Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Energy level diagrams

Time allowed: 15 minutes

Subject code **0620**

Chemistry

Questions from Paper 1 and Paper 2

You must have: a soft pencil, an eraser and a pen.

Total marks

/ 10

Instructions

- There are 10 questions. Each has four options: A, B, C and D.
- Choose one option for each question and record it as your teacher directs.
- If you change a choice, rub out the first one completely.

Information

- This paper has 10 questions worth 10 marks in total.

Advice

- Read every question through once before you write anything.
- If you finish early, go back and check your working.

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Turn over ►

Print at 100% (Actual size) so diagrams keep their real measurements.

1 Two chemical processes are described.

- During the combustion of ethanol, energy is .....1..... .
- During the electrolysis of aqueous sodium chloride, energy is .....2..... .

Which words complete gaps 1 and 2?

	1	2
A	given out	given out
B	given out	taken in
C	taken in	given out
D	taken in	taken in

Exothermic and endothermic reactions Click for more variations

Answer B

2 The temperature of the water in two beakers, X and Y, is measured as 21.5 °C.

5 g of sodium chloride is dissolved in the water in beaker X. The temperature changes to 18.0 °C.

5 g of calcium oxide is dissolved in the water in beaker Y. The temperature changes to 29.4 °C.

Which types of process are occurring in beakers X and Y?

	X	Y
A	endothermic	endothermic
B	endothermic	exothermic
C	exothermic	endothermic
D	exothermic	exothermic

Exothermic and endothermic reactions Click for more variations

Answer B

3 Which row describes the reaction pathway diagram and energy change in an exothermic reaction?

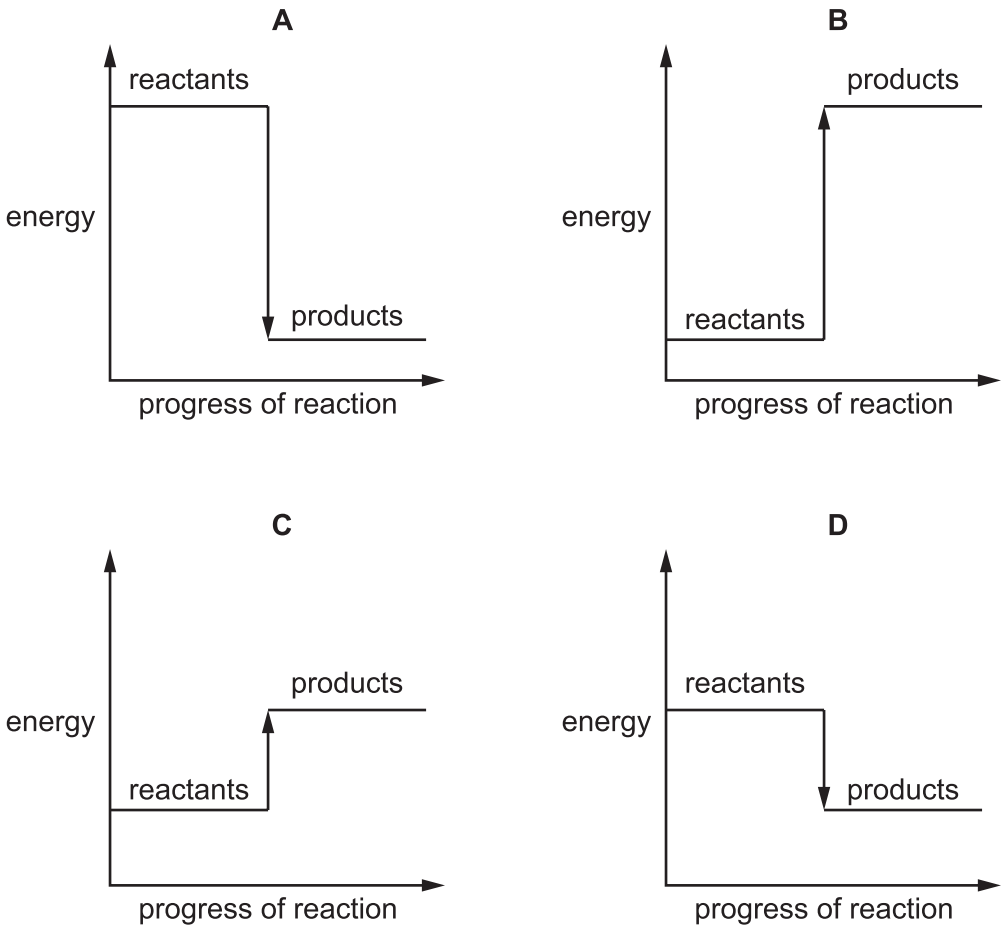
	reaction pathway diagram	energy is
A	reactants higher than products	absorbed
B	reactants higher than products	released
C	reactants lower than products	absorbed
D	reactants lower than products	released

Exothermic and endothermic reactions Click for more variations

Answer B

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4 Which energy level diagram shows the reaction that will give out the most energy?



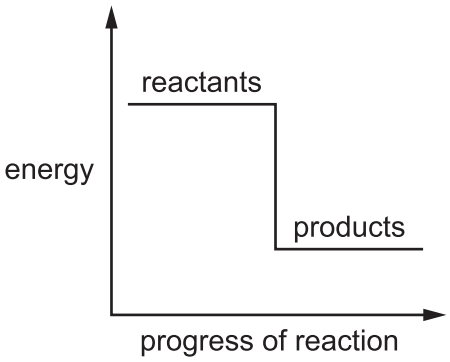
Exothermic and endothermic reactions Click for more variations

Answer A

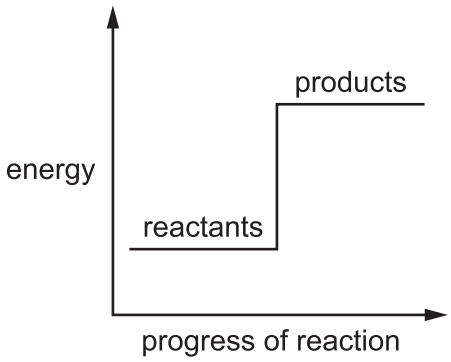
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5 Which reaction pathway diagram represents an endothermic reaction?

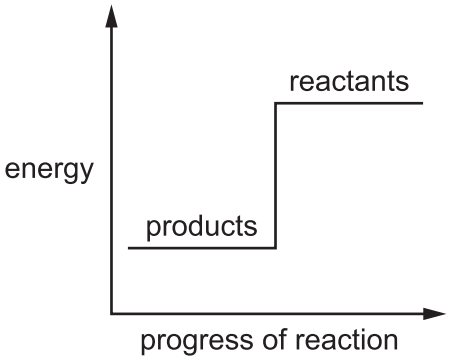
A



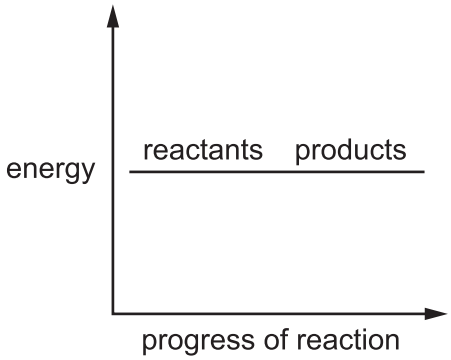
B



C



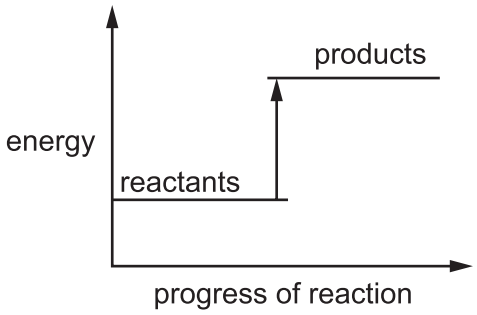
D



Exothermic and endothermic reactions Click for more variations

Answer B

6 The reaction pathway diagram for a reaction is shown.



Which statements are correct?

1 The reaction is exothermic.

2 The reaction is endothermic.

3 The temperature of the surroundings increases.

4 The temperature of the surroundings decreases.

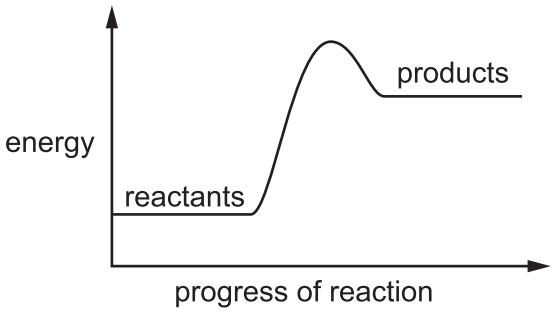
A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

Exothermic and endothermic reactions Click for more variations

Answer D

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7 A reaction pathway diagram is shown.



Which statement about this reaction is correct?

A The reaction rate increases during the reaction.

B The reaction is endothermic.

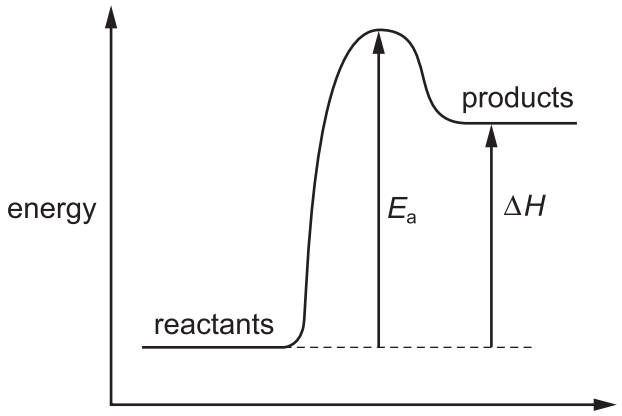
C The reaction transfers thermal energy to the surroundings.

D The temperature of the surroundings increases.

Exothermic and endothermic reactions Click for more variations

Answer B

8 The energy level diagram for a reaction is shown.



Which row is correct?

	sign of ΔH	overall energy change	sign of E_a
A	–	exothermic	–
B	+	endothermic	+
C	+	endothermic	–
D	+	exothermic	+

Exothermic and endothermic reactions Click for more variations

Answer B

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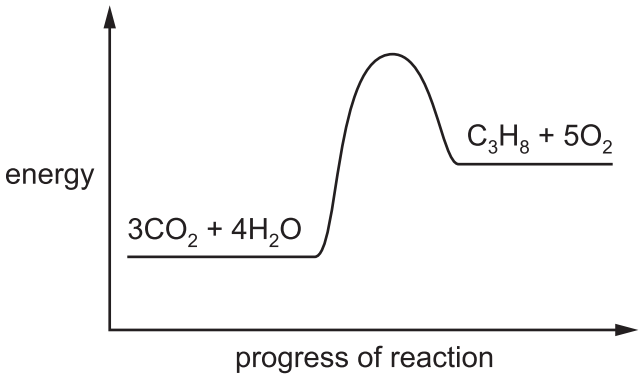
9 The complete combustion of propane is exothermic.

The equation for this reaction is shown.

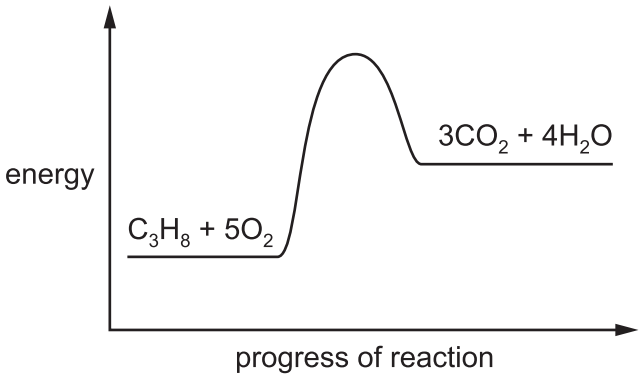
$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

Which energy level diagram represents the complete combustion of propane?

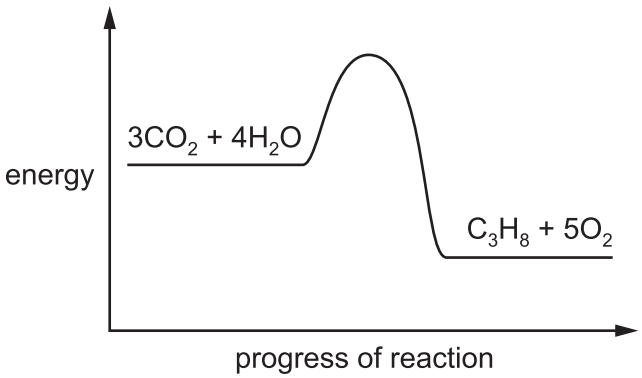
A



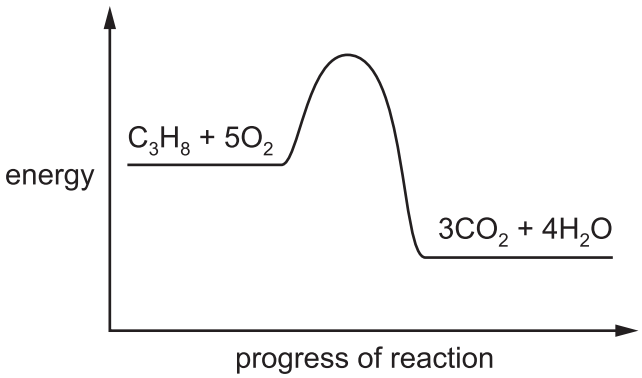
B



C



D



Exothermic and endothermic reactions Click for more variations

Answer D

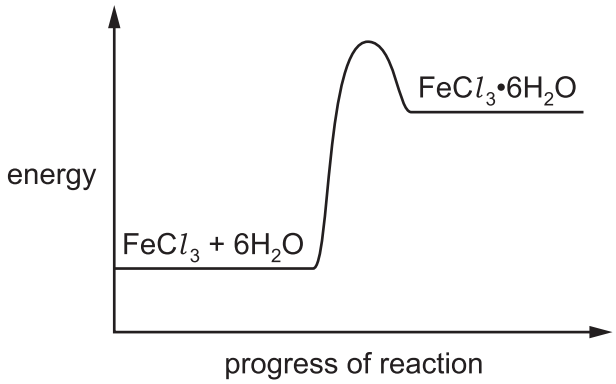
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10 When water is added to anhydrous iron(III) chloride, $FeCl_3$, hydrated iron(III) chloride, $FeCl_3 \cdot 6H_2O$, is formed and energy is given out.

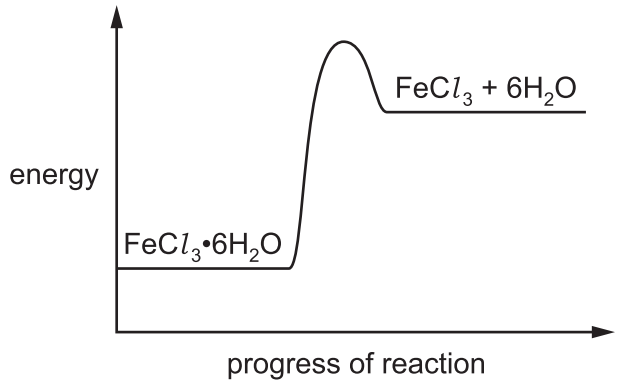
$$FeCl_3 + 6H_2O \rightleftharpoons FeCl_3 \cdot 6H_2O$$

Which reaction pathway diagram represents the formation of anhydrous iron(III) chloride in the **reverse** reaction?

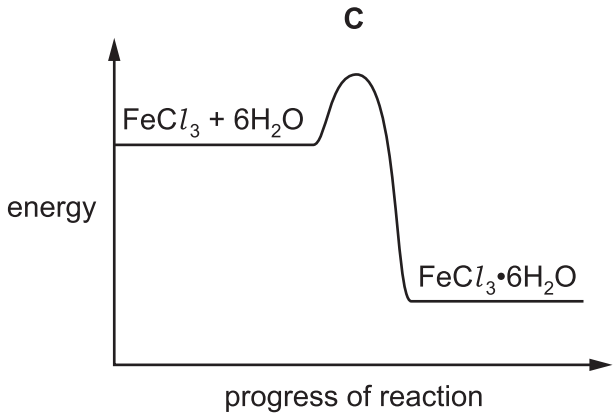
A



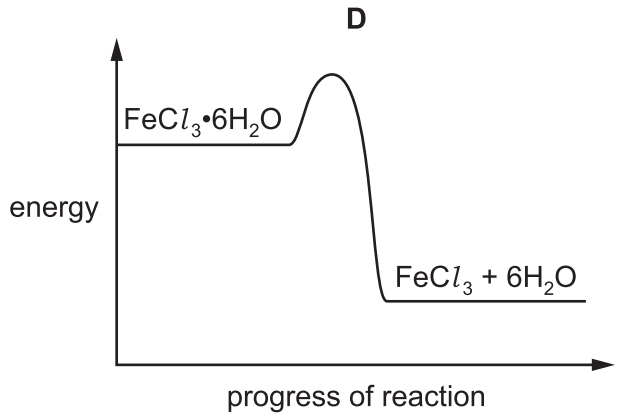
B



C



D



Exothermic and endothermic reactions Click for more variations

Answer B

Answer key

1	B
2	B
3	B
4	A
5	B
6	D
7	B
8	B
9	D
10	B

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