

8E Combustion

Name	
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Q1

Part	Step	Answer	Mark scheme
a	1st	hot	1 mark
b	2nd	flames	1 mark
c	3rd	fire extinguisher	1 mark

Q2

Part	Step	Answer	Mark scheme
ai	4th	A height of candle	1 mark
aii	4th	D time for candle to go out	1 mark
b	4th	To make the test fair/So that they don't affect the dependent variable	1 mark
c	4th	Use the same size of candle/container in each test.	1 mark

Q3

Part	Step	Answer	Mark scheme
	5th 5th	combustion – a reaction in which burning happens fuel – a substance that contains stored energy that can be released during burning hydrocarbon – a substance that contains only hydrogen and carbon oxidation – a reaction in which a substance combines with oxygen	2 marks – 2 marks for all correct; 1 mark for 2 or 3 correct; 0 marks for 1 or fewer correct

Q4

Part	Step	Answer	Mark scheme
ai	5th	B increases	1 mark
aii	5th	A water is being produced	1 mark
aiii	5th	D cloudy	1 mark
b	6th	The carbon dioxide from the burning fuel makes limewater turn cloudy.	1 mark

Q5

Part	Step	Answer	Mark scheme
a	5th	oxygen	1 mark
b	6th	It shows the three factors needed for a fire to burn.	1 mark
c	6th	It cools the fire down/takes heat away from the fire.	1 mark
d	6th	It makes the fire explode and spread.	1 mark

Q6

Part	Step	Answer	Mark scheme
a	6th	A magnesium oxide	1 mark
b	7th 7th	The difference in mass of 3.2g between the magnesium metal reactant and the magnesium oxide product is the mass of the oxygen that reacted with the magnesium; This is because atoms are not created or destroyed in the reaction, just rearranged.	1 mark 1 mark

Q7

Part	Step	Answer	Mark scheme
a	6th	B The temperature increases because energy is transferred from the fuel to the surroundings.	1 mark
b	6th	C The limewater will turn cloudy because it reacts with carbon dioxide produced in the reaction.	1 mark
c	6th	A The cobalt chloride paper will turn pink because water is produced in the reaction.	1 mark
d	7th 7th	Soot/unburnt carbon; This is formed because there is not enough oxygen for all the fuel to burn completely.	1 mark 1 mark

Q8

Part	Step	Answer	Mark scheme
a	6th	magnesium oxide	1 mark

b	7th	magnesium + oxygen → magnesium oxide	1 mark
c	6th	C The mass of the products is the same as the mass of the reactants.	1 mark

Q9

Part a	Step 6th	Answer The graph shows that the extent of ice has decreased between 1979 and 2010 by 1.4 million square kilometres, at a rate of about 0.05 million square kilometres a year.	Mark scheme 1 mark only if numerical calculation included.
b	7th 7th	Human activity, such as the burning of fossil fuels, is increasing the amount of carbon dioxide in the atmosphere. Increased carbon dioxide is causing global warming which will result in more ice melting.	1 mark 1 mark

Q10

Part ai	Step 5th	Answer sulfur dioxide	Mark scheme 1 mark
aii	5th	nitrogen oxides/NO _x gases (Do not accept 'soot particles'.)	1 mark
b	7th 7th	Many of the gases released by fossil fuel combustion are acidic; They dissolve in the clouds and make the rain <i>more acidic</i> than normal. (Do not accept 'make the rain acidic'.)	1 mark 1 mark
c	7th 7th	Carbon in hydrocarbon fuel reacts with oxygen from air; but there is not enough oxygen for it all to form carbon dioxide (or equivalent).	1 mark 1 mark
d	7th 7th	Use a catalytic converter on the exhaust; because it converts carbon monoxide to carbon dioxide.	1 mark 1 mark
e	7th 7th	It is causing an increase in the greenhouse effect; leading to global warming and climate change.	1 mark 1 mark

Q11

Part	Step	Answer	Mark scheme
a i ii	7th 7th	Sulfur impurities in fossil fuels react with oxygen when the fuel is burnt to form sulfur dioxide; Nitrogen reacts with oxygen at the high temperature in a vehicle engine to form nitrogen oxides.	1 mark 1 mark
b	6th	These gases make rain more acidic than normal/cause acid rain. (Do not accept: 'make the rain acidic')	1 mark
c	7th	The gases dissolve in water droplets in clouds and fall as acid rain, which damages the environment and living organisms.	1 mark
d	7th	Any suitable method supported by an appropriate explanation. For example: - reducing the amount of fossil fuel burnt by using nuclear fuel/renewable forms of energy to generate electricity, because these produce little or no carbon dioxide - reducing the amount that we use our cars, or changing their fuel so that we burn less petrol or diesel, because that will mean less carbon dioxide is released.	1 mark only if supported by an appropriate explanation.

Q12

Part	Step	Answer	Mark scheme
a	7th 7th	hydrocarbon + oxygen → carbon dioxide + water	2 marks – 1 mark for reactants; 1 mark for products
b	6th	Any suitable answer with appropriate explanation, e.g. - if oxygen concentration in container drops too low because oxygen is needed for the reaction. - carbon dioxide gas excludes oxygen from the flame.	1 mark for answer with good explanation.

ci cii	5th 5th 5th 5th	Any two variables that could affect time of burning, with suitable explanation of why it might affect burning time and suggestion of how it should be controlled, e.g. • Volume of container because different volumes contain different amounts of oxygen and more oxygen means flame could burn for longer. • Control by using identical container in each test. • Length of time candle has been alight before covering because flame also melts wax, making it easier for it to move up the wick and burn. • Make sure candles have been burning for same time or have same-sized pool of melted wax before covering.	4 marks – for each variable: 1 mark for explanation 1 mark for suggestion
d	8th 8th	Phlogiston theory: Scientists thought that things burnt because they contained phlogiston; Oxygen theory: We now know that substances need oxygen present so they can burn.	1 mark 1 mark

Overall Mark	/55
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