GCSE

Science A

General Certificate of Secondary Education

Unit **A213/01:** Unit 3: Modules B3, C3, P3 (Foundation 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.

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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
   <u>words</u>   = 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 <u>lifting</u>/(change in) <u>gravitational</u> 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.	Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.
☐	☐	✗
☐	☐	✗
✓	✗	✓
✗	✗	✓
☐	☐	☐
This would be worth zero marks.	*This would be worth one mark.*	*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)	<table><tr><td></td><td>true</td><td>false</td></tr><tr><td>Nuclear weapons ...</td><td>✔</td><td></td></tr><tr><td>The dose from rocks and ...</td><td></td><td>✔</td></tr><tr><td>Radon gas is the largest ...</td><td>✔</td><td></td></tr><tr><td>The dose from space ...</td><td></td><td>✔</td></tr></table>	[2]	All rows correct = 2 marks Two or three rows correct = 1 mark
(b)	☐ ☐ radiotherapy to treat cancer ☑ (1) ☐	[1]	Tick in any other box = 0 marks
(c)	**Any 3 from:** • any clear reference to data or bar size in graph; • dose from nuclear power very small/the least/lowest; • other bigger sources of dose; • risk/chance of getting cancer is low/unlikely to get cancer	[3]	One mark for each point. **Allow** reference to 8 bars. **Allow** reference to microsieverts. **Allow** also any discussion of the effect of distance.
	Total	[6]	
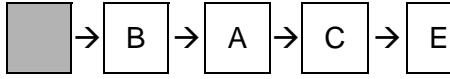
Question	Expected Answers	Marks	Additional Guidance
2 **(a)**	☐ ☐ ☐ ... is more penetrating ... ✓ (1)	**[1]**	Tick in any other box = 0 marks
(b)	A pipe in the desert. ✓ (1) ☐ ☐ ☐	**[1]**	Tick in any other box = 0 marks
(c)	**Any two from:** • protective clothing qualified by reference to <u>lead</u>; • shielded (by cabin/screen); • reference to distance from source; • tongs or other handling tools; • thick (lead) case to hold sources in transport; • regular checks for dose/wearing dosimeter badges ; • regular health and safety checks; • regular task changes/rota; • limit time of exposure; • training in the above	**[2]**	Allow other room.
	Total	**[4]**	

Question			Expected Answers	Marks	Additional Guidance
3	**(a)**		□ → B → A → C → E	**[2]**	D not used. Give mark as long as at least 3 boxes have been completed (1). A immediately before C (1). Allow marks for correct answers if words from sentences used rather than letters. eg 'turns turbine' = A
	(b)		All the carbon in plants... ☑ (1) □ All the carbon dioxide given off... ☑ (1) □ □	**[2]**	One mark for each correct answer. If 3 ticks given, deduct 1 mark 4 or 5 ticks = 0 marks
			Total	**[4]**	

Question			Expected Answers	Marks	Additional Guidance
4	**(a)**		**Any two from:** • falls (from 1963 to 2001)/overall downward trend/ • rises until 1970/275000 tonnes fish/rises then falls; • falls from 1971 (to 2001); • small rise around 1981/ small rise around 1974/ small rise around 1997/ fluctuates/goes up and down; • falls below the minimum population advised by scientists;	**[2]**	**Allow** + or − 1 year/+ or − 10000 tonnes **Ignore** ref to other years.
	(b)	**(i)**	dodo, quagga or any suitable example (1)	**[1]**	**Allow** mammoth. **Allow** hominids other than Homo sapiens.
		(ii)	<u>biodiversity</u> (1): prevent extinction/prevent dying out/reduction in numbers of species <u>food webs</u> (1): effect on other species <u>resources</u> (1): idea of maintaining such things as food, medicines, fibres, energy sources, ores, supply of materials	**[3]**	 **Ignore** 'damage to food chain/web'. **Allow** recycling to preserve resources. **Ignore** maintaining resources/resources will run out.
			Total	**[6]**	

Question			Expected Answers	Marks	Additional Guidance
5	(a)		☐ ☐ H. *habilis* lived longest ago... ☑ (1) ☐	[1]	Tick in any other box = 0 marks
	(b)	(i)	☐ ☐ ☐ ☐ H. *floresiensis* ☑ (1)	[1]	Tick in any other box = 0 marks
	(c)		common ancestor (1) extinct (1)	[2]	1 mark for each correct word.
	(d)	(i)	☐ ☐ 3 500 million years ago ☑ (1) ☐ ☐	[1]	Tick in any other box = 0 marks

Question			Expected Answers	Marks	Additional Guidance
5	(d)	(ii)	natural selection (1) variation (1) genes (1)	**[3]**	1 mark for each correct word.
			Total	**[8]**	
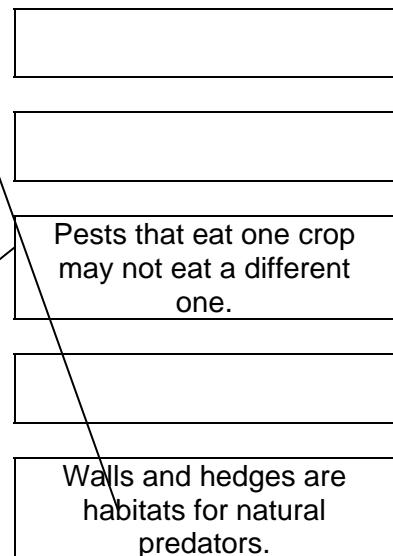
Question			Expected Answers	Marks	Additional Guidance
6	(a)		Doctors have better methods ... ✓ (1) More people are obese ... ✓ (1)	**[2]**	If three ticks given, deduct 1 mark. Four or five ticks = 0 marks
	(b)		don't know/understand about risk of diabetes (1) enjoy eating/not exercising/don't like healthy foods (1)	**[2]**	Ignore answers relating to the benefits of healthy eating.
	(c)		different because of age of onset/treatment/reason (1) explanation for the difference (1)	**[2]**	One mark for one way in which the two types of diabetes are different. One mark for explanation giving information from table below. **Allow** one mark for detail of type 1 diabetes and 1 mark for **complementary** detail of type 2 diabetes, as per the table (ie do not mix and match) **Type 1 / Type 2** pancreas not making insulin / body/cells not using insulin usually in young people / usually develops in adults treated by insulin injections / treated by diet and exercise Ignore references to genetics.
			Total	**[6]**	

Question			Expected Answers	Marks	Additional Guidance
7	(a)		D (1)	**[1]**	
	(b)		A and C (1)	**[1]**	**Both** answers in either order for one mark.
			Total	**[2]**	

Question			Expected Answers	Marks	Additional Guidance
8	(a)	(i)	Barry and Anwar (2)	**[2]**	One mark for each name in either order.
		(ii)	Barry (1)	**[1]**	
		(iii)	Donna (1)	**[1]**	
	(b)			**[2]**	One mark for each correct line. If more than one line is drawn from either or both left hand boxes, ignore that box.

Fields are smaller

Crops are rotated

Pests that eat one crop may not eat a different one.

Walls and hedges are habitats for natural predators.

| | | | **Total** | **[6]** | |

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