

# **Additional Applied Science A**

General Certificate of Secondary Education

Unit **A336/01**: Materials and Performance (Foundation Tier)

## **Mark Scheme for January 2013**

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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

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant – applies to neutral answers
<b>allow/accept</b>	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
Annotation	Meaning
	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

Annotation	Meaning
	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.

Eg

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

Put ticks (✓) in the two correct boxes.

✗
✗

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

✓
✗

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

✗
✗
✓
✓

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, eg 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, eg 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.

Eg If a question requires candidates to identify a city in England, then in the boxes

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

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).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Answer	Marks	Guidance
1	(a)		3	
	(b)		4	<b>allow</b> copper wire being flexible or ductile and flexible

Question		Answer	Marks	Guidance
	(c)	<p><b>clear indication of:</b> method of applying pure tension;</p> <p>how <b>known</b> force is applied;</p> <p>measure force which causes sample to snap;</p>	3	<p>cantilevers, beams or compression tests can only score on the last two marks</p> <p><b>allow</b> adding <b>known</b> weights</p> <p><b>allow</b> add weights until it breaks <b>but only allow</b> this mark if it is a sensible method eg no mark for dropping weights onto sample until it breaks</p> <p><b>reject</b> measurements of length, time, pressure</p>
<b>Total</b>			<b>10</b>	

Question		Answer	Marks	Guidance
2	(a)	<p>flower vase – lead glass;</p> <p>safe bus windows – toughened glass;</p> <p>sunglasses – photochromic glass;</p>	3	
	(b)	<p>mirror – reflective;</p> <p>bathroom window – translucent;</p> <p>camera lens – transparent;</p>	3	
<b>Total</b>			<b>6</b>	



Question		Answer	Marks	Guidance
3	(a)	valid use eg for security; to make space bigger / brighter	1	require indication of how mirror is used <b>allow</b> other purpose eg to check appearance / makeup <b>reject</b> a mirror property without any purpose eg 'to reflect' is a mirror property and not a use or purpose or a location with no indication of use eg 'in toilet'
	(b)	(i) rung around 100, 125	1	both 100 and 125 must be ringed to get the mark
		(ii) hearing loss	1	<b>accept</b> deafness
		(iii) decibel	1	
		(iv) name of material and whether it absorbs sound; how the material is used;	2	eg acoustic tiles absorb sound; cover the ceiling with tiles; carpet absorbs sound; put carpet on floor; (mirror) glass reflects sound; on outside of building
	(c)	(i)	1	
		PVC has low density. <input type="checkbox"/> PVC can be made in different colours. <input type="checkbox"/> PVC can be recycled. <input type="checkbox"/> PVC has a low electrical conductance. <input checked="" type="checkbox"/>		
		(ii)	1	
		Copper has low reactivity. <input type="checkbox"/> Copper has a high electrical conductance. <input checked="" type="checkbox"/> Copper is cheap. <input type="checkbox"/> Copper can be recycled. <input type="checkbox"/>		
		<b>Total</b>	<b>8</b>	

Question			Answer	Marks	Guidance
4	(a)	(i)	elastic;	1	<b>allow</b> elasticated, elastically, elasticity <b>reject</b> flexible
		(ii)	plastic;	1	<b>allow</b> plastically <b>reject</b> non-elastic or inelastic
	(b)	(i)	150 (N);	1	<b>allow</b> 145–155 (N)
		(ii)	1.2(%)	1	<b>allow</b> 1.1% to 1.3% <b>allow</b> ecf from 6bi
		(iii)	(yes) because (cloth) returns to its original shape up to 1.2% (stretch) / 1% is less than 1.2% / graph shows a straight line up to 1.2%	1	<b>allow</b> ecf from bii and bi only if all three parts are consistent <b>and</b> either: (yes) ecf values >150N, >1.2% reason as expected or: (no) because only returns to original shape up to ecf value / (no) because 1% is more than ecf value
			<b>Total</b>	<b>5</b>	

Question		Answer	Marks	Guidance
5	(a)	<div style="text-align: center;"> <input type="text" value="...the same as a pure metal."/> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px;">An alloy is...</div> <div style="border: 1px solid black; padding: 2px;">...a solid solution of elements in a metal.</div> </div> <div style="text-align: center; margin-top: 10px;"> <input type="text" value="...a complimentary material."/> </div> <div style="text-align: center; margin-top: 10px;"> <input type="text" value="...a composite material."/> </div>	1	
	(b)	hardness; less easily scratched / blunted OR stiffness; doesn't bend when used;	2	
	(c)	make it thicker/design shape carefully / use a different alloy	1	
	(d)	how experiment is set up by text or diagram how temperature change is measured; how expansion is measured;	3	
		<b>Total</b>	<b>7</b>	
		<b>Paper Total</b>	<b>36</b>	

**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](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

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**OCR (Oxford Cambridge and RSA Examinations)**  
Head office  
Telephone: 01223 552552  
Facsimile: 01223 552553

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