GCSE Science / Chemistry

Higher Tier

Unit 1 Chemistry

SPECIMEN MARK SCHEME

Version 1.0

Quality of Written Communication and levels marking

In Question 2(c) candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

In order to attain a mark within a certain level, **both** the science **and** the QWC must be of a standard appropriate to that level.

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
1(a)	two sodium atoms (react)		1
	two (bonded) chlorine atoms (react)	allow one chlorine molecule (reacts)	1
	two sodium ions and two chloride ions (are produced)	allow two molecules of sodium chloride (are produced) or two sodium chloride particles (produced)	1
1(b)(i)	(2x)	max **1** if candidate changes the number of electrons in the first energy level / shell	
	8x (in second energy level / shell)		1
	1x (in outer energy level / shell)		1
1(b)(ii)	sodium has 1 electron in its outer energy level / shell **or** chlorine has 7 electrons in its outer energy level / shell		1
Total			**6**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
2(a)	alkanes catalyst	substances must be in the order shown	1 1
2(b)	many (ethenes / monomers) bond / join together	allow ethenes / monomers bond / join together to form very large molecules for **2** marks	1 1

2(c)

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2.

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief description of a positive and a negative environmental impact involved with one or more methods used to reduce the amount of plastic bags sent to landfill.	There is some description of both positive and negative environmental impacts involved with at least 2 methods used to reduce the amount of plastic bags sent to landfill.	There is a clear, balanced and detailed description of both a positive and a negative environmental impact of using each of the 3 methods used to reduce the amount of plastic bags sent to landfill.

examples of the chemistry points made in the response

reuse:
reuse means less bags used so:

positive environmental impact
- saves raw materials / crude oil
- saves energy
- cuts down on CO_2 emissions
- less global warming

negative environmental impact
- could cause litter
- could still be sent to landfill

recycle:
bags can be recycled so:

positive environmental impact
- used to make new plastic bags / objects
- saves raw materials / crude oil
- saves energy compared to producing plastic bags from crude oil
- cuts down on CO_2 emissions
- less global warming

negative environmental impact
- collection point sites cause an eyesore / litter problem
- transportation to recycling plant releases carbon dioxide / causes global warming

burn:
bags can be burned so:

positive environmental impact
- could provide energy for heating buildings
- could provide energy for generating electricity

negative environmental impact
- increases CO_2 emissions
- increases global warming
- could release toxic gases
- does not conserve raw materials / crude oil

Total			**10**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
3(a)(i)	the continents of South America and Africa would have fitted together like a jigsaw there are matching / similar rocks / fossils on the continents of South America and Africa		1 1
3(a)(ii)	other scientists thought that continents are fixed / cannot float **or** Wegener had no evidence to prove that continents can move and that a land bridge could explain the matching / similar rocks / fossils on the continents of South America and Africa	allow Wegener was not respected by other scientists / PhD in astronomy	1 1
3(b)	radioactive mantle	words must be in the order shown	1 1
Total			**6**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
4(a)	calcium oxide calcium hydroxide calcium carbonate	substances must be in the order shown	1 1 1
4(b)(i)	strength of mortar decreases (as volume of sand increases)		1
4(b)(ii)	400 (cm^3) because the height the metal ball dropped from should be 42 cm and not 37 cm	 accept because the other results show that the height the metal ball dropped from should have an interval of 6cm	1 1
4(c)	contains aggregate	allow bonding is stronger	**1**
Total			**7**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
5(a)(i)	because large amounts of energy would be needed to extract the copper	accept because it is labour-intensive to extract copper from this land accept because copper would have to be extracted from a large area of land (owtte)	1
5(a)(ii)	any **one** from: • produces large amounts of solid waste • atmospheric pollution from carbon dioxide / sulfur dioxide • more lorries / traffic		1
5(b)(i)	iron is cheap	accept iron is much more abundant than copper	1
5(b)(ii)	iron displaces copper from solutions of its salts	accept iron is more reactive than copper	1
5(c)(i)	any **two** from: • less expensive/energy to extract the small amounts of copper • plants will remove carbon dioxide from the atmosphere as they grow • can release energy when plants are burned		2
5(c)(ii)	not continuous as it takes a long time for plants to grow	accept supply not continuous as plants only harvested once / twice a year	1
Total			**7**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
6(a)(i)	thermal decomposition		1
6(a)(ii)	hydration		1
6(a)(iii)	add bromine (water) / iodine solution (to K and L) K will decolourise these solutions **or** L will not decolourise these solutions		1 1
6(b)(i)	352 (g)	for correct answer if answer is incorrect 400 +114 - 162 gains 1 mark	2
6(b)(ii)	because 2 molecules of hydrocarbon J had 25 molecules of oxygen added **or** because 2 molecules of hydrocarbon J produced 16 molecules of carbon dioxide	allow because oxygen has been added to hydrocarbon J for **1** mark	2
6(c)(i)	raw materials are renewable	accept does not use crude oil	1
6(c)(ii)	alcohol does not need to be distilled process is continuous	accept alcohol produced is pure	1 1
Total			**11**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
7(a)(i)	(healthiest oil is) sunflower (oil) **or** rapeseed (oil)	no mark for the choice of oil accept the use of values from the table for these comparisons	
	sunflower (oil) is healthiest because it has less saturated fat than both olive (oil) and corn (oil) **or** rapeseed (oil) is healthiest because it has the lowest value of saturated fat compared with the other oils		1
	sunflower (oil) is healthiest because it has the highest value of polyunsaturated fat compared with all the other oils **or** rapeseed (oil) is healthiest because it has more polyunsaturated fat than both olive (oil) and corn (oil)		1
7(a)(ii)	no, because hydrogen adds to the unsaturated fat **or** no, because hydrogen reduces the number of carbon–carbon double bonds	accept no because reacting with hydrogen increases number of single bonds	1
	therefore there will be less polyunsaturated fat	accept therefore there will be more saturated fat	1
7(b)	molecules in egg yolk act as emulsifiers	accept lecithin molecules act as emulsifiers	1
	because molecules in egg yolk have a ‘head’ which dissolves in / attracted to water	accept because molecules in egg yolk are hydrophilic	1
	because molecules in egg yolk have a ‘tail’ which dissolves in / attracted to oil	accept because molecules in egg yolk are hydrophobic	1
Total			**7**

COMPONENT NUMBER: CH1HP

COMPONENT NAME: GCSE Science A Chemistry 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
8(a)	to remove solid / dust particles		1
8(b)	because at –200°C both (water and carbon dioxide) are solids this would therefore block pipes / equipment		1 1
8(c)	oxygen		1
8(d)(i)	helium		1
8(d)(ii)	nitrogen>argon>oxygen		1
Total			**6**