

# **Additional Applied Science A**

General Certificate of Secondary Education **A325/01**

Unit 3: Scientific Detection (Foundation Tier)

## **Mark Scheme for June 2010**

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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.

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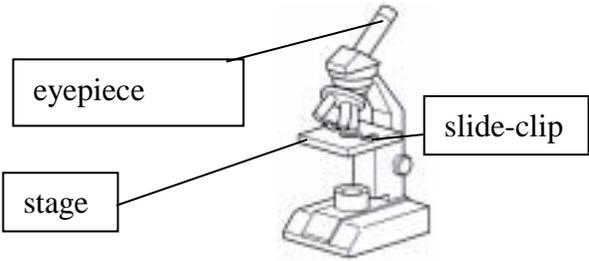
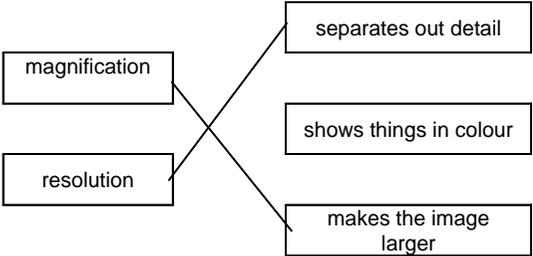
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Question		Expected Answer	Mark	Rationale/Additional Guidance										
1	a	<table border="1"> <tr> <td>collect representative samples</td> <td><input type="checkbox"/></td> </tr> <tr> <td>copy samples for multiple use</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>prevent change or deterioration to samples</td> <td><input type="checkbox"/></td> </tr> <tr> <td>avoid contamination of samples</td> <td><input type="checkbox"/></td> </tr> <tr> <td>avoid interfering with samples</td> <td><input type="checkbox"/></td> </tr> </table>	collect representative samples	<input type="checkbox"/>	copy samples for multiple use	<input checked="" type="checkbox"/>	prevent change or deterioration to samples	<input type="checkbox"/>	avoid contamination of samples	<input type="checkbox"/>	avoid interfering with samples	<input type="checkbox"/>	[1]	<p>if more than one box is ticked then candidate scores zero.</p> <p><b>allow</b> any indication of correct response.</p>
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	b	i	<table border="1"> <tr> <td>to ensure good working conditions</td> <td><input type="checkbox"/></td> </tr> <tr> <td>so everyone has equal pay</td> <td><input type="checkbox"/></td> </tr> <tr> <td>to maintain reliability</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>to save money</td> <td><input type="checkbox"/></td> </tr> </table>	to ensure good working conditions	<input type="checkbox"/>	so everyone has equal pay	<input type="checkbox"/>	to maintain reliability	<input checked="" type="checkbox"/>	to save money	<input type="checkbox"/>	[1]	<p>if more than one box is ticked then candidate scores zero.</p> <p><b>allow</b> any indication of correct response.</p>	
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		ii	<table border="1"> <tr> <td>to ensure workers pass their cycling proficiency test</td> <td><input type="checkbox"/></td> </tr> <tr> <td>to check the quality of their work</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>to ensure that they make sufficient profit</td> <td><input type="checkbox"/></td> </tr> <tr> <td>to make sure the test is the same every time</td> <td><input type="checkbox"/></td> </tr> </table>	to ensure workers pass their cycling proficiency test	<input type="checkbox"/>	to check the quality of their work	<input checked="" type="checkbox"/>	to ensure that they make sufficient profit	<input type="checkbox"/>	to make sure the test is the same every time	<input type="checkbox"/>	[1]	<p>if more than one box is ticked then candidate scores zero.</p> <p><b>allow</b> any indication of correct response.</p>	
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Question		Expected Answer	Mark	Rationale/Additional Guidance														
	<b>c</b>	<table border="1"> <tr> <td>keeping to health and safety regulations</td> <td>✓</td> </tr> <tr> <td>painting the laboratory every two years</td> <td></td> </tr> <tr> <td>having a good internal telephone system</td> <td></td> </tr> <tr> <td>updating the computers to the latest models every twelve months</td> <td></td> </tr> <tr> <td>paying for employees' lab-coats to be washed and replaced</td> <td></td> </tr> <tr> <td>regular maintenance and checking of equipment</td> <td>✓</td> </tr> <tr> <td>training and professional development of staff</td> <td>✓</td> </tr> </table>	keeping to health and safety regulations	✓	painting the laboratory every two years		having a good internal telephone system		updating the computers to the latest models every twelve months		paying for employees' lab-coats to be washed and replaced		regular maintenance and checking of equipment	✓	training and professional development of staff	✓	<b>[3]</b>	<p>if more than three boxes are ticked then minus 1 mark for each incorrect response. candidates cannot score less than zero.</p> <p><b>allow</b> any indication of correct response</p>
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		<b>Total</b>	<b>[6]</b>															

Question		Expected Answer	Mark	Rationale/Additional Guidance
2	a	 <p>The diagram shows a light microscope. Three boxes with arrows point to specific parts: 'eyepiece' points to the top lens, 'stage' points to the platform where the slide sits, and 'slide-clip' points to the mechanism that holds the slide in place.</p>	[2]	3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
	b	20 x 40; 800;	[2]	800 = 2 marks
	c	 <p>The diagram shows two boxes on the left: 'magnification' and 'resolution'. Three boxes on the right describe functions: 'separates out detail', 'shows things in colour', and 'makes the image larger'. Arrows connect 'magnification' to 'separates out detail' and 'makes the image larger'. Arrows connect 'resolution' to 'separates out detail' and 'shows things in colour'.</p>	[2]	1 mark for each connection  multiple lines going to more than one box does not score for that connection
<b>Total</b>			[6]	

Question		Expected Answer	Mark	Rationale/Additional Guidance
3	a		[2]	<p>1 mark for each correct object circled</p> <p>if more than two objects are circled then minus 1 mark for each incorrect response. Candidates cannot score less than zero.</p> <p><b>allow</b> any indication of correct response</p> <p><b>ignore</b> any circles on photo 2</p>
	b	20; cm;	[2]	<b>allow</b> 19 to 21
	c	sketch / draw; written / notes / voice recorder;	[2]	<b>ignore</b> video / photos / CCTV / computers
		<b>Total</b>	[6]	

Question		Expected Answer	Mark	Rationale/Additional Guidance										
4	a	<table border="1"> <tr> <td>electrons only</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>light only</td> <td><input type="checkbox"/></td> </tr> <tr> <td>both electrons and light</td> <td><input type="checkbox"/></td> </tr> <tr> <td>neither electrons or light</td> <td><input type="checkbox"/></td> </tr> </table>	electrons only	<input checked="" type="checkbox"/>	light only	<input type="checkbox"/>	both electrons and light	<input type="checkbox"/>	neither electrons or light	<input type="checkbox"/>	[1]	<p>if more than one box is ticked then candidate scores zero.</p> <p><b>allow</b> any indication of correct response.</p>		
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	b	<table border="1"> <tr> <td>negative nucleus surrounded by positive electrons</td> <td><input type="checkbox"/></td> </tr> <tr> <td>positive nucleus surrounded by positive electrons</td> <td><input type="checkbox"/></td> </tr> <tr> <td>negative nucleus surrounded by negative electrons</td> <td><input type="checkbox"/></td> </tr> <tr> <td>positive nucleus surrounded by negative electrons</td> <td><input checked="" type="checkbox"/></td> </tr> </table>	negative nucleus surrounded by positive electrons	<input type="checkbox"/>	positive nucleus surrounded by positive electrons	<input type="checkbox"/>	negative nucleus surrounded by negative electrons	<input type="checkbox"/>	positive nucleus surrounded by negative electrons	<input checked="" type="checkbox"/>	[1]	<p>if more than one box is ticked then candidate scores zero.</p> <p><b>allow</b> any indication of correct response</p>		
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	c	<table border="1"> <tr> <td>very thick specimens</td> <td><input type="checkbox"/></td> </tr> <tr> <td>living organisms</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>specimens that are opaque</td> <td><input type="checkbox"/></td> </tr> <tr> <td>moving objects</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>specimens that are very hard</td> <td><input type="checkbox"/></td> </tr> </table>	very thick specimens	<input type="checkbox"/>	living organisms	<input checked="" type="checkbox"/>	specimens that are opaque	<input type="checkbox"/>	moving objects	<input checked="" type="checkbox"/>	specimens that are very hard	<input type="checkbox"/>	[2]	<p>if more than two boxes are ticked then minus 1 mark for each incorrect response. Candidates cannot score less than zero.</p> <p><b>allow</b> any indication of correct response</p>
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	d	<p>cost / size / idea of hard to use or prepare;</p> <p>magnification / larger image / resolution / detail / depth of field / 3D images;</p>	[2]	<p><b>ignore</b> any of the five statements used in part (c)</p> <p><b>ignore</b> colour</p> <p><b>allow</b> can examine <u>surface detail</u> of thick specimens <b>allow</b> &gt;X 1200 <b>ignore</b> more powerful / precise / zoom in more / clearer / accurate</p>										
		<b>Total</b>	<b>[6]</b>											

Question			Expected Answer	Mark	Rationale/Additional Guidance
5	a	i		[1]	
		ii	3;	[1]	<b>allow</b> DEF
		iii	6;	[1]	<b>allow</b> ABCDEF
		iv	A, (C and E);	[1]	<b>allow</b> A alone A & E A & C no other letters
	b			[2]	1 mark for each connection  multiple lines going to more than one box does not score for that connection
	c		to be able to identify unknown dye;	[1]	<b>allow</b> idea of match up with dyes they don't know <b>ignore</b> used as reference / accurate / reliable
			<b>Total</b>	[7]	

Question			Expected Answer	Mark	Rationale/Additional Guidance
6	a	i	C / C and D;	[1]	reject D on its own
		ii	B;	[1]	
	b	i	<pre> graph LR   A[red turns to blue] --- B[acidic]   C[neither colour changes] --- D[neutral]   E[blue turns to red] --- F[alkaline] </pre>	[2]	3 correct lines = 2 marks. 1 or 2 correct lines = 1 mark
		ii	qualitative;	[1]	
<b>Total</b>				<b>[5]</b>	
<b>Paper Total</b>				<b>[36]</b>	

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