

Additional Applied Science A

General Certificate of Secondary Education

Unit **A336/02**: Materials and Performance (Higher Tier)

Mark Scheme for January 2012

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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 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.

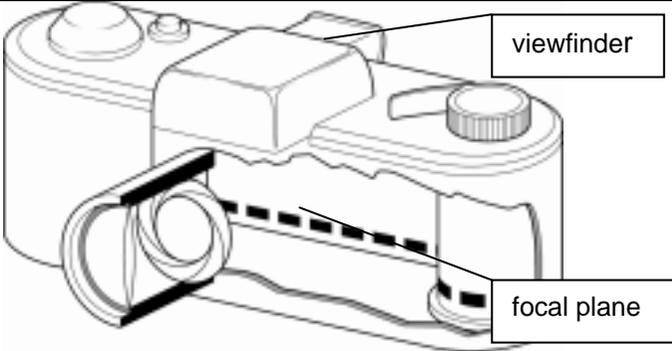
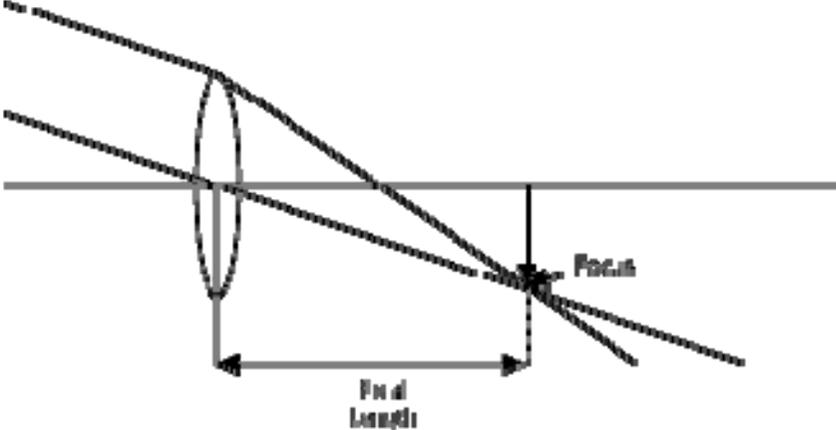
E.g. If a question requires candidates to identify a city in England, then in the boxes

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)	smooth curve through (all) points	1	must start at origin not a straight line
	(b) (i)	(temporary) loss of hearing	1	allow answers referring to environmental impact allow damage to hearing/ears/sound loss reject pain/hurts
	(ii)	causes pain/hurts	1	allow permanent deafness must be comparatively worse than b(i)
	(iii)	ringing in the ears/ hearing sound that isn't there/ hearing a whistling noise/buzzing	1	
	(c)	material; absorb/reflect as appropriate for material	1 1	for example, acoustic ceiling tiles/carpets/curtains/sponge/polystyrene/a cavity wall reject 'foam' reject open door/window reject traps sound
2	(a)	B	1	
	(b) (i)	three times	1	
	(ii)	C	1	
	(c)	increases time (for collision); force decreases	2	decreases rate of change of momentum worth 2

Question			Answer	Mark	Guidance
3	(a)	(i)		2	
		(ii)	to stop reflection; so more light passes through the lens;	1	
	(b)	 <p>focus: rays meet/cross at the focus (1);</p> <p>focal length: distance from the focus to the (centre of the) lens (1);</p>	3	<p>allow whether the image is clear or fuzzy</p> <p>allow where the image is on the diagram</p> <p>allow: distance from the lens to focal point or plane/where the rays cross/where you put the film</p>	

Question		Answer	Mark	Guidance
		power shows: how strong the lens is/ how much lens alters direction of ray(s) / the focal length (1)		if the diagram contradicts the explanation, then zero allow: the number of dioptres/ how many dioptres allow a connection demonstrated between power and focal length reject power = focal length
	(c)	(i) image of car is larger (1) image is out of focus/ blurred (1)	2	
		(ii) move lens towards object/away from the film	1	
4	(a)	(i) substitute pair of coordinates at $F = 20\text{N}$ in $F=kx$ (1) evaluate $k= 2.7$ (1) N/mm (1)	3	allow $7.3 < x < 7.5$ allow ecf from own value of x
		(ii) 12.6 ± 0.2	1	
		(iii) outside the range of measurement/outside elastic limit/may behave differently/may have snapped/may be plastic	1	
	(b)	pair of materials (1); property (1); situation (1)	3	clothing being worn, body and cloth; flexibility matches; false joint, bone and metal; strength matches if not 'mechanical property' zero marks
5		material A and material B have same thermal behaviour;(1) so that they expand at the same rate so not come loose or be damaged;(1) C expands when hot (1) to stop the cap being removed (1)	4	owtte
6		complete circuit including cell and sample; ammeter in series with sample; voltmeter in parallel with sample; use $G = I/V$ to work out the electrical conductance	4	allow 'lamp' symbol for sample
Total			36	

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