Reaction profiles

1 **When lit, a candle burns wax, $C_{20}H_{42}$, in the presence of oxygen.**

a **Write a balanced equation for the reaction.** (2 marks, ★★)

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b **Draw a labelled reaction profile diagram for the reaction.** (2 marks, ★★)

c **Using your diagram, explain why the candle doesn't burn without first being lit.** (2 marks, ★★★)

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The energy changes of reactions

H 1 **For the following questions, tick the box that gives the correct definition. Tick one box for each question.** (3 marks, ★)

a **Bond breaking:**

Releases energy	
Requires energy	
Only happens in endothermic reactions	
Only happens in exothermic reactions	

b **Bond making:**

Releases energy	
Requires energy	
Only happens in exothermic reactions	
Only happens in endothermic reactions	

c **Endothermic reactions:**

Require more energy to break bonds than is released in making them	
Require more energy to make bonds than is released in breaking them	
Require less energy to break bonds than is released in making them	
Require less energy to make bonds than is released in breaking them	

Chemical cells and fuel cells

1 **Cell and battery technology is a massive area of research. Devices such as mobile phones, laptops and electric cars use rechargeable batteries that provide a high voltage.**

a **Suggest one advantage of using rechargeable batteries instead of disposable batteries in mobile phones.** (1 mark, ★)

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b **Describe what happens to the electrodes of a rechargeable cell when an external current is applied.** (1 mark, ★★)

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c **Explain why lithium-zinc cells might be more suitable for these uses than zinc-copper cells.** (2 marks, ★★★)

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d **Plan an experiment that would allow you to determine the maximum voltage that can be achieved using strips of lithium, zinc, copper and aluminium. Explain how you would maintain a fair test.** (4 marks, ★★★)

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e **Predict the relative voltage from each cell by drawing a line.** (5 marks, ★★★)

Lithium-zinc	5 Highest voltage
Zinc-copper	4
Lithium-aluminium	3
Lithium-copper	2
Zinc-aluminium	1 Lowest voltage