GCSE Science A 1

Higher Tier

Unit 5H

SPECIMEN MARK SCHEME

Version 1.0

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Quality of Written Communication and levels marking

In Question 7(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: SCA1HP

COMPONENT NAME: GCSE Science A 1 Unit 5H

STATUS: Specimen V1.0

question	answers	extra information	mark
1(a)	dead / inactive form of virus introduced into body		1
	white blood cells stimulated to produce antibodies		1
	correct antibodies rapidly made if the body is infected with the virus		1
1(b)	the percentage of children vaccinated fell to zero in 1995		1
	but the number of children developing autism rose and fell during the period when % vaccinations was falling		1
	number of children developing autism peaked after MMR vaccination had ceased		1
	which suggests that something other than MMR vaccination was causing autism		1
Total			**7**

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STATUS: Specimen V1.0

question	answers	extra information	mark
2(a)	because there is insufficient data for line graph		1
2(b)	injection with no testosterone		1
2(c)	the performance of testosterone group improved more than that of placebo group quantitative figure given eg about 4 times greater		1 1
2(d)	(no) there was a significant improvement after 6 weeks	allow significant improvement after 3 weeks	1
Total			**5**

question	answers	extra information	mark
3(a)	ovary		1
3(b)	womb / uterus		1
3(c)	fertility		1
3(d)	by the blood system		1
Total			**4**

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STATUS: Specimen V1.0

question	answers	extra information	mark
4(a)	+ (1) neutron	answers must be in the order shown	1 1
4(b)	because there is one / same number of electron(s) in outer energy level / shell		1
4(c)(i)	unreactive **or** full outer energy level / shell		1
4(c)(ii)	helium has only two electrons in outer energy level	accept helium is less dense than air	1
Total			**5**

question	answers	extra information	mark
5(a)	because the traditional method of extraction produces large amounts of solid waste because the traditional method of extraction would cause atmospheric pollution due to the release of carbon dioxide / sulfur dioxide		1 1
5(b)(i)	because iron is cheap	accept because iron is much more abundant than copper	1
5(b)(ii)	iron is more reactive than copper therefore iron displaces copper from solutions of its salts / copper sulfate solution		1 1
Total			**5**

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STATUS: Specimen V1.0

question	answers	extra information	mark
6(a)	oxygen / O_2 / O		1
6(b)(i)	zinc boils / evaporates out of furnace because of its low boiling point therefore because lead has a high boiling point it remains in the furnace		1 1
6(b)(ii)	on cooling the zinc forms a solid and the lead remains liquid therefore the lead can be poured off / decanted from the zinc	accept because zinc is less dense it floats on lead accept therefore the zinc can be poured off / decanted from the lead	1 1
Total			**5**

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COMPONENT NAME: GCSE Science A 1 Unit 5H

STATUS: Specimen V1.0

question	answers	extra information	mark
7(a)	16 800 000	allow **1** mark for substitution into correct equation ie 100 x 4200 x 40	2
7(b)	7	allow ecf from part (a)	1

Question 7 continues

Question 7 continued

7(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 the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater, including either advantages or disadvantages from the **examples** below.	There is a description of some of the advantages **and** disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with at least **one** advantage and **one** disadvantage from the **examples** below.	There is a clear, balanced and detailed description of the advantages **and** disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with a minimum of **two** advantages and **two** disadvantages from the **examples** below.

examples of the points made in the response	extra information
advantages • a renewable energy source • energy is free • does not pollute the atmosphere • no fuel is burnt • energy can be stored (in the water)	accept specific examples of polluting gases
disadvantages • only available in daylight hours • availability fluctuates • insufficient hours of sunlight in some countries • average low intensity in some countries	accept unreliable energy source

Total			**9**

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STATUS: Specimen V1.0

question	answers	extra information	mark
8(a)	energy used to refine oil… = 20J energy 'wasted' = 60J energy used to make car move = 20J	all three correct = **2** marks two correct = **1** mark one / none correct = **0** marks	2
8(b)	25% / 0.25	for correct answer allow error carried forward correctly from part (a) if answer is incorrect accept evidence of $\frac{\text{useful energy out}}{\text{total energy in}}$ **or** 20% / 0.2 for **1** mark	2
Total			**4**

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STATUS: Specimen V1.0

question	answers	extra information	mark
9(a)	stimulus/heat detected by temperature receptors in skin		1
	impulses move along sensory neurone to spinal cord / CNS		1
	chemical transmission across synapse		1
	to relay neurone		1
	impulses to muscle / effector via motor neurone		1
	muscle / effector contracts, moving the hand away		1
9(b)(i)	0.02 s	correct answer gains **2** marks if answer incorrect, evidence of 1.5 / 75 gains **1** mark	2
9(b)(ii)	impulse slowed down because of time taken for diffusion of the chemical across the synapse		1
Total			**9**

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STATUS: Specimen V1.0

question	answers	extra information	mark
10	argued evaluation • large scale trial gave better results • chose uneducated women so that if these women could use it correctly, women elsewhere would be able to • uneducated women unlikely to give informed consent • no placebo • used pill with high dose of hormone / should have tried a range of doses / results not valid for other populations • women not told pill was experimental / pill might have side effects / should have done pre-trial to check for side effects		6
Total			**6**

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question	answers	extra information	mark
11(a)	because the sensors are not near where people / residents live	accept because the sensors are not between cement works and where people live	1
	because the sensors are not positioned where concentration of particles was likely to be highest	accept because the sensors are not positioned downwind	1
11(b)	the average concentration of particles was **only** 1.8(ppm) **or** the average concentration of particles was below 2(ppm)	accept the average concentration of particles was 1.8(ppm) which is less than 2.0 (ppm)	1
11(c)	because the readings at some (2/3) sensors could have been higher than 2ppm		1
	because the sensors did not detect particles below 0.5mm		1
	because small particles / particles below 0.5mm / 0.4mm / 0.3mm / 0.2mm could (still) cause cancer / asthma	ignore global dimming **or** cars becoming dirty **or** position of sensors	1
Total			**6**

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STATUS: Specimen V1.0

question	answers	extra information	mark
12(a)(i)	344 – 350(°C)		1
12(a)(ii)	216(°C)		1
12(a)(iii)	the vapours / gases cool as they rise up the fractionating column		1
	which causes the vapours / gases to condense		1
	at different temperatures or into fractions that have different boiling points		1
12(b)(i)	$10 \longrightarrow 6 + 8$		1
	$7 \longrightarrow 6 + 8$		1
12(b)(ii)	first reaction is complete combustion	accept first reaction has excess/enough oxygen	1
	second reaction is incomplete combustion	accept second reaction has limited oxygen	1
Total			**9**

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STATUS: Specimen V1.0

question	answers	extra information	mark
13(a)(i)	transfer of energy by waves / infrared (radiation)	accept rays for waves do **not** accept transfer of energy electromagnetic waves ignore reference to heat	1
13(a)(ii)	ions / electrons gain (kinetic) energy	accept atom / particles / molecules for ions accept ions vibrate faster accept ions vibrate with bigger amplitude	1
	this energy is transferred to cooler parts of the metal by free electrons as they diffuse through the metal and collide with ions (and other electrons)		1
13(b)	water particles at the bottom are heated		1
	water particles move faster **or** take up more space	do **not** accept start to move / vibrate	1
	the warmer water expands **or** becomes less dense	do **not** accept answers in terms of particles expanding	1
	and the warm water rises / cold water falls to take its place		1
Total			**7**

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STATUS: Specimen V1.0

question	answers	extra information	mark
14(a)	the marbles model / act as molecules	accept atoms / particles for molecules	1
	molecules leaving a liquid = evaporation **or** marbles leaving tray = evaporation		1
14(b)	to evaporate the alcohol requires energy		1
	this energy is taken from the skin and the skin feels cold	accept heat for energy	1
14(c)	there are attractive forces between molecules		1
	only the fastest molecules have enough energy to break away from other molecules		1
	these molecules escape from the surface of the liquid		1
	therefore the average speed / energy of the remaining molecules goes down		1
	the lower the average speed / energy of molecules the lower the temperature of the liquid		1
Total			**9**