

Science A

General Certificate of Secondary Education

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

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
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
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

- Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- 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 the third and fourth boxes are required for the mark:

☐
☐
☒
☒
☐

*This would be worth
1 mark.*

☐
☐
☒
☒
☐

*This would be worth
0 marks.*

☒
☒
☒
☒
☐

*This would be worth
1 mark.*

- 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-box questions:

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 and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. 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 cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

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

e. For answers marked by levels of response:

i. **Read through the whole answer from start to finish**

ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor

iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

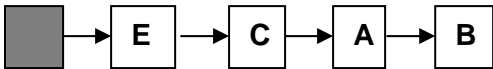
- iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			Answer	Marks	Guidance
1	(a)		<div style="display: flex; justify-content: space-between; align-items: center;"> <div>Gamma is more penetrating</div> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> </div> <div style="text-align: right;">(1)</div>	1	Tick in any other box = 0 marks
	(b)		<div style="display: flex; justify-content: space-between; align-items: center;"> <div>A pipe in the desert.</div> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> </div> <div style="text-align: right;">(1)</div>	1	tick in any other box = 0 marks
	(c)		Any two from: <ul style="list-style-type: none"> • protective clothing; • 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 1 example – e.g. gloves, suit, mask allow - go into other room
			Total	4	

Question			Answer	Marks	Guidance
2	(a)		<div> <div>Nuclear weapons give a tiny fraction</div> <div><input checked="" type="checkbox"/></div> <div><input type="checkbox"/></div> </div> <div> <div>The dose from rocks and buildings is.....</div> <div><input type="checkbox"/></div> <div><input checked="" type="checkbox"/></div> </div> <div> <div>The dose from space is more than</div> <div><input type="checkbox"/></div> <div><input checked="" type="checkbox"/></div> </div> <div> <div>Radon gas is the largest cause of radiation</div> <div><input checked="" type="checkbox"/></div> <div><input type="checkbox"/></div> </div>	3	all rows correct = 3 marks three rows correct = 2 marks two rows correct = 1 mark
	(b)		<div> <div>Radiotherapy to treat cancer</div> <div><input type="checkbox"/></div> <div><input checked="" type="checkbox"/></div> <div>(1)</div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div> </div>	1	tick in any other box = 0 marks
	(c)		Any 3 from: <ul style="list-style-type: none"> any clear reference to data or bar size in graph; dose from nuclear power very small/the least/lowest; other bigger sources of dose/stated example from graph; risk/chance of getting cancer is low/unlikely to get cancer. 	3	one mark for each point. allow reference to microsieverts e.g. not many μSv , or a value (less than 10) in μSv . not NO risk or chance of getting cancer allow also any discussion of the effect of distance.
			Total	7	

Question			Answer	Marks	Guidance
3	(a)			2	D not used. Give mark as long as at least 3 boxes have been completed (1) C immediately before A (1) allow marks for correct answers if words from sentences used rather than letters eg 'turns turbine' = C
	(b)		<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div> <div> All the carbon dioxide ...comes from burning plants All the carbon in plants comes from the atmosphere. </div>	2	one mark for each correct answer. if 3 ticks given, deduct 1 mark 4 or 5 ticks = 0 marks
			Total	4	

Question			Answer	Marks	Guidance
4	(a)		herring	1	one mark for correct response accept incorrect spelling if intention clear more than one response from the list = 0 ignore words not from list
	(b)		Cecily	1	one mark for correct response accept incorrect spelling if intention clear more than one name = 0.
	(c)	(i)	Food chains always start with plants <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	one mark for correct response more than one response = 0
		(ii)	 <input type="checkbox"/> <input type="checkbox"/> There will be fewer mackerel..... <input checked="" type="checkbox"/>	1	one mark for correct response more than one response = 0
			Total	4	

Question			Answer	Marks	Guidance
5	(a)		extinct: Upright man / Heidelberg man / Neanderthal man not extinct: Modern man	1	one mark for a correct response for BOTH any incorrect response given = 0 mark
	(b)		Upright man <div><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div>	1	one mark for correct response more than one response = 0
	(c)	(i)	A and D	1	both needed for one mark (either order)
		(ii)	B	1	accept any clear indication of correct response more than one response = 0
			Total	4	

Question			Answer	Marks	Guidance
6	(a)		any two from: religious conviction; natural selection/evolution is too slow to observe; did not like the idea that they were evolved from "apes"; insufficient evidence; lack of knowledge of a genetic mechanism;	2	two clearly distinct arguments allow "not enough time for it to have happened" accept already had an explanation they were satisfied with/did not want to accept new ideas ignore 'no evidence/proof'
	(b)		Any three from: variation not all the males have the same size tails/same number eyespots; competition males compete for mates/females prefer males with bigger tails/more eyespots; reproduction (selected) males are more likely to reproduce; evolutionary consequence passing on genes for bigger tails (so tail size increases over time);	3	allow reverse arguments 'females prefer to mate with males with most eyespots' is a quote but gets points 1 & 2 NB 'males with bigger tails/more eyespots are more likely to reproduce' = 2 marks (marking points 1 & 3) accept offspring will have bigger tails
			Total	5	

Question			Answer	Marks	Guidance
7	(a)		<div>colouring <input type="checkbox"/></div> <div>flavouring <input type="checkbox"/></div> <div>vegetable oil <input checked="" type="checkbox"/></div> <div>sugar <input type="checkbox"/></div> <div>water <input checked="" type="checkbox"/></div>	2	each correct answer = 1 mark if three ticks made deduct 1 mark four or five ticks = 0 marks allow any other indication of correct response eg underlining, cross, shading
	(b)	(i)	any one additive and explanation from: sweetener (1) – reduce amount of sugar (1); preservative (1) – keep food safe (1); antioxidant (1) – stop reaction with oxygen (1); colouring (1) – make more attractive (1); stabilisers (1) – maintain the consistency of the food (1) flavourings (1) – improve the taste (1)	2	one additive plus one mark for clear explanation of its use (ignore ref to emulsifiers) explanation must be linked to additive. ignore “to taste sweet” ignore references to named substances eg salt, E numbers, (the only exception is E162) allow other descriptions of use – eg for preservative “stops it going mouldy” “stops it going off” allow replace colours lost (in processing) reject explanations using the word from the additive eg preservatives – preserves food
	(b)	(ii)	<div>They have passed a safety test <input checked="" type="checkbox"/> <input type="checkbox"/></div> <div>They all supply energy to the body <input type="checkbox"/> <input checked="" type="checkbox"/></div> <div>They are approved for use in the UK <input checked="" type="checkbox"/> <input type="checkbox"/></div> <div>They are never harmful <input type="checkbox"/> <input checked="" type="checkbox"/></div>	2	all four boxes correct = 2 marks three or two correct = 1 mark allow any other indication of correct response eg underlining, cross, shading

Question			Answer	Marks	Guidance
	(c)		<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; width: 100px; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 30px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">carbohydrate</div> <div style="border: 1px solid black; padding: 2px 5px;">only C, O and H</div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">protein</div> <div style="border: 1px solid black; width: 100px; height: 30px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 100px; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; padding: 2px 5px;">C, O, N and H</div> </div>	2	1 mark for each correct line if two lines drawn from either left hand box = 0 marks for that box
			Total	8	

Question			Answer	Marks	Guidance
8			cook at high temperatures/heat up to high temperatures (1) keep food in fridge/freezer before use (1) use preservatives eg salt/vinegar (1) references to preparation – wash food/wash hands-clean surfaces (1) keep foods separate (to avoid cross-contamination) (1)	2	accept cook thoroughly/properly ignore “keep at high temperatures” ignore just “heat it” accept keep at low temperatures/keep cool allow 'eat by sell-by date' or equivalent ignore – cover food allow use of radiation to kill bacteria
			Total	2	

Question			Answer	Marks	Guidance
9	(a)		Laura (1)	1	
	(b)		Gabriel (1); Craig (1)	2	either order
	(c)		any one from: no/little exercise; being obese; alcohol (consumption); smoking; stress; medications (not just drugs);	1	not just “exercise” watch out for answers which suggest ways of reducing risk – take more exercise, cut down on smoking etc.
			Total	4	

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