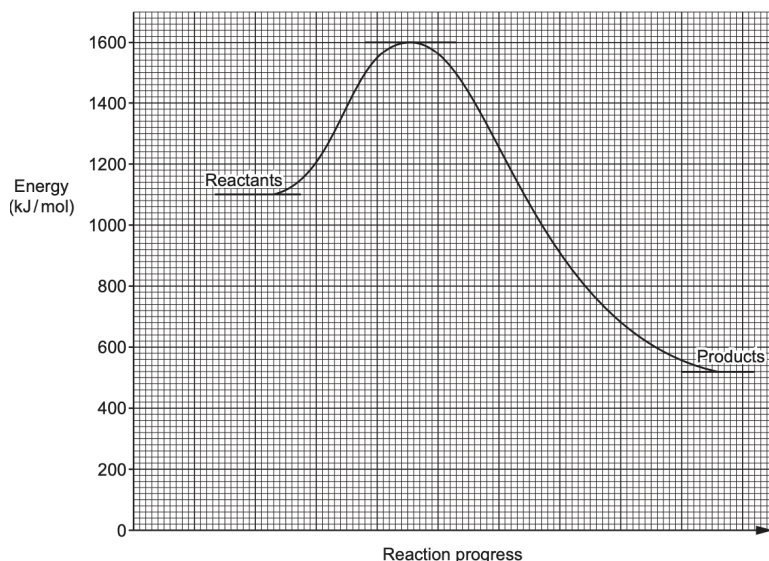


[Reaction profiles]

Q1.a(2018)

3 The graph below shows the energy changes during a chemical reaction.



(a) (i) Draw an arrow on the graph to show the **activation energy**.

Label your arrow **A**.

[1]

Q1.b(2018)

Draw another arrow on the graph to show the overall **energy change** in the reaction.

Label your arrow **E**.

[1]

Q1.c(2018)

The reaction in the graph is **exothermic**.

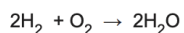
Explain why. Use ideas about bonds.

.....
.....
..... [2]

Q1.d(2018)

Hydrogen burns in oxygen to form water.

Look at the equation for the reaction.



Bond	Average bond energy (kJ/mol)
H – H	436
H – O	464
O = O	498

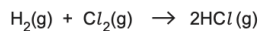
Calculate the **energy change** for this reaction.

Use the average bond energies shown in the table.

Answer = kJ/mol [3]

Q2.a(2020)

Hydrogen, H_2 , and chlorine, Cl_2 , react to make hydrogen chloride, HCl .



The reaction is exothermic.

(a) Look at Fig. 13.1. It shows the reaction profile for the reaction.

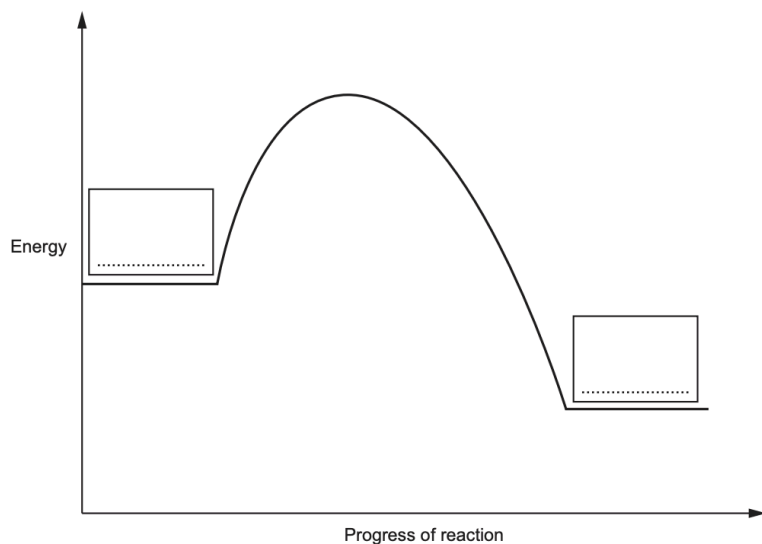


Fig. 13.1

Complete Fig. 13.1 by filling in the **two** boxes.

Use the **balanced symbol equation** to help you.

[2]

Q2.b(2020)

(b) Fig. 13.2 shows three energy changes, A, B and C, for a reaction.

The energy released in the reaction is 102 kJ/mol.

The activation energy for the reaction is 142 kJ/mol.

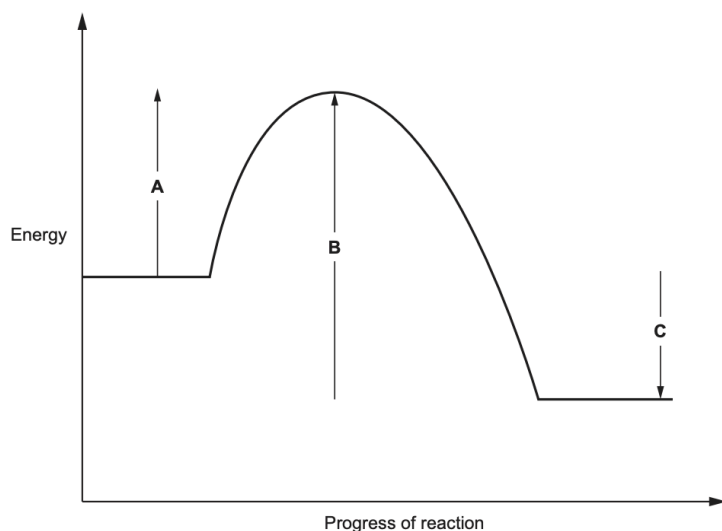


Fig. 13.2

Complete the table to identify:

- Which arrow, A, B or C, shows the energy released in the reaction, 102 kJ/mol.
- Which arrow, A, B or C, shows the activation energy for the reaction, 142 kJ/mol.

Tick (✓) **one** box in each row.

	A	B	C
Energy released 102 kJ/mol			
Activation energy 142 kJ/mol			