AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.9.2.4

The carbon footprint and its reduction

Past-paper questions

Tier	**Foundation**
Question groups	**5**
Available paper years	**2007–2013**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.9.2.4 The carbon footprint and its reduction

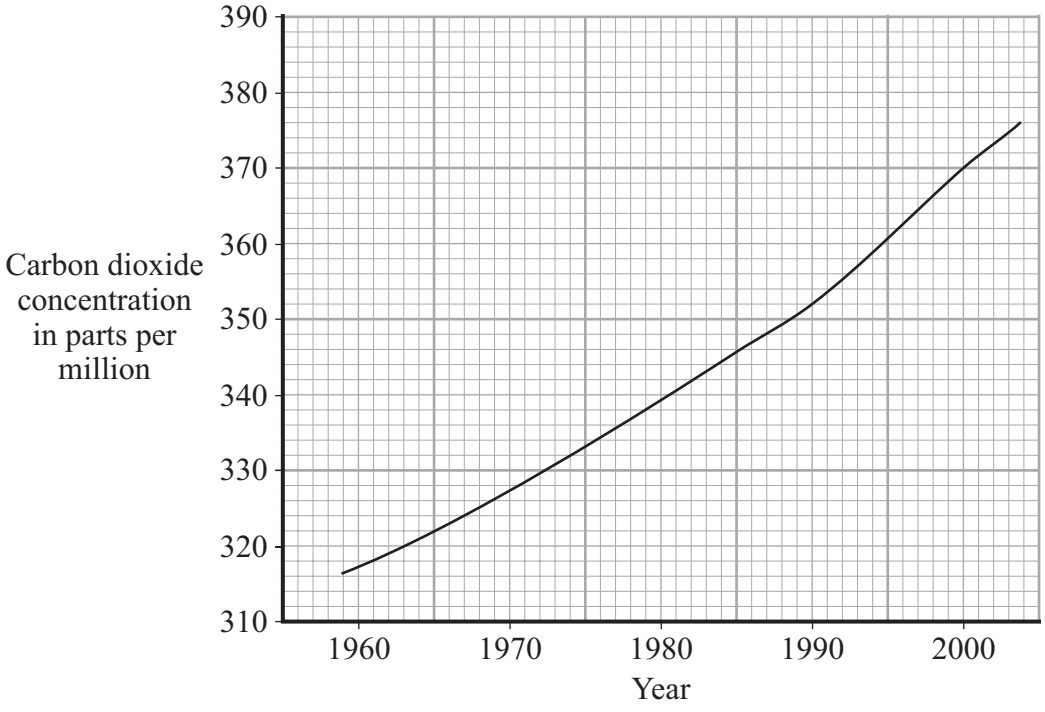
Question 01

November 2007 | CHY1B | Original Q9 | Legacy

QUESTION NINE

Measurements of carbon dioxide in the atmosphere have been made continuously for almost 50 years at the Mauna Loa Observatory, 4000 metres up a mountain in Hawaii.
This site is far enough away from any large carbon dioxide source to be a reliable measuring point.

Atmospheric carbon dioxide levels measured at Mauna Loa, Hawaii



9A What is the mean (average) rate of increase per year of carbon dioxide (in parts per million) in the atmosphere at Mauna Loa between 1990 and 2000?

1 1.8

2 18.0

3 352.0

4 370.0

9B The change in carbon dioxide concentration over the past 50 years is thought to be a result of . . .

1 increased volcanic activity.

2 an increase in the use of fossil fuels.

3 variations in the Sun's energy output.

4 an increase in ocean temperatures.

4.9.2.4 The carbon footprint and its reduction

Question 01 · continued

9C Many scientists think that there is a close link between atmospheric carbon dioxide levels and global warming.
Some political leaders have taken no action to reduce carbon dioxide emissions.

One possible reason is that . . .

1 restrictions on industrial development might result.

2 their countries have few oil reserves.

3 they do not think that scientists are qualified to make important judgements.

4 they do not think that global warming will affect their country.

9D Concerns about carbon dioxide levels and global warming have increased research and technical development in some areas.

Which of these has **not** been part of this development?

1 the use of ethanol as a fuel in cars

2 the use of diesel oil instead of petrol in cars

3 the use of vegetable oils as a fuel in cars

4 the development of electric cars

END OF TEST

4.9.2.4 The carbon footprint and its reduction

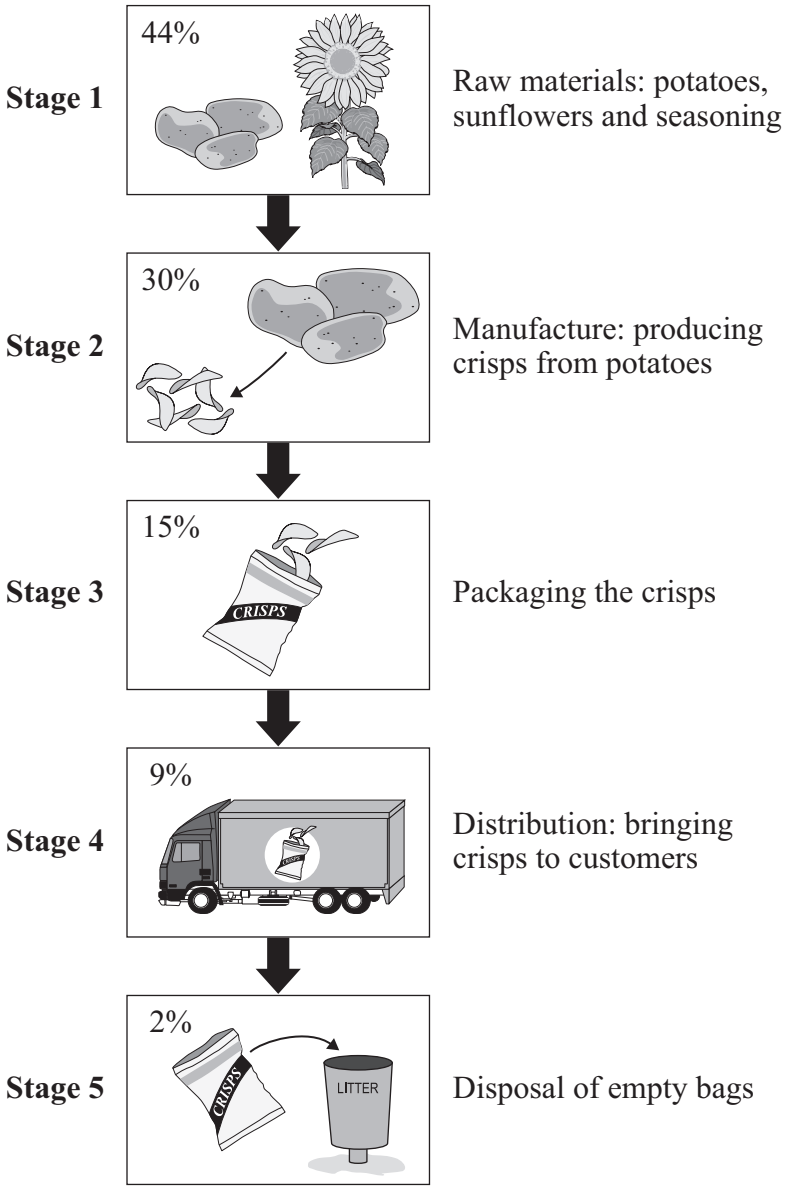
Question 02

June 2009 | CHY1AP | Original Q7 | Legacy

QUESTION SEVEN

The carbon footprint of a food product is the amount of carbon dioxide that is produced in its preparation, distribution and disposal.

The diagram shows the percentage (%) of the carbon footprint for each stage for a bag of crisps.



7A How is most of the carbon dioxide produced in **Stage 4**?

1 It is produced when the lorries use fuel.

2 It is breathed out by the driver.

3 It escapes from the crisp bags.

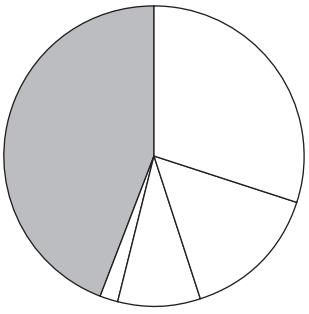
4 It escapes from the tyres of the lorries.

4.9.2.4 The carbon footprint and its reduction

Question 02 · continued

7B Which stage on the diagram corresponds to the shaded area on the pie chart?

Percentage (%) of carbon footprint for a bag of crisps



1 **Stage 1**

2 **Stage 2**

3 **Stage 3**

4 **Stage 4**

7C If the company reduces the carbon footprint for a bag of crisps, this will help to . . .

1 reduce the acid rain that it causes.

2 meet government targets on global warming.

3 reduce the sale of crisps which contribute to obesity.

4 reduce the use of sunflower oil.

7D Which of the following changes would reduce the carbon footprint for the bag of crisps?

1 increase the sales of the crisps

2 change the colour of the crisp bags

3 pack many more bags of crisps into each lorry

4 increase the size of the lorry fleet

4.9.2.4 The carbon footprint and its reduction

Question 03

June 2009 | CHY1BP | Original Q8 | Legacy

QUESTION EIGHT

This question is about vegetable oils.

8A When food is cooked, it is heated up and chemical changes take place in the food. Food that is cooked in vegetable oil (fried) is completely different from food cooked in water (boiled). Food cooked in oil reaches a much higher temperature than food cooked in water.

This is because . . .

1 water has a higher melting point than vegetable oil.

2 vegetable oil has a higher melting point than water.

3 water has a higher boiling point than vegetable oil.

4 vegetable oil has a higher boiling point than water.

8B Many vegetable oils contain unsaturated compounds.

This means that . . .

1 they do **not** dissolve in water.

2 they contain double carbon carbon bonds.

3 they react with an emulsifier.

4 they are hydrocarbons.

8C The amount of unsaturation in a vegetable oil is found by measuring . . .

1 how much steam it reacts with.

2 how much hydrogen it reacts with.

3 how much iodine it reacts with.

4 how much nickel it reacts with.

4.9.2.4 The carbon footprint and its reduction

Question 03 · continued June 2009 | CHY1BP | Original Q8 | Legacy

8D Biodiesel is a fuel made from vegetable oils.

Biodiesel is almost ‘carbon neutral’.

This is because . . .

1 it is a renewable energy source.

2 it will never run out.

3 carbon dioxide is absorbed by the plants from which vegetable oils are obtained.

4 the carbon dioxide produced when it burns is not acidic.

Turn over for the next question

4.9.2.4 The carbon footprint and its reduction

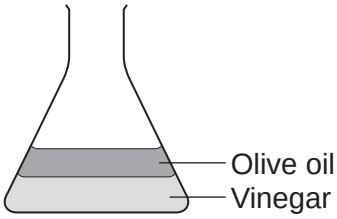
Question 04

5 Olive oil is used to make salad dressings and margarine.

5 (a) Vinegar is often used in salad dressings.
Vinegar contains 95% water and 5% ethanoic acid.

5 (a) (i) To make a simple salad dressing add olive oil to vinegar and shake.
After a few minutes the mixture separates.

Simple salad dressing



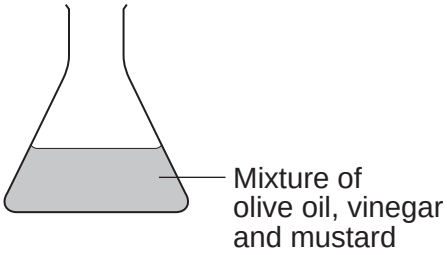
Tick (✓) **one** reason why the olive oil separates above the vinegar.

Reason	Tick (✓)
Olive oil does not dissolve in vinegar.	
Olive oil has a higher density than vinegar.	
Olive oil has a higher boiling point than vinegar.	

(1 mark)

5 (a) (ii) To make a French salad dressing add mustard to the olive oil and vinegar and shake.
After several minutes the mixture does **not** separate.

French salad dressing



The olive oil, vinegar and mustard mixture does **not** separate.
Give **one** reason why.

.....

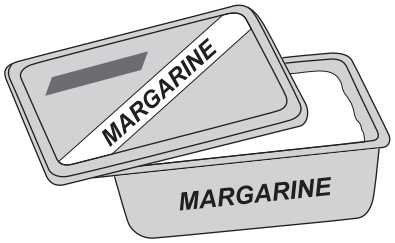
.....

(1 mark)

4.9.2.4 The carbon footprint and its reduction

Question 04 · continued June 2012 | CH1FP | Original Q5 | Legacy

5 (b) Olive oil contains *unsaturated* compounds. Olive oil can be hardened to make margarine.



5 (b) (i) Draw a ring around the correct answer to complete the sentence.

Unsaturated compounds contain | double | ionic | metallic | carbon-carbon bonds.

(1 mark)

5 (b) (ii) Draw **one** line from the test that would detect unsaturated compounds to the result of the test.

Test	Result of test
Add bromine water	Turns cloudy
Add limewater	Turns colourless
Add water	Turns orange

(1 mark)

5 (c) Olives grow on trees.
When olive oil is burned it produces carbon dioxide.

5 (c) (i) Burning olive oil as a fuel is said to be 'carbon neutral'.
Suggest why.

.....

.....

(1 mark)

5 (c) (ii) Olive oil is too expensive to use as biodiesel fuel.
Suggest another reason why olive oil should **not** be used as a fuel.

.....

.....

(1 mark)

6

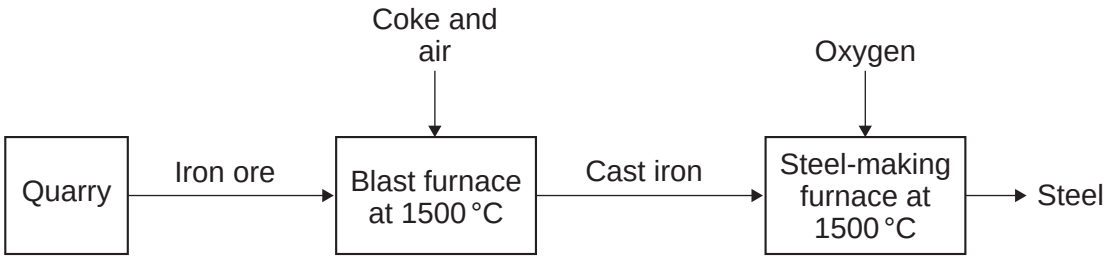
4.9.2.4 The carbon footprint and its reduction

Question 05

January 2013 | CH1FP | Original Q4 | Legacy

4 The iron produced from iron ore in a blast furnace is called cast iron.

Cast iron is converted into steel in a furnace.



Iron ore contains iron oxide.
Coke contains carbon.

4 (a) Quarrying iron ore will have an impact on everything near to the quarry.

4 (a) (i) Describe **one** positive impact and **one** negative impact of quarrying iron ore.

positive impact .....

.....

negative impact.....

.....

(2 marks)

4 (a) (ii) Draw a ring around the correct answer to complete the sentence.

Ores contain enough metal to make extraction of the metal

carbon neutral.

economical.

reversible.

(1 mark)

4 (b) Many chemical reactions take place in a blast furnace.
Use the flow diagram to help you to answer this question.

Suggest how the blast furnace is heated.

.....

.....

(1 mark)

4.9.2.4 The carbon footprint and its reduction

Question 05 · continued

4 (c) A chemical reaction for the extraction of iron is:

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

4 (c) (i) Complete the word equation for this chemical reaction.

..... + carbon monoxide → iron + ...

(2 marks)

4 (c) (ii) Draw a ring around the correct answer to complete the sentence.

Iron is extracted from its ore by

- decomposition.
- oxidation.
- reduction.

(1 mark)

4 (d) Cast iron contains about 4% carbon.
Cast iron is converted into low-carbon steels.

4 (d) (i) Low-carbon steel is produced by blowing oxygen into molten cast iron.

Suggest how oxygen removes most of the carbon.

.....

.....

.....

.....

(2 marks)

4 (d) (ii) Draw a ring around the correct answer to complete the sentence.

Metals, such as nickel, are added to low-carbon steels to make the steel

- corrode easily.
- easy to shape.
- much harder.

(1 mark)

Question 4 continues on the next page

4.9.2.4 The carbon footprint and its reduction

Question 05 · continued

4 (e) Recycling steel uses less energy than producing steel from iron ore**.**

Tick (✓) **one** advantage and tick (✓) **one** disadvantage of recycling steel.

Statement	Advantage Tick (✓)	Disadvantage Tick (✓)
Iron is the second most common metal in the Earth's crust.		
Less carbon dioxide is produced.		
More iron ore needs to be mined.		
There are different types of steel which must be sorted.		

(2 marks)

12