

8E Combustion

Name	
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Q1

Use words from the box to complete the sentences correctly. Not all the words will be used.

burn	flames	hot	fire extinguisher	wet	wood
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a) To light a bonfire, you need to make the wood very

.

[1 mark]

b) We can tell when the wood starts to burn, because we can see

.

[1 mark]

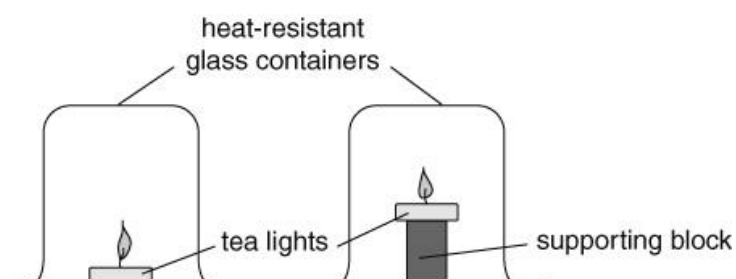
c) To put the fire out, we can use a

.

[1 mark]

Q2

A tea light is a type of candle. The diagram shows apparatus used to investigate the effect of the height of a candle on the time taken before the candle goes out.



a)

i Which is the independent variable in the experiment? Tick *one* box.

☐

A height of candle

☐

B the material of the container

☐

C size of container



D time taken for candle to go out

[1 mark]

ii Which is the dependent variable in the experiment? Tick *one* box.

A height of candle



B the material of the container

C size of container



D time taken for candle to go out

[1 mark]

b) The other variables need to be controlled. Explain why.

[1 mark]

c) Choose *one* of the control variables and suggest how this variable could be controlled.

[1 mark]

Q3

Draw lines to link each of the words on the left with its meaning shown on the right.

combustion

a reaction when a substance combines with oxygen

fuel

a substance made of only hydrogen and carbon

hydrocarbon
burning

a substance containing stored energy that can be released during

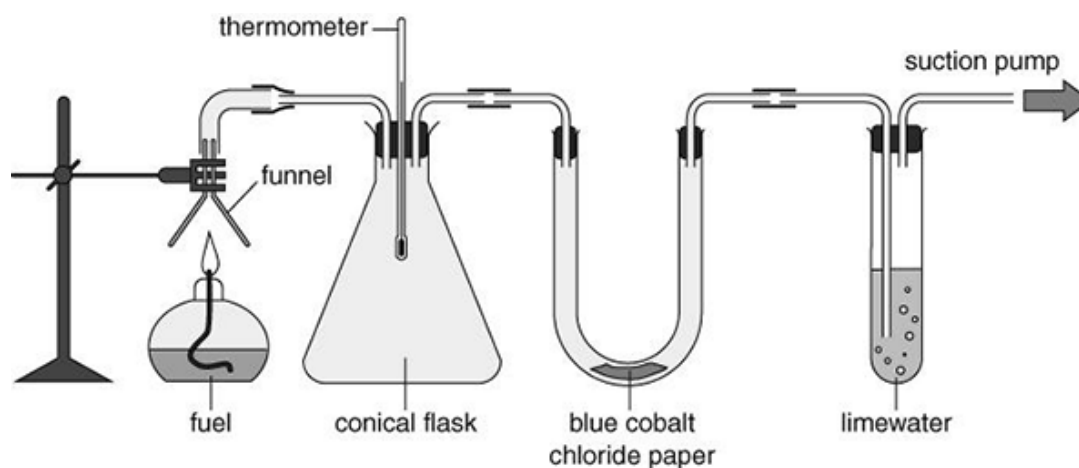
oxidation

a reaction when burning happens

[2 marks]

Q4

The apparatus shown below is used to show what happens during the combustion of a hydrocarbon fuel.



a) Tick *one* box to complete each sentence in parts **i**, **ii** and **iii** below.

i The thermometer will show that during the experiment the temperature will ...

- ☐ A decrease
- ☐ B increase
- ☐ C stay the same
- ☐ D fluctuate

[1 mark]

ii The blue cobalt chloride paper will change to pink because ...

- ☐ A water is being produced.
- ☐ B oxygen is being produced.
- ☐ C carbon dioxide is being produced.
- ☐ D heat is being produced.

[1 mark]

iii The limewater will change from clear to ...

- ☐ A pink
- ☐ B blue
- ☐ C dark
- ☐ D cloudy

[1 mark]

b) Explain your answer to part **a iii**.

[1 mark]

Q5

The diagram shows an incomplete fire triangle.



a) What is the missing word on the triangle?

[1 mark]

b) Explain what the fire triangle shows.

[1 mark]

c) Explain how water helps to put out a fire.

[1 mark]

d) Explain why you should not use water on burning oil.

[1 mark]

Q6

When 4.9 g of magnesium is burnt, 8.1 g of product is formed.

a) What is the name of the product formed? Tick *one* box.

- ☐ A magnesium oxide
- ☐ B magnesium dioxide
- ☐ C carbon dioxide
- ☐ D magnesium chloride

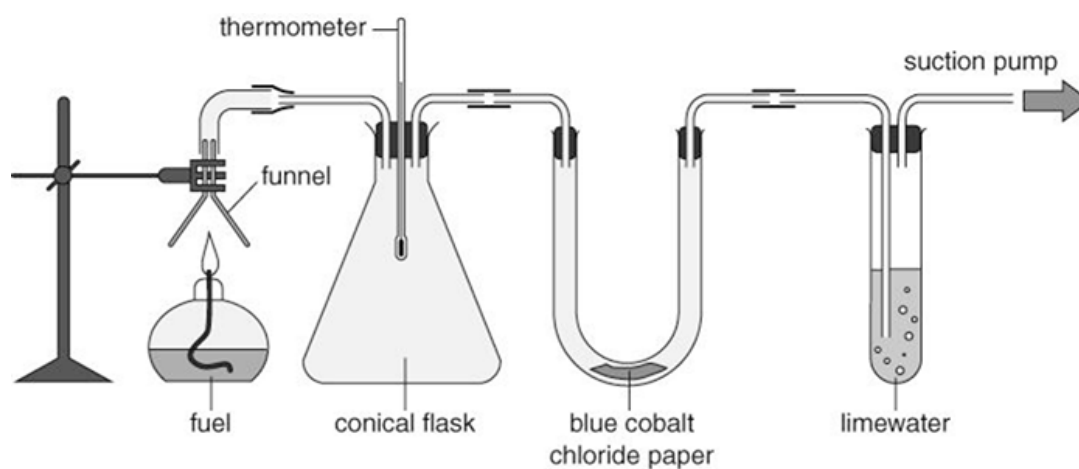
[1 mark]

b) Explain the increase in mass.

[2 marks]

Q7

The apparatus shown below is used to show what happens during the combustion of a hydrocarbon fuel.

a) What will happen to the thermometer reading during the experiment? Tick *one* box.

- ☐ A The temperature decreases because energy is absorbed by the fuel.
- ☐ B The temperature increases because energy is transferred from the fuel to the surroundings.
- ☐ C The temperature decreases because energy is transferred from the thermometer to the surroundings.
- ☐ D The temperature increases because energy is transferred from the surroundings to the fuel.

[1 mark]

b) What will happen to the limewater during the experiment? Tick *one* box.

☐

A The limewater will turn cloudy because it reacts with oxygen produced in the reaction.

☐

B The limewater will turn dark because it reacts with heat produced in the reaction.

☐

C The limewater will turn cloudy because it reacts with carbon dioxide produced in the reaction.

☐

D The limewater will turn pink because it reacts with carbon dioxide produced in the reaction.

[1 mark]

c) Why will the cobalt chloride paper change during the experiment? Tick *one* box.

☐

A The cobalt chloride paper will turn pink because water is produced in the reaction.

☐

B The cobalt chloride paper will turn white because acid is produced in the reaction.

☐

C The cobalt chloride paper will stay blue because water is not produced in the reaction.

☐

D The cobalt chloride paper will turn pink because carbon dioxide is produced in the reaction.

[1 mark]

d) During the experiment a black powder can form on the funnel above the candle.

Name this black powder and explain why the powder forms.

[2 marks]

Q8

a) Name the product formed when magnesium metal burns in air.

[1 mark]

b) Write a word equation for this reaction.

[1 mark]

c) What happens to the mass of reactants and mass of products in this reaction? Tick *one* box.

- ☐ A The mass of the products is more than the mass of the reactants.
- ☐ B The mass of the products is less than the mass of the reactants.
- ☐ C The mass of the products is the same as the mass of the reactants.
- ☐ D The mass of the products is not comparable with the mass of the reactants.

[1 mark]

Q9

The graph shows the average area of Arctic sea ice in January, from 1979 to 2010.



a) Describe the trend shown in the graph.

[1 mark]

b) Explain how this change can be linked to human activity.

[2 marks]

Q10

Carbon monoxide and carbon dioxide are pollutants produced from the combustion of fossil fuels. Other pollutants are also produced.

a) i Name *one* non-metal oxide pollutant produced from the combustion of an impurity in fossil fuels.

[1 mark]

ii Name one non-metal oxide pollutant produced by the high temperature inside a vehicle engine when the engine is burning fossil fuels.

[1 mark]

b) Explain how the combustion of fossil fuels can cause acid rain.

[2 marks]

c) Explain how carbon monoxide is produced in a car engine.

[2 marks]

d) Explain how the amount of carbon monoxide released into the air from a car exhaust can be reduced.

[2 marks]

e) The carbon dioxide produced from the combustion of fossil fuels is a problem. Explain why.

[2 marks]

Q11

Sulfur dioxide and nitrogen oxides are pollutants found in the air.

a) Explain how these gases are produced from fossil fuels.

i sulfur dioxide

[1 mark]

ii nitrogen oxides

[1 mark]

b) Explain how these gases harm the environment.

[1 mark]

c) Carbon dioxide is also produced from fossil fuels. Explain how carbon dioxide gas can harm the environment.

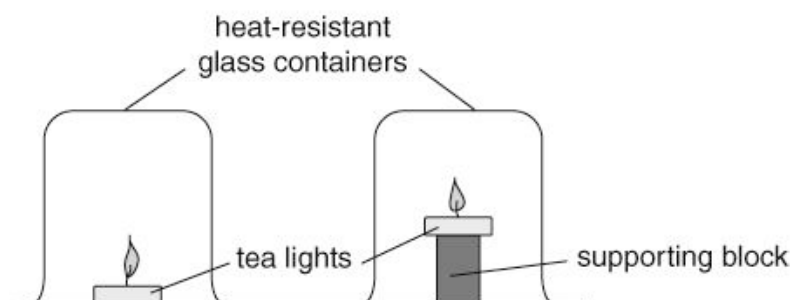
[1 mark]

d) Suggest *one* way carbon dioxide emissions could be reduced and explain why your suggestion would reduce carbon dioxide emissions.

[1 mark]

Q12

A tea light is a type of candle. The diagram shows apparatus used to investigate the effect of the height of a candle on the time taken before the candle goes out.



a) Candle wax is a hydrocarbon. Write a word equation for the complete combustion of candle wax.

[2 marks]

b) Explain why the candle flame goes out.

[1 mark]

c) Identify *two* control variables for this experiment. For each control variable explain how it might affect the experiment and suggest how it could be controlled.

i Control variable and effect:

[1 mark]

How this variable could be controlled:

[1 mark]

ii Control variable and effect:

[1 mark]

How this variable could be controlled:

[1 mark]

d) Wood, is made of hydrocarbons. In the 18th Century, scientists would have used the idea of phlogiston to explain the loss of mass when a piece of wood burns.

Compare the phlogiston theory with the modern explanation of burning.

[2 marks]

Overall Mark	/55
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