Name _____ **Class** _____ **Date** _____

1 **a** State what is meant by a hydrocarbon.

_____

_____

(2 marks)

b Complete the word equation to show what is formed when a hydrocarbon undergoes *complete* combustion.

hydrocarbon + oxygen → _____ + _____

(2 marks)

c What is the *toxic* gas that is formed by the *incomplete* combustion of a hydrocarbon? Tick *one* box.

☐ A   carbon

☐ B   carbon dioxide

☐ C   carbon monoxide

☐ D   hydrogen

(1 mark)

(Total for Question 1 = 5 marks)

2 Magnesium burns in oxygen to form magnesium oxide.

a Describe what is seen during this reaction.

_____

(1 mark)

b What is the type of reaction occurring when a metal gains oxygen? Tick *one* box.

☐ A   distillation

☐ B   neutralisation

☐ C   oxidation

☐ D   thermal decomposition

(1 mark)

c A piece of magnesium ribbon with a mass of 1.2 g is burnt in a crucible and forms 2.0 g of magnesium oxide.

Calculate the mass of oxygen that reacted with the magnesium. Explain your answer.

_____

_____

(2 marks)

(Total for Question 2 = 4 marks)

3 a i State what is meant by exothermic.

_____

(1 mark)

ii State the *three* factors that are needed for a fire to burn.

_____

(1 mark)

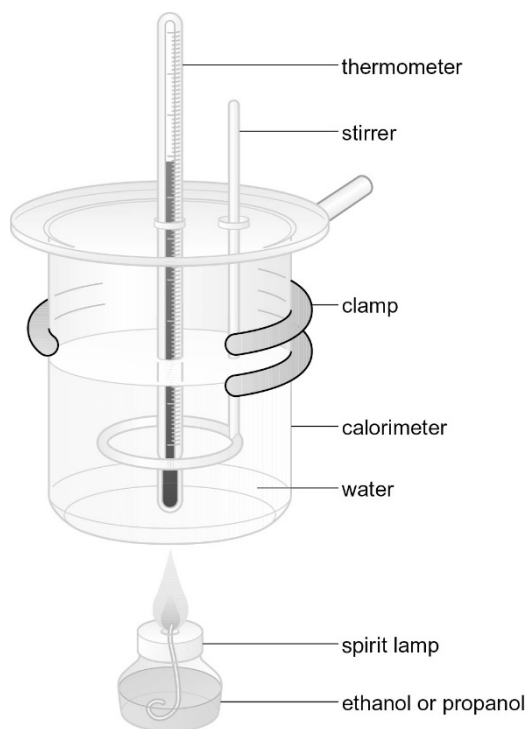**iii** What does this hazard symbol mean? Tick *one* box.

☐ A corrosive

☐ B flammable

☐ C oxidising

☐ D toxic

(1 mark)

b An experiment is carried out to compare the temperature rise of water when two fuels – ethanol and propanol – are burnt separately for 5 minutes each, using the apparatus shown.

- thermometer
- stirrer
- clamp
- calorimeter
- water
- spirit lamp
- ethanol or propanol

i State the independent variable in this experiment.

_____

(1 mark)

ii State the dependent variable in this experiment.

_____

(1 mark)

iii State *one* other variable in the experiment and how you could control it to make the experiment a fair test.

_____

_____

_____

(2 marks)

(Total for Question 3 = 7 marks)

4 **a** State *one* human activity that increases the amount of carbon dioxide in the atmosphere.

_____

(1 mark)

b State *one* thing that could happen if carbon dioxide levels continue to increase in the atmosphere.

_____

(1 mark)

(Total for Question 4 = 2 marks)

5 **a** Give the meanings of the following words.

i atom _____

(1 mark)

ii element _____

(1 mark)

iii compound _____

(1 mark)

b **i** Which element is represented by the symbol Cu? Tick *one* box.

☐ A   calcium

☐ B   carbon

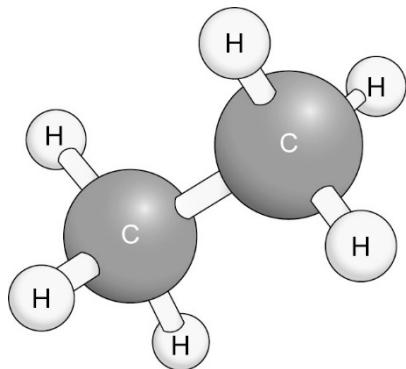☐ C   chlorine

☐ D   copper

(1 mark)

ii Which element is represented by the symbol K? Tick *one* box.

☐ A   iron

☐ B   krypton

☐ C   lead

☐ D   potassium

(1 mark)

c   This model represents ethane.

i   Give the formula for ethane.

_____

(1 mark)

ii   The mass of carbon in ethane is four times greater than the mass of hydrogen in ethane.

Calculate the mass of hydrogen combined with 12 g of carbon.

_____

(1 mark)

d   i   What is the name of the group of elements that contains lithium, sodium and potassium? Tick *one* box.

☐   A   alkali metals

☐   B   halogens

☐   C   noble gases
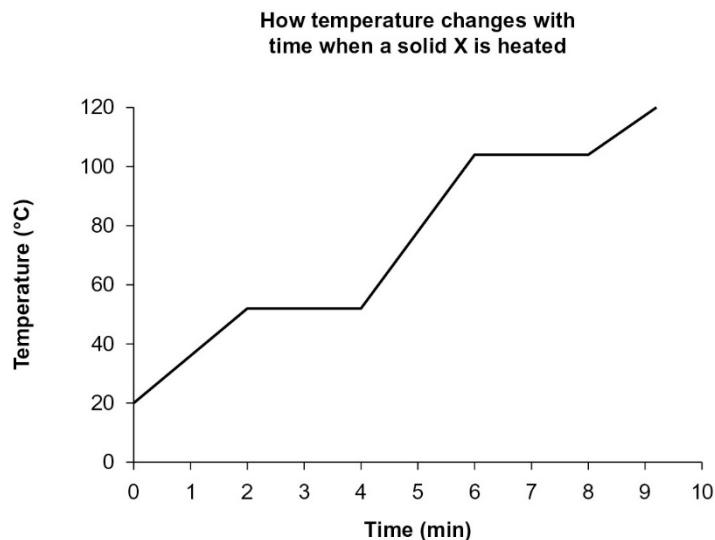
☐   D   transition metals

(1 mark)

ii   Complete the word equation to show the products formed when lithium reacts with water.

lithium + water → _____ + _____

(2 marks)

(Total for Question 5 = 10 marks)

6   A solid, X, is heated and the temperature is measured at minute intervals.

The graph shows the results.

**How temperature changes with
time when a solid X is heated**

a   What is the physical state of X at 80 °C?

_____

(1 mark)

b   What is the melting point of substance X?

_____

(1 mark)

c   When substance X boils, the temperature does not change. Explain why.

_____

_____

_____

_____

(2 marks)

(Total for Question 6 = 4 marks)

7   **a**   Some metals are used as catalysts.

Explain what a catalyst is.

_____

_____

(2 marks)

b i Complete the word equation to show the two missing reactants needed for iron to rust.

iron + _____ + _____ → iron hydroxide (rust)

(2 marks)

ii One type of iron oxide has the formula Fe_2O_3.

In this formula, what is the ratio of iron atoms to oxygen atoms?

_____

(1 mark)

c Part of the reactivity series of metals is shown.

sodium   most reactive

calcium

iron

copper   least reactive

Which metal reacts with oxygen but does not react with dilute hydrochloric acid? Tick *one* box.

☐ A   calcium

☐ B   copper

☐ C   iron

☐ D   sodium

(1 mark)

d Magnesium reacts with sulfuric acid (H_2SO_4) to form magnesium sulfate ($MgSO_4$) and hydrogen (H_2).

i Describe what is seen when a piece of magnesium ribbon is added to excess dilute sulfuric acid.

_____

(2 marks)

ii Write the balanced equation for this reaction.

_____

(2 marks)

(Total for Question 7 = 10 marks)

8   Six students carry out an experiment: they add a 3 cm length of magnesium ribbon to 20 cm^3 (an excess) of dilute hydrochloric acid. The students measure the temperature of the acid before and after adding the magnesium ribbon and calculate the rise in temperature.

The results are shown in the table.

Student	Temperature rise (°C)
1	10
2	11
3	12
4	9
5	5
6	10

a   Which student calculated the highest temperature rise and which student calculated the lowest? Tick *one* box.

		Highest temperature rise	Lowest temperature rise
☐	A	student 1	student 4
☐	B	student 3	student 5
☐	C	student 4	student 2
☐	D	student 6	student 3

(1 mark)

b   State which is the anomalous result.

_____

(1 mark)
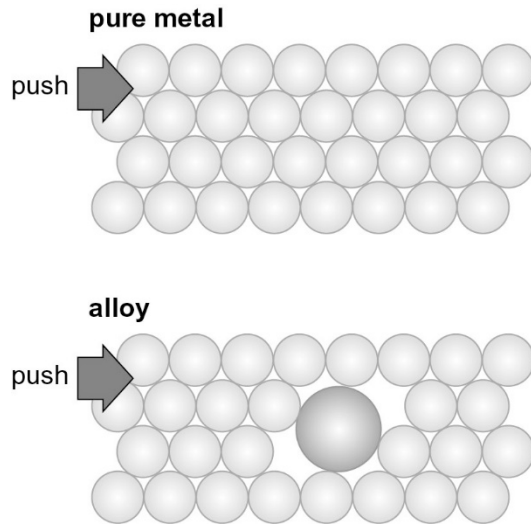
c   Give *one* reason for the anomalous result.

_____

_____

(1 mark)

9 The diagrams show the arrangement of particles in a pure metal and in an alloy.

pure metal

push

alloy

push

Use the diagrams to explain why alloys are stronger than pure metals.

_____

_____

_____

_____

_____

_____

(4 marks)

(Total for Question 9 = 4 marks)

10 a Igneous rocks are formed when molten magma cools and solidifies.

Compare the sizes of the crystals formed when molten magma cools quickly and when it cools slowly. Give a reason for your answer.

_____

_____

(2 marks)

b Describe how igneous rocks change into metamorphic rocks.

_____

_____

(2 marks)

c Explain how rocks are weathered during freeze–thaw action.

_____

_____

_____

_____

(2 marks)

d Describe how fossils are formed in some sedimentary rocks.

_____

_____

_____

_____

(2 marks)

e State which type of rock consists of layers of interlocking crystals.

_____

(1 mark)

f Most metals occur as ores, and the metal is obtained by mining the ore then extracting the metal by a chemical process.

Give *two* advantages of recycling metals rather than using new supplies of metals.

_____

_____

_____

_____

_____

_____

(2 marks)

(Total for Question 10 = 11 marks)

TOTAL FOR TEST = 60 MARKS