AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.9.2.4

The carbon footprint and its reduction

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**15**
Available paper years	**2007–2013**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.9.2.4 The carbon footprint and its reduction

Answer 01 · Mark scheme

June 2007 | CHY1B | Original Q9 | Legacy

Nine	**4**	**1**	**3**	**4**

Answer 02 · Mark scheme

November 2007 | CHY1B | Original Q4 | Legacy

Four	**1**	**2**	**1**	**2**

Answer 03 · Mark scheme

January 2008 | CHY1H | Original Q5 | Legacy

No matching mark scheme was available in the supplied archive for this question.

Answer 04 · Mark scheme

March 2008 | CHY1BP | Original Q4 | Legacy

Four	**2**	**1**	**2**	**3**

4.9.2.4 The carbon footprint and its reduction

Answer 05 · Mark scheme

June 2008 | CHY1H | Original Q6 | Legacy

question	answers	extra information	mark
6(a)	any **two** environmental problems with linked explanations • global warming (1) caused by (formation of) carbon dioxide / greenhouse gas (1) • acid rain (1) caused by (formation of) sulfur dioxide (1) • global dimming (1) caused by (formation of) particles / particulates / fires / smoke / carbon / pm 10 (1) • scarring of landscape (1) caused by mining / quarrying of coal (1)	accept effects of global warming ignore greenhouse effect accept effects of acid rain ignore respiratory problems accept sulfur oxide ignore sulfuric acid ignore respiratory problems ignore ozone layer	max 4
6(b)	any **three** from: • replant the trees / renewable / sustainable • carbon dioxide is used by the trees / photosynthesis • it's a (continuous carbon) cycle • no '<u>new</u>' carbon (dioxide) is produced **or** no locked up carbon (dioxide) is released	 ignore reusable accept trees absorb carbon dioxide as they grow do **not** allow respiration accept 'carbon dioxide goes back into the air' accept trees use CO_2 which is released when trees are burnt accept no carbon (dioxide) from fossil fuels is produced	3
Total			**7**

4.9.2.4 The carbon footprint and its reduction

Answer 05 · Mark scheme June 2008 | CHY1H | Original Q6 | Legacy

COMPONENT NUMBER: CHY1H

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

Answer 06 · Mark scheme November 2008 | CHY1BP | Original Q6 | Legacy

Six	**2**	**3**	**2**	**1**

Answer 07 · Mark scheme June 2009 | CHY1BP | Original Q3 | Legacy

Three	**4**	**2**	**3**	**3**

Answer 08 · Mark scheme June 2009 | CHY1BP | Original Q7 | Legacy

Seven	**2**	**1**	**1**	**3**

4.9.2.4 The carbon footprint and its reduction

Answer 09 · Mark scheme

January 2010 | CHY1H | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)	(thought to cause) global warming / green house (effect) / climate change	ignore other consequences of global warming do **not** accept acid rain / ozone layer / global dimming	1
3(b)	any **three** from: • replant trees / renewable / sustainable • carbon (dioxide) used by trees / photosynthesis • it is a (continuous / carbon) cycle **or** carbon (dioxide) goes back into the air • no new carbon (dioxide) is produced **or** no locked up carbon (dioxide) is released **or** the carbon (dioxide) was absorbed millions of years ago	 ignore reusable accept trees absorb carbon (dioxide) as they grow ignore respiration accept burning wood is carbon neutral for the **second** and **third** bullet points: accept trees use carbon dioxide which is released when (trees / wood are / is) burnt for **2** marks	3
Total			**4**

4.9.2.4 The carbon footprint and its reduction

Answer 09 · Mark scheme January 2010 | CHY1H | Original Q3 | Legacy

CHY1H

Answer 10 · Mark scheme June 2010 | CHY1BP | Original Q7 | Legacy

Seven	**2**	**2**	**2**	**3**

Answer 11 · Mark scheme March 2011 | CHY1BP | Original Q8 | Legacy

Eight	**3**	**2**	**3**	**2**

4.9.2.4 The carbon footprint and its reduction

Answer 12 · Mark scheme

June 2011 | CHY1H | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6	any **four** from: **Arguments for biodiesel** max **three** from: • sustainable / renewable • (carbon neutral) absorbs CO_2 when growing / during photosynthesis • burning biodiesel produces low amounts particulates / carbon monoxide • can use waste vegetable oils / fats (from food industry) **or** can use waste plant material • can be used to conserve crude oil (instead of / mixed with petroleum diesel) • produced by a low energy / temperature process • biodegrades (easily) **Arguments against biodiesel** max **three** from: • creates food shortages • deforestation to plant more crops leads to loss of habitat / biodiversity **or** deforestation leads to a reduction in absorption of CO_2 • burning biodiesel produces high amounts of nitrogen oxides • crops takes time to grow • vast areas of land needed to grow crops conclusion supported by the argument presented, which must give added value to the points for and against given above	to gain **4** marks both pros and cons should be given allow burning biodiesel produces little / low amount of global dimming ignore sulfur dioxide accept produced by a low tech process ignore engine effects accept price of food increases allow burning trees increases CO_2 allow deforestation increases global warming allow increases acid rain allow crops can fail	4 1
Total			**5**

The AQA UMS Conversion Calculator is available on the Results statistics page of the AQA Website

4.9.2.4 The carbon footprint and its reduction

Answer 13 · Mark scheme

November 2011 | CHY1AP | Original Q5 | Legacy

Five	**4**	**2**	**2**	**2**

Answer 14 · Mark scheme

November 2011 | CHY1AP | Original Q6 | Legacy

Six	**2**	**2**	**3**	**2**

4.9.2.4 The carbon footprint and its reduction

Answer 15 · Mark scheme

June 2013 | CH1HP | Original Q7 | Legacy

Question 7

question	Answers	extra information	Mark
7(a)	ethanol is made up of only one type of molecule **or** ethanol is a compound	allow ethanol is pure	1
	diesel / petrol / rapeseed oil are mixtures	accept composition of diesel / petrol / rapeseed oil varies / changes allow different hydrocarbons have different melting points ignore diesel, petrol and rapeseed oil are impure	1
7(b)(i)	sugar is mixed with / dissolved in water	accept sugar cane for sugar	1
	yeast (is added)	allow enzymes are added if no other mark awarded, allow correct word or chemical equation for **1** mark	1
7(b)(ii)		accept carbon for carbon dioxide	
	(growing sugar cane / rapeseed) plants absorbs carbon dioxide	accept carbon dioxide is used for photosynthesis	1
	which is released (when the biofuel burns)	do **not** accept no carbon dioxide is released (when biofuels burn)	1
7(c)	nitrogen / N_2 **and** oxygen / O_2 (in the air)	do **not** accept fuels contain nitrogen	1
	react in the hot engine / at high temperature		1

Question 7 continues on the next page

Question 7 continued

question	Answers	extra information	Mark
7(d)	any **three** from: • ethanol needs a higher temperature to burn than petrol **or** ethanol has a higher flashpoint than petrol • ethanol releases less energy (per litre) than petrol • sugar is renewable **or** crude oil is non-renewable / will run out • sugar cane growth is unreliable / slow **or** crude oil is a reliable supply • ethanol is made by a batch / slow process **or** petrol is made by a continuous / fast process • ethanol is carbon neutral **or** petrol contains 'locked up' carbon dioxide • sugar / sugar cane should be used for food not for fuels	ignore references to melting point allow ethanol is not readily available **or** petrol is readily available accept idea of food shortages	3
	a justified conclusion that adds value	accept one **additional** point from the list above as long as one comparison of replacing petrol with ethanol is made	1
Total			**12**

UMS Conversion Calculator: www.aqa.org.uk/umsconversion