GCSE

Additional Applied Science

Foundation Tier

Unit 1 (Science at Work)

SPECIMEN MARK SCHEME

Version 1.0

Quality of Written Communication and levels marking

In Question 6(c)(i) 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: Unit 1F (Science at Work)

COMPONENT NAME: Additional Applied Science

STATUS: Specimen V1.0

question	answer	extra information	mark
1(a)	Student B (no mark) any **four** from: • hair tied back out of way • wearing safety goggles • bag safely out of way so not trip hazard • heat-proof mat used • beaker safely on tripod • apparatus away from edge of bench	accept converse for student A	4
1(b)	Petrol is inflammable	accept catches fire	1
Total			**5**

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question	answer	extra information	mark
2(a)	muscles arteries anaerobic		1 1 1
2(b)	oxygen carbon dioxide		1 1
2(c)(i)	(for the first 2 minutes) the heart beat is steady and low because the athlete is not exercising (at rest) (after 2 minutes) heart beat increases because exercising, and muscles need oxygen and glucose heart beat reaches peak (at minute 4) because exercise has ended	 accept respiration 	1 1 1
2(c)(ii)	11½ minutes (or valid value extrapolated from line)		1
2(c)(iii)	**A** (no mark) any **two** from: • (**A** has) lower resting heart rate • (**A** has) lower peak heart rate • (**A** has) faster recovery time	 accept starting for resting accept converse for **B**	 2
Total			**11**

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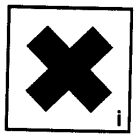
question	answer	extra information	mark
3(a)(i)	**A** – no fizzing **or** no gas given off **B** – no sulfate present **C** – chloride present	accept no reaction	1 1 1
3(a)(ii)	lead present	accept zinc / aluminium	1
3(b)	lead chloride	accept zinc chloride / aluminium chloride allow ecf from table	1
3(c)			1
Total			**6**

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question	answer	extra information	mark
4(a)	aluminium – is a good electrical conductor		1
	ceramic – withstands high temperatures		1
	plywood – is a composite material		1
	poly(ethene) – softens in boiling water		1
4(b)	mixture of elements containing at least one metal	accept a mixture of metals	1
4(c)(i)	composite		1
4(c)(ii)	**X** – compression		1
	Y – tension		1
Total			**8**

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STATUS: Specimen V1.0

question	answer	extra information	mark
5(a)(i)	B		1
5(a)(ii)	biceps contracts and triceps relaxes muscles work as an antagonistic pair	must have action of both muscles for mark owtte (but must have idea of antagonists / antagonistic)	1 1
5(b)(i)	Moment = force x perpendicular distance to pivot = 0.27 + 0.05 = 0.32 x 9 = 2.88	correct answer with or without working = **2** marks accept 9 x 32 = 288 for **1** mark	1 1
5(b)(ii)	because the moments have to be equal to stop the hand moving down **or** because the distance between the muscle attachment and the elbow pivot is less than the distance between the weight and the elbow pivot		1
Total			**6**

COMPONENT NUMBER: Unit 1F (Science at Work)

COMPONENT NAME: Additional Applied Science

STATUS: Specimen V1.0

question	answer	extra information	mark
6(a)	Food Standards Agency / Defra	accept FSA	1
6(b)	any **two** from: • nitrates • phosphates • potassium • magnesium		2

6(c)(i)

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 procedure for comparing the two fertilisers. The answer may not necessarily lead to a successful comparison of the fertilisers.	There is a description of the controlled procedure for comparing the two fertilisers that could easily be followed by another person. The answer **must** enable a basic comparison of the fertilisers.	There is a clear, detailed description of the controlled procedure for comparing the two fertilisers that could easily be followed by another person. The answer **must** enable a detailed comparison of the fertilisers.

examples of the points made in the response:	extra information
• two samples of the same type of seed • two samples containing the same amount of seed • allow seed to germinate / start to grow • in a suitable controlled environment	Examples of a suitable controlled environment include: • light • temperature • moisture • carbon dioxide • density of planting • type of growing medium

• add one type of fertiliser to one sample and the other type to the second sample • add equal amounts of each fertiliser • when plants finish growing, weigh the wheat	

6(c)(ii)	compare the mass of crop yield grown in A with that grown in B. If A>B then hypothesis is correct	owtte	1

6(d)	pigs kept indoors use less energy to keep warm	accept converse argument for animals kept outdoors	1
	and use less energy to produce faeces / urine		1
	and use less energy in moving around		1
	so more energy is used for growth		1

Total			**14**

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question	answer	extra information	mark
7(a)(i)	the normal		1
7(a)(ii)	correct angles R_f = sin45 / sin30 = 1.414 fits in the range for headlamps from table		1 1 1 1
7(b)(i)	as the temperature of the liquid changes, so does its refractive index this means that when the refractive index of liquid and glass is the same the glass 'disappears'	 allow because there is no refraction of light	1 1
7(b)(ii)	acts as a check on results can calculate a mean can lead to reduction in effect of random errors		1 1 1
Total			**10**