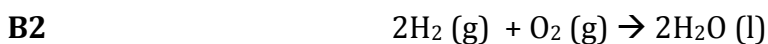


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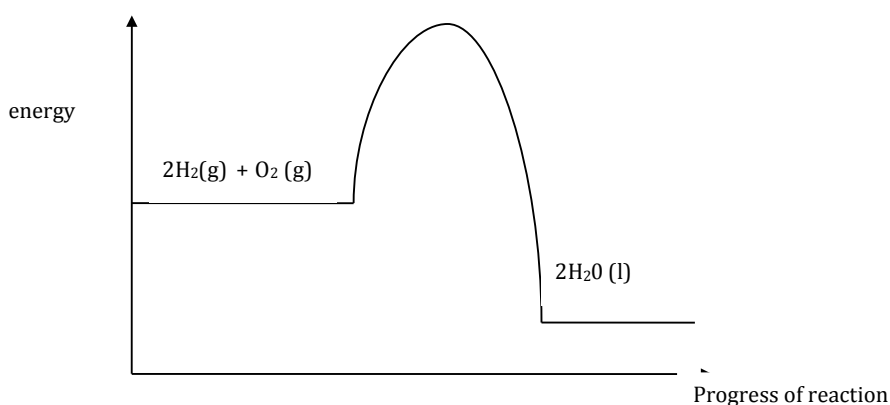
B1 Two experiments **I** and **II** were carried out to investigate the rate of reaction between magnesium carbonate and excess nitric acid of concentration 0.5 mol/dm^3 at two different temperatures. The total volume of carbon dioxide given off was measured at regular intervals. The results for experiment **I** and experiment **II** were shown below.



- (a) Write a chemical equation, with state symbols, for this reaction.
- (b) Which experiment, **I** or **II** was carried out at a lower temperature? Explain your answer.
- (c) Why does the rate of the formation of carbon dioxide gradually decrease as the reaction proceeds?



This is the energy profile diagram for the reaction between hydrogen and oxygen.



Is this reaction exothermic or endothermic? Explain terms of bond breaking and bond forming.

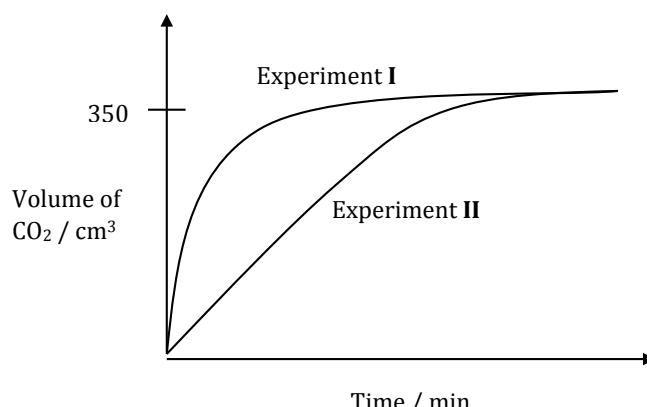
Module 6 (Solutions)

- A1** Two experiments were carried out in which hydrochloric acid was added to aqueous solutions of sodium thiosulphate. **D**
- A2** When solid potassium iodide is added to water, the temperature of the liquid decreases. What deduction can be made from this observation? **A**
- A3** The formation of hydrogen bromide from hydrogen and bromine is an exothermic reaction.



What may be deduced from this information? **C**

- B1** Two experiments **I** and **II** were carried out to investigate the rate of reaction between magnesium carbonate and excess nitric acid acid of concentration 0.5 mol/dm^3 at two different temperatures. The total volume of carbon dioxide given off was measured at regular intervals. The results for experiment **I** and experiment **II** were shown below.



- (a) Write a chemical equation, with state symbols, for this reaction.

CACSW



- (b) Which experiment, **I** or **II** was carried out at a lower temperature? Explain your answer.

Expt II

The gradient of the curve for Expt II is gentler suggesting that the reaction speed is slower. At lower temperature, the speed of reaction is slower.

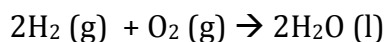
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- (c) Why does the rate of the formation of carbon dioxide gradually decrease as the reaction proceeds?

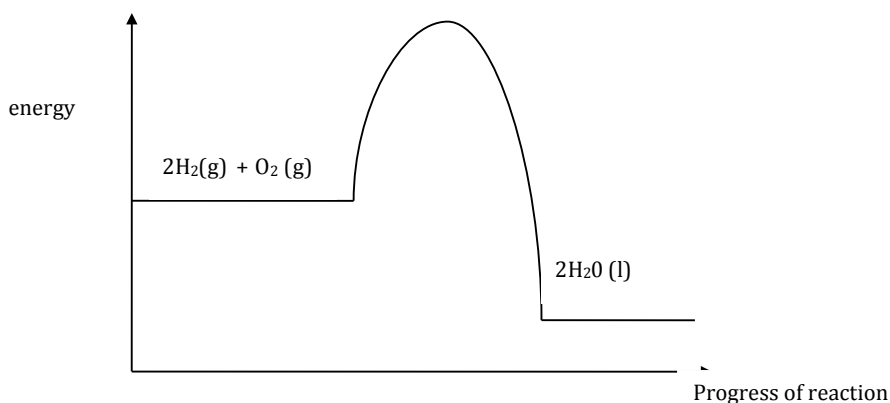
As reaction continues, the reactants will be used up gradually. The amount of particles present between the reaction system also reduces.

Hence, the speed of reaction between the two reactants become much slower, as there is lower possibilities of collision and effective collision, therefore, reducing the amount of CO₂ liberated.

B2



This is the energy profile diagram for the reaction between hydrogen and oxygen.



Is this reaction exothermic or endothermic? Explain terms of bond breaking and bond forming.

Exothermic. More energy is released when bond is broken than the energy absorbed from bond formation.