OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

Unit **A216/02:** Modules B5, C5, P5 (Higher Tier)

Mark Scheme for January 2011

Oxford Cambridge and RSA Examinations

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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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Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.

2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.

3. Accept any clear, unambiguous response which is correct, eg mis-spellings if phonetically correct (but check additional guidance).

4. Abbreviations, annotations and conventions used in the detailed mark scheme:

/	=	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

eg mark scheme shows 'work done in lifting/(change in) gravitational potential energy' (1)
"work done" = 0 marks
"work done lifting" = 1 mark
"change in potential energy" = 0 marks
"gravitational potential energy" = 1 mark

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

6. 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.

The example below illustrates how to apply this principle to an objective question.

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 zero marks.

Put ticks (✓) in the two correct boxes.

This would be worth one mark.

Put ticks (✓) in the two correct boxes.

This would be worth one mark.

7. 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.

8. 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

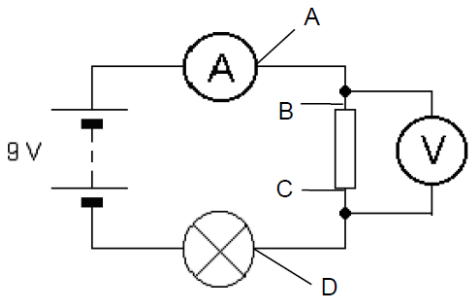
Edinburgh	
Manchester	
Paris	
Southampton	

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

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

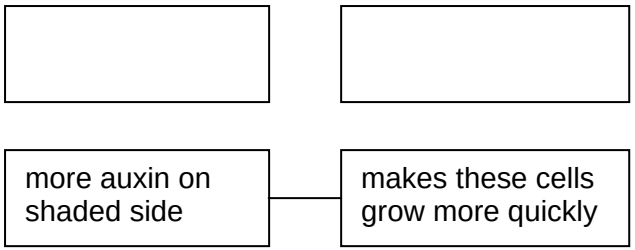
Question			Expected Answers	Marks	Additional Guidance
1	(a)		nitrogen (1)	[1]	
	(b)		**Any three from:** • forces between molecules are weak (1); • molecules are small (1); • (molecules) easy to separate/break bonds/ overcome forces between/ move apart (1); • gives a reason for condensation at low temperature – eg less energy, slower speed of molecular movement (1)	[3]	
			Total	[4]	
2	(a)	(i)	iron oxide + carbon ➔ iron + carbon dioxide	[2]	Left hand side iron oxide and carbon in either order. Right hand side iron and carbon dioxide in either order. All four boxes correct = 2 marks Any two or three boxes correct = 1 mark **Allow** carbon monoxide or carbon oxide as alternatives to carbon dioxide. **Reject** chemical symbols.
		(ii)	oxidised reduced	[1]	**Both** must be correct for one mark. Accept other forms of the verbs, eg oxidisation, oxidising if clear.
		(iii)	3 (1) 2 (1)	[2]	
	(b)		magnesium, aluminium, calcium (1)	[1]	**Accept** in any order. If lead, cobalt or iron is one of the three, then no marks.
			Total	[6]	
3	(a)		3 (1)	[1]	
	(b)		$\frac{44}{12} \times 92$ (1)	[1]	
	(c)	(i)	l aq aq	[1]	All correct for one mark; allow upper case letters L, AQ. **Ignore** any brackets.
		(ii)	(electrical) conductivity (1)	[1]	**Ignore** pH, electrolysis.
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
4	(a)		the magnet spins/rotates/turns inside the coil (1) called (electromagnetic) induction (1)	[2]	**Not** moving the magnet in and out of the coil. **Accept** induced, but **not** electromagnetic on its own. **Accept** coil spinning as alternative to magnet spinning.
	(b)		**Any two from:** • spin the magnet faster (1); • use a stronger magnet (1); • more (turns of) wire in the coil (1); • put iron inside the coil (1)	[2]	Apply list principle if more than two suggestions given (General guidance point 8). **Accept** spin/move coil faster as alternative to spin the magnet faster. **Not** bigger magnet, more magnets. **Accept** larger coil.
			Total	[4]	
5	(a)		☐ The current in the lamp heats it up. ☑ (1) The battery pushes charges... ☑ (1) ☐ ☐	[2]	
	(b)		0.5 A (1)	[1]	
	(c)		series increases	[1]	Both correct = 1 mark
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
6	(a)		current is (rate of) flow of charge/electrons/all parts of circuit have mobile charges (1); only one path for charge/current **or** charges/electrons are not used up as they enter and leave components (1)	[2]	First marking point is realising that current is due to charges moving. Second marking point is either realising that charges do not get used up or lost, or that there are no branches/parallel circuits for them to go elsewhere
	(b)	(i)		[1]	Look for a correct symbol (circle with V inside), connected to either side of the resistor only. One lead must connect between points A and B. The other lead must connect between points C and D. The voltmeter may be drawn either inside or outside the circuit
		(ii)	6 Ω (1)	[1]	
			Total	[4]	
7			electrons positive repel identical	[2]	All four correct = 2 marks Any two or three correct = 1 mark
			Total	[2]	

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>8</td><td>(a)</td><td>(i)</td><td>meiosis, half the/23
mitosis, the same/46</td><td>[2]</td><td>All four correct = 2 marks
Two or three correct = 1 mark
One correct = 0 marks</td></tr>
<tr><td></td><td></td><td>(ii)</td><td><table><tr><td></td><td></td></tr><tr><td>Cell growth</td><td>Cell division</td></tr><tr><td>A
C
D</td><td>B</td></tr><tr><td></td><td></td></tr></table></td><td>[2]</td><td>All four correct = 2 marks
Two or three correct = 1 mark
One correct = 0 marks</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Vick and Andrew (1)</td><td>[1]</td><td>Both names correct in either order = 1 mark</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[5]</td><td></td></tr>
<tr><td>9</td><td>(a)</td><td></td><td>stem (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>(plant/growth) hormone (1)</td><td>[1]</td><td>Accept auxin</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Some unspecialised cells...tissues. ☑ (1)
Some unspecialised cells...organs. ☑ (1)
☐
☐
☐</td><td>[2]</td><td>Correct pattern for [2]
One mistake for [1]

A mistake is
• an extra tick
• a missing tick
• a tick in the wrong place</td></tr>
</table>

Question			Expected Answers	Marks	Additional Guidance
	(d)			[1]	If more than the one correct link is drawn, no marks.
			Total	[5]	
10	(a)		double helix (1)	[1]	**Do not accept** "helix" or 'spiral helix': must be double helix owtte
	(b)		**Any three from:** links DNA code to order of bases (1); (DNA stays where it is and) the code carried by a copy (of the gene)/RNA (1) sites – to the cytoplasm/ribosomes (1) type – amino acids/protein is made (1)	[3]	Neutral – DNA is in the nucleus. May list A,T/U,C,G or may state that pairs match for this mark.
			Total	[4]	

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