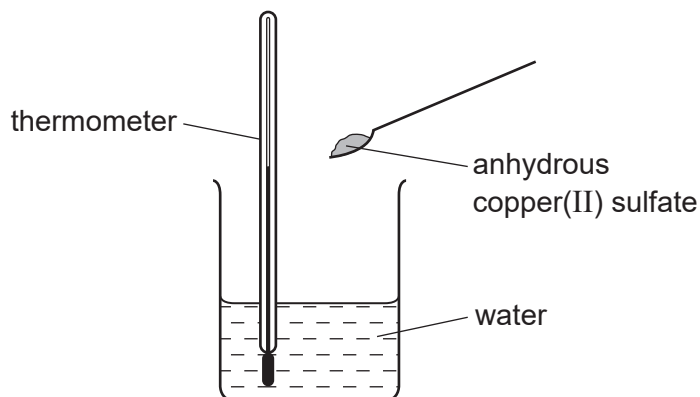


EXOTHERMIC AND ENDOTHERMIC REACTIONS

- 1 When anhydrous copper(II) sulfate is added to water a solution is formed and heat is given out.



Which row shows the temperature change and the type of reaction taking place?

	temperature change	type of reaction
A	decrease	endothermic
B	decrease	exothermic
C	increase	endothermic
D	increase	exothermic

- 2 Which experiment is the most exothermic?

	initial temperature / °C	final temperature / °C
A	20	5
B	20	32
C	25	12
D	25	34

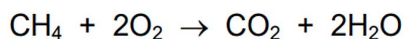
- 3 Sodium nitrate is added to water in a beaker and stirred until it dissolves.

At the end of the experiment, the beaker feels cold.

Which row describes the reaction?

	temperature of solution	type of reaction
A	decreases	endothermic
B	decreases	exothermic
C	increases	endothermic
D	increases	exothermic

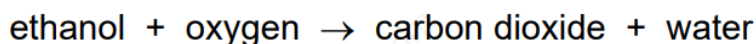
4 The combustion of methane is exothermic.



Which statement about this reaction is correct?

- A The energy needed to break the bonds in methane and oxygen is greater than the energy released in making new bonds in carbon dioxide and water.
- B The energy needed to break the bonds in methane and oxygen is less than the energy released in making new bonds in carbon dioxide and water.
- C The energy released in breaking bonds in methane and oxygen is greater than the energy needed to make new bonds in carbon dioxide and water.
- D The energy released in breaking bonds in methane and oxygen is less than the energy needed to make new bonds in carbon dioxide and water.

5 Ethanol is used as a fuel.



Which statements are correct?

- 1 The reaction is endothermic.
- 2 The products have more energy than the reactants.
- 3 The oxygen for this reaction comes from the air.
- 4 The temperature of the reaction mixture rises during this reaction.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

6 Information about two reactions is given.

- The neutralisation reaction between citric acid and sodium hydrogencarbonate is endothermic.
- The displacement reaction between magnesium and carbon dioxide is exothermic.

Which statements about the two reactions are correct?

- 1 The energy of the products formed in the neutralisation reaction is greater than the energy of the reactants.
- 2 The energy of magnesium and carbon dioxide is greater than the energy of magnesium oxide and carbon.
- 3 In an exothermic reaction, the energy required to break the bonds is greater than the energy released when the new bonds are formed.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only