

GCSE

Additional Applied Science

Unit **A192/01**: Science of Materials and Production
(Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2014

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.










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These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response

	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

- a. If a candidate alters his/her response, examiners should accept the alteration.
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

c. The list principle:
 If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

MARK SCHEME:

Question		Answer	Mark	Guidance
1	a	ceiling tiles / wall tiles / curtains / plants / underlay; to absorb the sound owtte;	1 1	not double glazing / cavity insulation accept sensible modification which would work in practice not to reduce the sound level not reflect the sound
	b	The loudness is half of what it was. ✓ The loudness is double what it was. The loudness is four times what it was. The loudness is one quarter of what it was	1	
	c	<p>sound intensity</p> <p>40 dB</p> <p>90 dB</p> <p>140 dB</p> <p>description</p> <p>temporary hearing loss</p> <p>very painful</p> <p>very quiet</p>		completely correct for [2] one or two correct for [1]
	d	<pre> graph LR microphone[microphone] --> amplifier[amplifier] amplifier --> loudspeaker[loudspeaker] </pre>	2	microphone anywhere before amplifier [1] amplifier anywhere before loudspeaker [1]
2	a	sulfuric acid + iron \longrightarrow (iron sulfate) + hydrogen	2	correct reactants in any order for [1] accept sulphuric hydrogen as a product for [1]
	b	pour mixture through filter (paper); liquid (solution) passes through / solid (iron) does not;	1 1	accept sieve accept decanting e.g. pour off the liquid [1] leave solid at the bottom [1]
	c	each tablet is 0.5 g; iron sulphate = $200 \times 0.1 = 20$ g;	1 1	also $0.1 \times 200 = 20$ for [1]

Question		Answer	Mark	Guidance
3	a	<p>[Level 3]</p> <p>Describes some relevant strategies and no irrelevant ideas. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2]</p> <p>Describes some relevant strategies and some irrelevant ideas. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1]</p> <p>Describes a strategy which would be effective. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0]</p> <p>Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targetted at grades up to E.</p> <p>Indicative science points may include:</p> <p>relevant strategies grind lumps into powder stir the mixture heat it up increase concentration of acid / lower its pH add a catalyst</p> <p>irrelevant ideas use a different acid use a different solid chemical purify the solid change the acid strength use more/less acid use more/less solid</p>

Question		Answer	Mark	Guidance
4	a	stiffness is $(24/6) = 4$ N/mm; less than 5 N/mm (so not stiff enough);	1 1	ignore incorrect or missing units not unqualified yes / no accept a qualified conclusion based on an incorrect calculation using only 24 and 6
	b	Use a longer plank <input type="checkbox"/> Use a thicker plank <input checked="" type="checkbox"/> Use a smaller weight <input type="checkbox"/> Use a different material <input checked="" type="checkbox"/> Have a bigger displacement <input type="checkbox"/>	2	
	c	tested (by laboratory) / meets (products) standards; high quality / consistent / safe / reliable;	1 1	accept approved / checked / assessed not price ignore incorrect reasons

Question	Answer	Mark	Guidance
5	<p>[Level 3]</p> <p>Describes some light sources, each with an advantage and a disadvantage. Quality of written communication does not impede communication of the science at this level.</p> <p style="text-align: right;">(5 – 6 marks)</p> <p>[Level 2]</p> <p>EITHER describes a light source with an advantage and a disadvantage OR describes some light sources, each with an advantage or a disadvantage. Quality of written communication partly impedes communication of the science at this level.</p> <p style="text-align: right;">(3 – 4 marks)</p> <p>[Level 1]</p> <p>Describes a light source, with an advantage or a disadvantage. Quality of written communication impedes communication of the science at this level.</p> <p style="text-align: right;">(1 – 2 marks)</p> <p>[Level 0]</p> <p>Insufficient or irrelevant science. Answer not worthy of credit.</p> <p style="text-align: right;">(0 marks)</p>	6	<p>This question is targeted at grades up to C</p> <p>Indicative science points may include:</p> <p>sunlight / daylight adv: no cost / no need for electricity dis: intensity or colour changes with time of day or the weather / actors can suffer from exposure</p> <p>lamps / lights adv: consistent lighting / alter colour balance with filters / control brightness / control angle of illumination dis: need power / cost money / unsafe cables / electrocution / limited area of illumination</p> <p>fluorescent lamps adv: cheaper lamp dis: harsh cold light / emit UV which causes cancer</p> <p>incandescent lamps adv: soft warm light / control intensity dis: IR makes actors hot / lamps get hot</p> <p>LEDs adv: cool / control intensity / control colour dis: expensive</p> <p>lasers adv: very bright dis: danger of blinding / small area of illumination</p>

Question			Answer	Mark	Guidance
6	a	i	33.5 °C	1	within half a square range of 33.4°C to 33.6°C (1)
	a	ii	0915 to 0920	1	
	b		(glucose) + oxygen \longrightarrow carbon dioxide + water	3	each correct entry for [1] products in either order
	c		stop contamination / adulteration / spoiling (of food product); by bacteria / other fungus;	1 1	not just cleans / sterilises accept germs accept any of the following for [1] each harvest the mycoprotein which has been growing steriliser kills all microorganisms in bioreactor water removes traces of steriliser fungus provides fresh starter population

Question	Answer	Mark	Guidance
8	<p>[Level 3]</p> <p>Describes and explains some relevant actions. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2]</p> <p>Describes some relevant actions, one of which is explained. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1]</p> <p>Describes some relevant actions. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0]</p> <p>Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to C.</p> <p>Indicative science points may include:</p> <p>action – explanation</p> <p>access to grass / hay / pellets - so that they have food to eat; shelter - to keep them warm; supply drinking water – to avoid dehydration; regular checks - to monitor their welfare use the vet / antibiotics - to keep them healthy; space for exercise - to develop muscle; restrict space – so that they don't waste energy; access to mother's milk - for extra nutrition; give them hormones - to promote growth;</p> <p>ignore irrelevant details when allocating a level ignore references to "grow big" or "add weight" as an explanation</p>

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Head office
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Facsimile: 01223 552553

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