MARGIN

2. Air bags in cars are intended to prevent injuries in a car crash. When an air bag is activated, a series of reactions takes place.

(a) In the first reaction, sodium azide decomposes into sodium metal and nitrogen gas. The nitrogen gas inflates the air bag.

(i) An ignitor supplies the energy required for the reaction to occur.

State the term used to describe the minimum kinetic energy required by particles before a reaction can occur successfully. **1**

(ii) A typical car air bag contains 80 g of sodium azide, NaN_3.

Calculate the energy released, in kJ, when 80 g of sodium azide decomposes. **1**

$$NaN_3 \rightarrow Na + 1\tfrac{1}{2}N_2 \qquad \Delta H = -42.6 \text{ kJ mol}^{-1}$$

$GFM = 65.0$ g

(iii) Sodium azide is an ionic compound.

State the charge on the azide group ion. **1**

[Turn over

MARKS | DO NOT WRITE IN THIS