

GCSE

Additional Applied Science

Unit **A192/02**: Science of Materials and Production
(Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

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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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Annotations

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

	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

- If a candidate alters his/her response, examiners should accept the alteration.
- 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

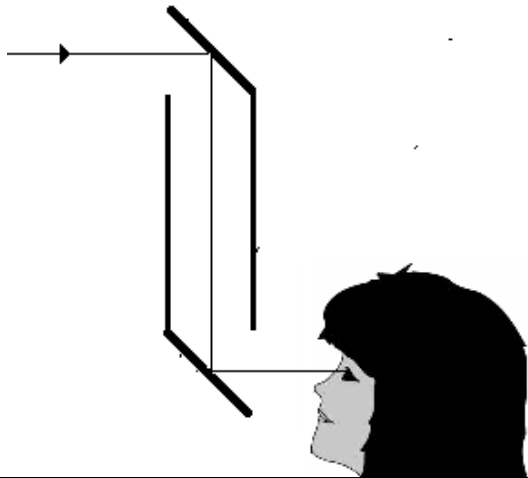
Question		Answer	Mark	Guidance
1	a	MgCO ₃ ; Na ₂ SO ₄ ;	1 1	in any order
	b	<p>[Level 3] Explains two linked processes in the procedure. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Describes two linked processes in the procedure. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Describes one process in the procedure. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] 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> <ul style="list-style-type: none"> • description of step <ul style="list-style-type: none"> • explanation for step <ol style="list-style-type: none"> 1. mix solutions together 2. to form (precipitate of) magnesium carbonate 3. pour through filter paper 4. to separate crystals/precipitate from solution 5. pour water through filter paper 6. to wash/clean the crystals 7. place filter paper in oven 8. to evaporate water <p>accept decanting instead of filtering</p>

Question		Answer	Mark	Guidance
2	a	there isn't one place that all of them ate;	1	accept not everyone ate the same thing not they all ate at more than one place not they all ate at different places
	b	EITHER poisoned food (probably) from Best Pizza Parlour; largest number of people (five) ate there; OR least likely to be at Fresh Fish (or Quick Pasta); only one person ate at each of these;	1 1	
	c	bacteria grow/reproduce in the food; their waste products are poisonous;	1 1	accept bacteria make poisons/toxins not bacteria spread
	d	any two of the following for [1] each: <ul style="list-style-type: none"> • named source food e.g. grape juice, milk • named product food e.g. wine, yogurt • name microorganism e.g. yeast, bacteria 	2	choose from: yeast convert fruit juice into wine yeast convert barley into beer yeast convert wheat into bread bacteria convert milk into yogurt / cheese

Question		Answer	Mark	Guidance
3	a	tension / tensile	1	
	b	csa = 78.5 mm ² ; bs = 509.55 N/mm ²	1 1	accept 509.5, 509.6, 509 or 510 accept ECF for incorrect csa used in bs for 1 mark
	c	Ref to safety; (large) margin/be able to take more than 100N/mm ² ;	1 1	
	d	i	1	accept value between 4.4kN and 4.8kN
		ii	1 1	ignore deformed unqualified

Question		Answer	Mark	Guidance
4	a	name of a composite material e.g. fibreglass, kevlar, concrete, plywood, reinforced glass; description of structure e.g. glass fibres in resin, spun polymer threads, stones in cement; 2 properties or drawbacks (overcome) of the materials in the composite e.g. strong, tough, brittle, soft;;	1	not alloy
			1	
			1	
			1	

Question		Answer	Mark	Guidance
5		<p>[Level 3] Suggests and explains a minimum of 2 descriptions of materials for either reflection and/or absorption linked to their locations. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p>	6	<p>This question is targeted at grades up to A*</p> <p>Indicative science points may include:</p> <p>reflection</p> <ul style="list-style-type: none"> • sound bounces off hard smooth surfaces • such as wood, concrete, brick • placed around stage and ceiling • allows more sound to reach audience <p>absorption</p> <ul style="list-style-type: none"> • sound is absorbed by soft rough surfaces • such as cloth, expanded plastic • placed on back and side walls, floor • to prevent echoes • which confuse sound reaching audience
		<p>[Level 2] Suggests a location and linked description of a material for either reflection or absorption and explains the choice. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p>		
		<p>[Level 1] Suggests a location and linked description of a material for either reflection or absorption. No valid explanation. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p>		
		<p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>		

Question		Answer	Mark	Guidance	
6	a		2	<p>ray continues to top mirror and reflects at 45 degrees (by eye) for [1]</p> <p>ray reflects off bottom mirror at 45 degree (by eye) and continues straight to the eye for [1]</p> <p>accept straight lines drawn without a ruler</p> <p>rays must meet at reflectors.</p>	
	b	i	converging transparent refracts diverging image	3	<p>all five correct for [3] any four correct for [2] any three correct for [1]</p>
		ii	yellow; blue is absorbed / only red and green transmitted/not absorbed	1 1	accept stage reflects red and green

Question		Answer	Mark	Guidance
7		<p>[Level 3] Explains 2 tests and/or 2 processes. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Explains a test or process. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Describes either a test or a process. No valid explanation. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to B.</p> <p>Indicative science points may include</p> <p>tests</p> <ul style="list-style-type: none"> • Resazurin for freshness <ul style="list-style-type: none"> • to protect consumers • fat/protein content for quality <ul style="list-style-type: none"> • to meet required standard <p>processes</p> <ul style="list-style-type: none"> • cool storage <ul style="list-style-type: none"> • to slow bacterial growth • hygienic milking conditions <ul style="list-style-type: none"> • to avoid contamination • pasteurisation / heat treatment <ul style="list-style-type: none"> • to kill bacteria • (ultra)filtering <ul style="list-style-type: none"> • to remove bacteria <p>Need to test milk so safe (to sell/drink) = L1</p>

Question		Answer	Mark	Guidance
8	a	total volume = 5.0 litre; concentration = 10 g/litre;	1	award [1] for 16.7 g/litre
	b	30 litres	1	
	c	technical - don't need the highest purity	1	

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