1. The table shows the start and end temperatures of four reactions.

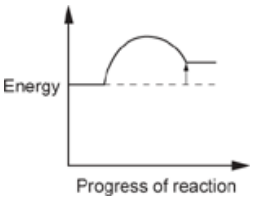
Which reaction is endothermic?

	Temperature at start (°C)	Temperature at end (°C)
A	19.0	19.0
B	19.0	15.2
C	20.0	23.2
D	20.0	21.0

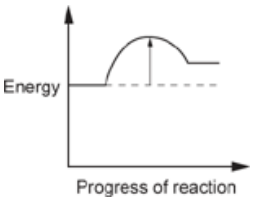
Your answer ☐ **[1]**

2. Which reaction profile shows an **exothermic** reaction with the arrow marking the activation energy?

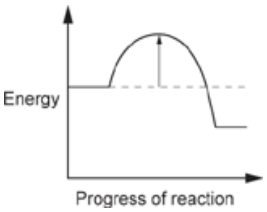
A



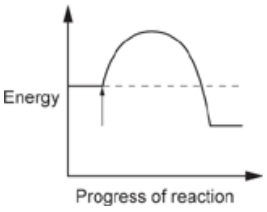
B



C



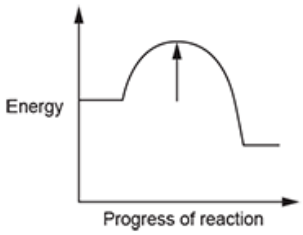
D



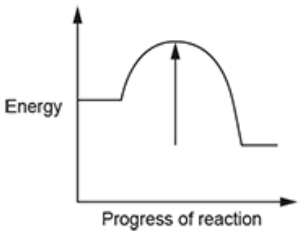
Your answer ☐ **[1]**

3. Which reaction profile has an arrow showing the **activation energy**?

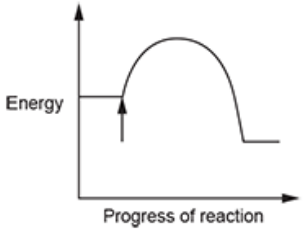
A



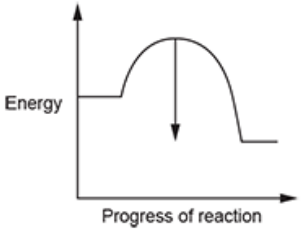
B



C



D



Your answer ☐ **[1]**

4. The table shows the energy given out when 1 g of different alkanes burn.

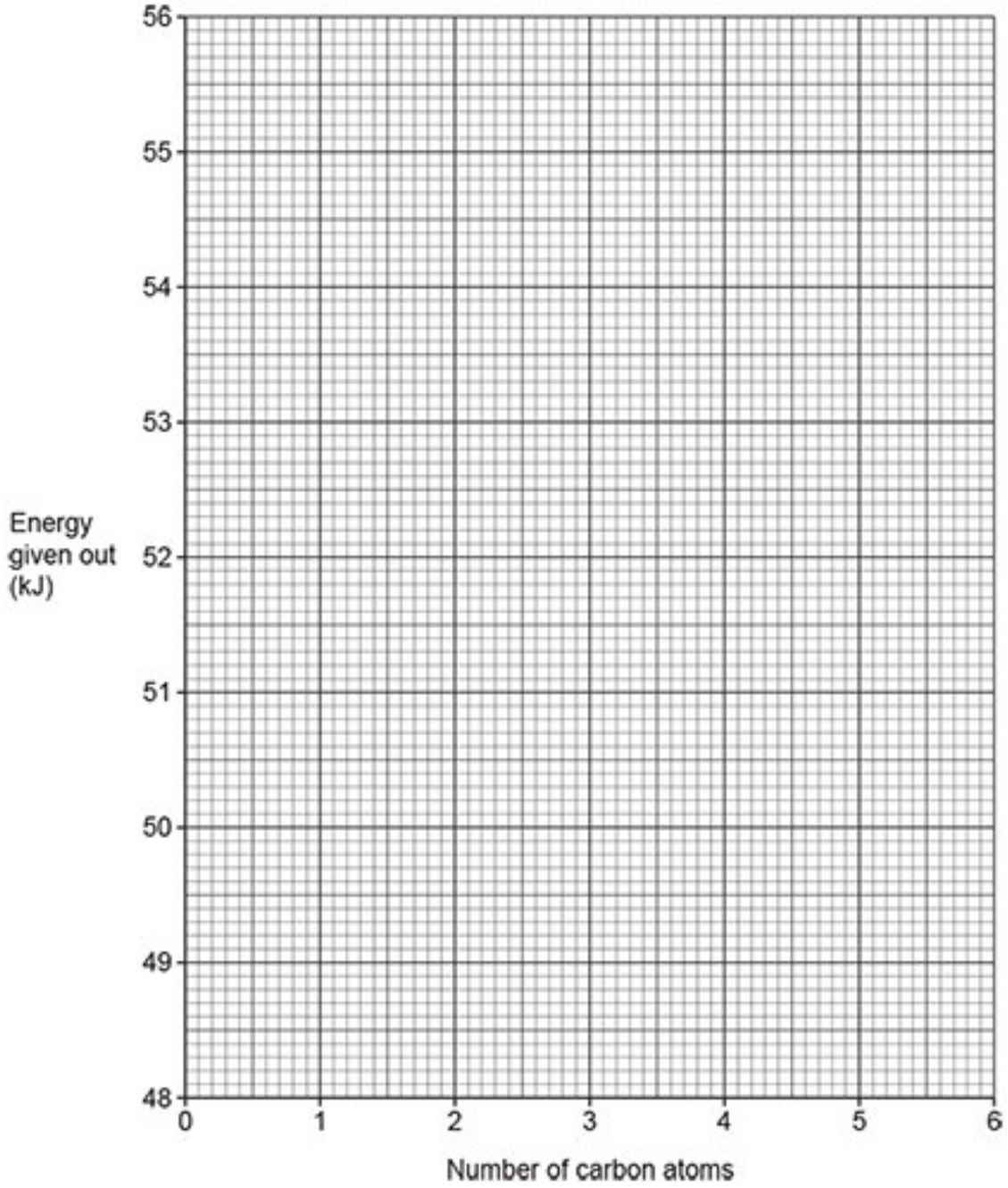
Alkane	Number of carbon atoms	Energy given out (kJ)
methane	1	55.6
ethane	2	52.6
propane	3	50.4
butane	4	
pentane	5	48.7
hexane	6	48.4

i. Plot a graph of the data from the table.

[2]

ii. Draw a curve of best fit on your graph.

[1]



iii. The energy given out when 1 g of butane burns is missing from the table.

Use the graph to estimate the energy given out by butane.

Energy given out by butane = ... kJ **[1]**

iv. What name is given to the type of reaction that **gives out energy**?

---

[1]

5(a). * The table shows the results of two chemical reactions, **A** and **B**.

	Temperature at the start of the reaction (˚C)	**Temperature at the end of the reaction (˚C)**	**Energy change (kJ / mol)**
Reaction **A**	25.5	32.1	−157
Reaction **B**	23.4	18.3	+ 241

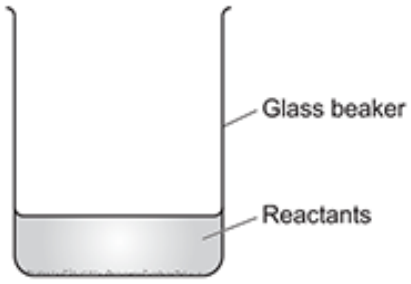
Use the information in the table to state if each of the reactions, **A** and **B**, are exothermic or endothermic.

Explain your answers.

[6]

(b). A teacher wants to calculate the temperature change of a reaction.

The diagram shows the apparatus they use.



i. The teacher measures the temperature of the reaction at the start and end of the reaction.

What apparatus do they use to measure the temperature?

[1]

ii. The temperature of the reaction does not change. The teacher thinks too much heat is escaping from the apparatus.

Suggest **two** ways they can improve the apparatus to stop the heat escaping.

1 _____

_____

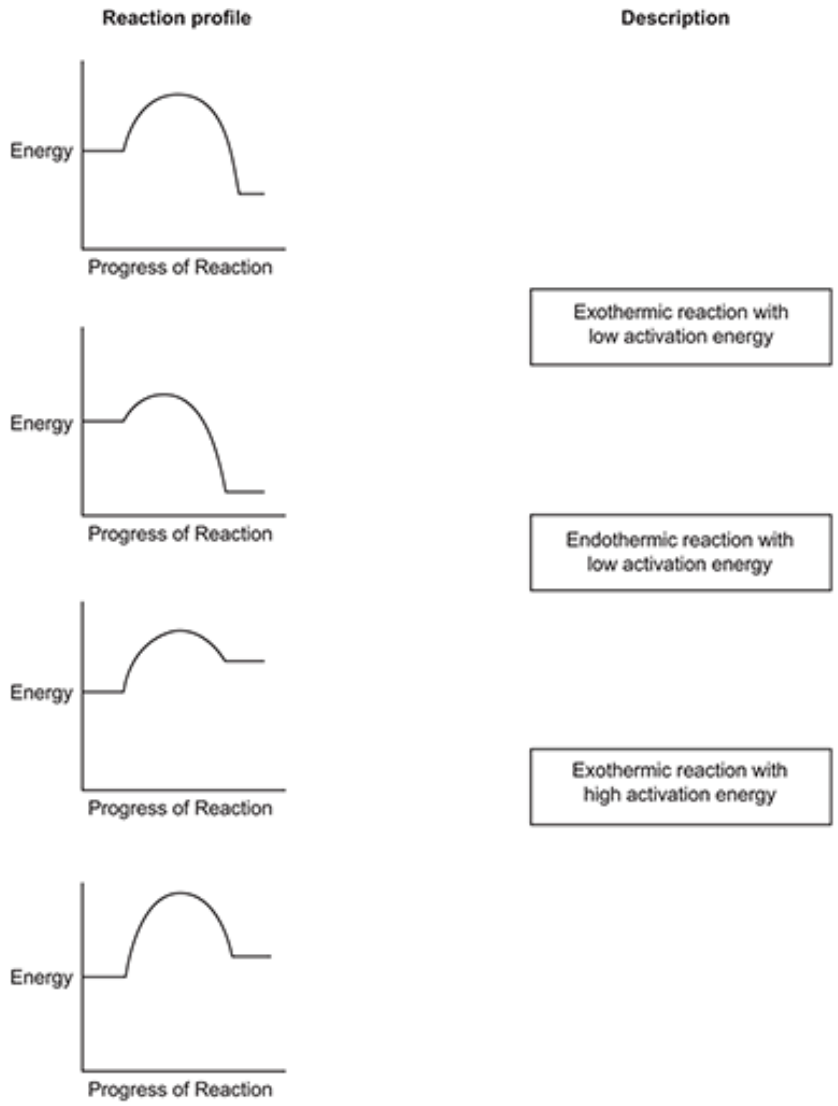
2 _____

_____

[2]

(c). The diagrams show the reaction profiles for four different reactions.

Draw **three** lines to connect the **reaction profile** with its correct **description**.



[3]