OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A
Twenty First Century Science

General Certificate of Secondary Education **J630**

Mark Scheme for the Units

January 2008

J630/MS/R/08J

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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GCSE Science A Twenty First Century (J630)

MARK SCHEMES FOR THE UNITS

Guidance for Examiners

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   Each separate marking point is indicated by (1) at the end of that marking point.

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	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
allow	=	answers that can be accepted
( )	=	words which are not essential to gain credit
__	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW / owtte	=	alternative wording
ora	=	or reverse argument

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'
work done = 0 marks
work done lifting = 1 mark
change in potential energy = 0 marks
gravitational potential energy = 1 mark

5   Annotations: the following annotations are available on SCORIS.

✓	=	correct response
✗	=	incorrect response
bod	=	benefit of the doubt
nbod	=	benefit of the doubt **not** given
ECF	=	error carried forward
^	=	information omitted
I	=	ignore
R	=	reject

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

7   The list principle: if a list of responses greater than the number requested is given, you 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, i.e. 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.

1

8   Marking method for tick boxes:
     If there is a set of boxes, some of which should be ticked and others left empty, then you
     need to judge the entire set of boxes.

     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). For a two-mark
question, the rationale would be:
         All boxes are indicated scores 0 marks.
         All boxes blank scores 0 marks.
         All four boxes correct scores 2 marks.
         Three boxes correct scores 1 mark.
         Two boxes correct scores 1 mark.

Edinburgh			✔			✔	✔	✔	✔	
Manchester	✔	✘	✔	✔	✔				✔	
Paris				✔	✔		✔	✔	✔	
Southampton	✔	✘		✔		✔	✔		✔	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

Mark Scheme A211/01 Modules B1, C1, P1 Foundation

Question			Expected Answers	Marks	Rationale
1	a		made of several layers [T] (1) middle is called the mantle [F] (1) outside layer is called the crust [T] (1) made of tectonic plates [T] (1)	4	**allow** ✓ for T **and** x for F second box blank does **not** count as F
	b		mountains occur where plates meet [✓] seafloor spreading [✓] volcanoes and earthquakes [✓]	2	if all 5 boxes are ticked, award no marks. if 4 boxes are ticked, deduct 1 mark from the score all three correct: 2 marks two correct: 1 mark one correct does not get a mark. **allow** T for ✓, F for blank. NB Two correct ticks = 1 mark, **not** two!
			Total	**6**	

Question			Expected Answers	Marks	Rationale
2	a		Shapley Curtis both [✓] [ ] [ ] (1) [✓] [ ] [ ] (1) [ ] [✓] [ ] (1) [ ] [ ] [✓] (1)	4	one mark for **each correct row** do not give a mark for any row with more than one tick
	b		supports Curtis [✓] (1)	1	no extra ticks allowed.
	c		galaxies (1) away (from us) (1)	2	**allow** any clear indication of choice.
	d		14 000 million (1)	1	**allow** any clear indication of choice.
			Total	**8**	
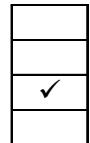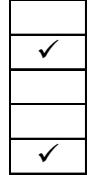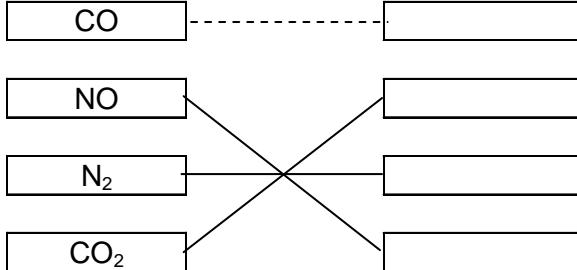
Question			Expected Answers	Marks	Rationale
3	**a**		E C B A D F C before B (1) B before A (1) A before D (1)	3	if any letter appears more than once, treat that letter as a blank in each occurrence. If lower case b and d (for example) cannot be distinguished, treat them as the same
	b	**i**	increase chance of cancer ✓ reach the age of thirty ✓	1	**both** correct (plus two blanks) for the one mark
		ii	80% with breast cancer genes ✓ (1)	1	no extra ticks allowed.
		iii	Andy (1)	1	**allow** any clear indication of choice cannot have two (or more) names
			Total	**6**	

Question			Expected Answers	Marks	Rationale
4	**a**		one copy (1) two copies (1) DNA (1)	3	**allow** '1 copy', 'one' or other clear indication of correct choice **allow** '2 copies', 'two' or other clear indication of correct choice
	b		XY / X and Y (1)	1	either order **not** 'X or Y'
	c		because she donated the egg ✓ (1)	1	no extra ticks allowed
	d		Jayne ✓ (1) Sean ✓ (1) Alison ✓ (1)	3	if all 5 boxes are ticked, award no marks if 4 boxes are ticked, deduct 1 mark from the score one mark for each correct choice
			Total	**8**	

Question			Expected Answers	Marks	Rationale
5	**a**		below below pass	2	3 correct: 2 marks 2 correct: 1 mark 1 correct : no marks NB two correct ticks = 1 mark **not** two
	b		carbon dioxide and carbon monoxide (1) oxygen …… water (1)	2	CO_2 and CO - either order **allow** O or O_2 for oxygen, H_2O for water - order important both chemicals needed for each mark
	c	**i**	lies well outside the range ☐☐✓☐☐ (1)	1	no extra ticks allowed
		ii	0.02 to 0.04 / 0.02 – 0.04 / 0.02, 0.04 / 0.04 to 0.02 / 0.04 – 0.02/ 0.04, 0.02 (1)	1	**both** correct for one mark check decimal point: 0.2 to 0.4 is wrong
		iii	sensor may not work reliably ✓ (1) carbon monoxide may vary ✓ (1)	2	if 4 or 5 boxes are ticked, award no marks if 3 boxes are ticked, deduct 1 mark from the score one mark for each correct choice
			Total	**8**	

Question			Expected Answers	Marks	Rationale
6	**a**		1% argon (smallest segment) 20% oxygen (medium segment) 79% nitrogen (largest segment)	2	argon correct (1) oxygen **and** nitrogen correct (1)
	b		highest in morning and evening ✓ (1) decreases overnight ✓ (1)	2	if all 4 boxes are ticked, award no marks. if 3 boxes are ticked, deduct 1 mark from the score one mark for each correct choice
	c		CO - - - - - - - - [ ] NO [ ] N_2 [ ] CO_2 [ ]	2	**ignore** any link going to or coming from a box with more than one link 3 links correct (2) 1 or 2 links correct (1)
			Total	**6**	

| | | | **Paper Total** | **42** | |

Mark Scheme A211/02 Modules B1, C1, P1 Higher

Question			Expected Answers	Marks	Rationale
1	a		made of tectonic plates — T mantle is liquid — F plates are on top of the mantle — T tectonic plates move about — T volcanoes and earthquakes — T mountains build up — F	4	6 correct (4) 5 correct (3) 4 correct (2) 3 correct (1) note 1 or 2 correct = 0 T or F must be clearly a T or an F rather than a combination or one overwritten on the other without clear decision if overwrite is clearly bolder then **allow**
	b		ridges of solidified magma — ✓ volcanoes and earthquakes — ✓	1	**both** correct for one mark **allow** any clear indication of choice.
			Total	**5**	

Question			Expected Answers	Marks	Rationale
2	**a**		<table><tr><td>Shapley</td><td>Curtis</td><td>both</td></tr><tr><td>✓</td><td></td><td></td></tr><tr><td>✓</td><td></td><td></td></tr><tr><td></td><td>✓</td><td></td></tr><tr><td></td><td></td><td>✓</td></tr></table>	4	one mark for each correct row
	b		<table><tr><td>supports Shapley</td><td>supports Curtis</td></tr><tr><td>x</td><td>x</td></tr><tr><td>x</td><td>✓</td></tr></table>	2	one mark for each correct row blank = X but if a mixture of X and blank boxes then blank = No Response
	c		spiral nebulae are moving away ✓ theory that space is expanding ✓ there is a correlation ✓	3	one mark for each correct ✓ see guidance 8 regarding marking for tick boxes
			Total	**9**	

A211/02   **Mark Scheme**   **January 2008**

Question			Gd	Expected Answers	Marks	Rationale
3	a		D	XY / X and Y	1	either order **not** X or Y
	b		D	because she donated the egg ✓	1	no extra ticks allowed.
	c		AA*	(table) A B C yes yes D no no E yes no F no no G yes no H yes no	2	one mark for each correct column if any overwriting, **allow** if correct response is clearly bolder
	d		BA	(linking diagram) are clones / not exactly same DNA — mutations occur during development / embryo split into two groups of cells	2	one mark for each correct link if either left-hand box has more than one link, ignore that box
				Total	**6**	

9

Question			Gd	Expected Answers	Marks	Rationale
4	**a**		C	increase chance of cancer ✓ reach the age of thirty ✓	1	**both** correct (plus two blanks) for the one mark
	b		C	Andy (1)	1	**allow** any clear indication of choice cannot have two (or more) names
				Total	**2**	

Question			Gd	Expected Answers	Marks	Rationale
5	**a**	**i**	D	fact (1)	1	
		ii	C	prediction (1)	1	
	b		BA	no nuclear replacement ✓ stem cells are from the patient ✓	2	one mark for each correct ✓ see guidance 8 regarding marking for tick boxes
	c	**i**	B	1 **and** 3 (1)	1	either order
		ii	A	2, 5 **and** 6 (1)	1	any order
				Total	**6**	

Question			Expected Answers	Marks	Rationale
6	**a**		limits have been set ✓ engine speed is a factor ✓ percentages of pollutant gases ✓	2	3 correct (2) 2 correct (1) 1 correct = 0 marks see guidance 8 regarding marking for tick boxes
	b		_(table below)_	2	mark each row separately, more than 1 tick in the row = 0 for that row 3 correct rows (2) 2 or 1 correct row(s)(1)
	c	**i**	lies well outside the range ✓	1	no extra ticks allowed
		ii	0.02 to 0.04 / 0.02 – 0.04 / 0.02, 0.04 / 0.04 to 0.02 / 0.04 – 0.02/ 0.04, 0.02 (1)	1	**both** correct for one mark check decimal point: 0.2 to 0.4 is wrong
		iii	sensor may not work reliably ✓ carbon monoxide may vary ✓	2	if 4 or 5 boxes are ticked, award no marks if 3 boxes are ticked, deduct 1 mark from the score one mark for each correct choice
			Total	**8**	

Part b table:

	in fuel	in air	in both
carbon monoxide			✓
sulphur dioxide			✓
nitrogen oxides		✓	

Question			Expected Answers	Marks	Rationale
7	a		nitrogen monoxide/ NO (1) nitrogen/ N/N_2 (1)	2	must be in correct order formula must be capital letters e.g. N 2 should be subscript e.g. N_2 not N2
	b		CO_2 NO	2	one mark for CO_2 and one for NO formula must be capital letters e.g. N 2 should be subscript e.g. CO_2 not CO2 or CO^2
	c		Australia has highest population F Australia produces more nitrogen dioxide F UK produces less nitrogen dioxide F Hungary produces less nitrogen dioxide T	2	4 correct (2) 2 or 3 correct (1) 1 correct (0) if any overwriting, **allow** if correct response is clearly bolder.
			Total	6	

| | | | **Paper Total** | 42 | |

Mark Scheme A212/01 Modules B2, C2, P2 Foundation

Question			Expected Answers	Marks	Rationale
1	a		<table><tr><td>True</td><td>False</td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr></table>	2	any row with more than one tick or other indication of choice is wrong a blank row is wrong 4 rows correct (2) 2 or 3 rows correct (1) 1 row correct (0)
	b		film (card B) cup (card C) advantages 1, 4, 6 (1) 1, 5 (1) disadvantages 3 6 (1 for **both**)	3	advantages - 2 marks in total disadvantages - 1 mark in total
	c	i	751 (1)	1	
		ii	710 (1)	1	if wrong outlier identified in I, allow ecf as below <table><tr><td>outlier chosen</td><td>acceptable response</td></tr><tr><td>705</td><td>721.5 / 722 / 721</td></tr><tr><td>710</td><td>720.25 / 720</td></tr><tr><td>715</td><td>719</td></tr></table>
		iii	more results, better estimate ✓ (1) repeating to check for reliability ✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks.
			Total	**9**	

Question			Expected Answers	Marks	Rationale
2	**a**		2 (1)	1	**allow** any indication of choice
	b		small molecule (1) polymer (1) cross-link (1)	3	
	c		less flexible higher temperature a mixture of chemicals	2	**allow** any clear indication of choice 3 correct (2) 1 or 2 correct (1)
			Total	**6**	

Question			Expected Answers	Marks	Rationale
3	**a**		infrared (1) photosynthesis (1) atmosphere (1) warmer (1)	4	**allow** incorrect spelling
	b	**i**	Melanie ✓ (1) Mary ✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used
		ii	Sunil ✓ (1)	1	no extra ticks allowed
			Total	**7**	

Question			Expected Answers	Marks	Rationale
4	a		infrared B radio waves A ultraviolet C X-rays D	3	4 correct (3) 3 correct (2) 1 or 2 correct (1)
	b		radiation leak — can't break molecules into bits food radioactive — the metal keeps microwaves inside ionising radiation — different from nuclear radiation more energy than light — less energy than light photons	3	one mark for each correct link as shown
			Total	**6**	

Question			Expected Answers	Marks	Rationale
5	a	i	stomach lining —— produces acid skin ×× contains chemicals sweat and tears ×× physical barrier	2	3 correct (2) 1 or 2 correct (1)
		ii	reproduce (1) symptoms (1) poisons (1)	3	
	b	i	15% (1)	1	**allow** any indication of choice
		ii	bacteria (1) fungi (1)	2	**allow** any indication of choice one mark for each correct choice deduct one mark for each incorrect choice if more than two are chosen
	c		in UK, TB in children is rare ☑ (1) most never encounter a case ☑ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
			Total	**10**	

Question			Expected Answers	Marks	Rationale
6	a		B A C	2	3 correct (2) 1 or 2 correct (1) **allow** the names
	b	i	Sean (1)	1	**ignore** spelling
		ii	Jayne (1)	1	**ignore** spelling
			Total	**4**	

			Paper Total	**42**	
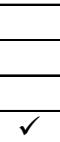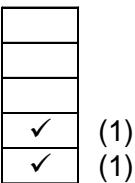
Mark Scheme A212/02 Modules B2, C2, P2 Higher

Question			Expected Answers	Marks	Rationale
1	a		<table><tr><td>True</td><td>False</td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr></table>	2	any row with more than one tick or other indication of choice is wrong a blank row is wrong 4 rows correct (2) 2 or 3 rows correct (1) 1 row correct (0)
	b		film (card B) cup (card C) advantages 1, 4, 6 (1) 1, 5 (1) disadvantages 3 6 (1 for **both**)	3	advantages - 2 marks in total disadvantages - 1 mark in total
	c	i	695 (2) **or** 670 / 669.8 (1)	2	
		ii	<table><tr><td>True</td><td>False</td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr></table>	1	
		iii	more results, better estimate ✓ repeating to check for reliability ✓	1	
			Total	**9**	

Question			Expected Answers	Marks	Rationale
2	**a**		small molecules from crude oil small molecules polymerise sulfur is used oils and resins are used	2	if any box has more than one link drawn to it, ignore all those links 4 correct links (2) 2 or 3 correct links (1)
	b	**i**	energy is put to good use ✓ shredded car tyre surface ✓ putting tyres in landfill ✓	2	3 correct ticks and two blanks : 2 marks 3 correct ticks, one extra tick and one blank: 1 mark 2 correct ticks and at least 2 blanks: 1 mark no other combination gets any marks
		ii	raw materials used ✓ methods of disposal ✓ average time tyres used ✓	2	3 correct ticks and two blanks : 2 marks 3 correct ticks, one extra tick and one blank: 1 mark 2 correct ticks and at least 2 blanks: 1 mark no other combination gets any marks
			Total	**6**	

Question			Expected Answers	Marks	Rationale
3	a		weaker further from source F (1) ionising radiation T (1) non-ionising radiation F (1) X-rays F (1)	4	one mark for each correct letter allow the full 'true' or ✓ for T and 'false' or x for F blank boxes are wrong.
	b	i	Melanie ✓ (1) Mary ✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used
		ii	Sunil ✓ (1)	1	no extra ticks allowed
			Total	**7**	

Question			Expected Answers	Marks	Rationale
4	a	i	gamma (rays) / γ (1)	1	**ignore** spelling errors. if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral
		ii	gamma (rays) / γ, ultraviolet / UV, X-rays / X	1	all three needed for the mark - order and spelling are not important if more than three terms written, list principle applies treat any subsequent variety of a correct answer as neutral
		iii	ultraviolet / UV(1)	1	**ignore** spelling errors. if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral
	b			3	if any box has more than one link drawn to it, ignore all those links 4 correct links (3) 2 or 3 correct links (2) 1 correct link (1)
			Total	**6**	

Question			Expected Answers	Marks	Rationale
5	**a**		acid in stomach ✓ (1)	1	no extra ticks allowed
	b	**i**	symptoms (1)	1	**ignore** spelling errors.
		ii	B (1)	1	
	c	**i**	15% (1)	1	**allow** any indication of choice
		ii	Slows spread of disease F TB microorganisms become resistant F Result of mutations T Increase spread of disease T	1	all correct for one mark blank boxes are wrong allow the full 'true' or ✓ for T and 'false' or ✗ for F
		iii	fungus/ fungi/fungal (1)	1	**ignore** spelling errors if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral
	d		in UK, TB in children is rare ✓ (1) most never encounter a case ✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
			Total	**8**	

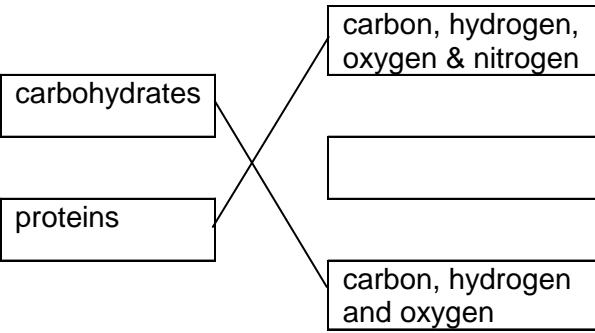| Question			Expected Answers	Marks	Rationale
6	**a**	**i**	C (1)	1	look at the letter on the dotted line, **not** the diagram, for this part
		ii	X on the bulge in diagram A (1)	1	centre of X must be on the actual bulge in diagram A (the bulge is what diagram A has extra to diagram B)
	b		oxygen / O_2 / O(1)	1	
	c	**i**	may have other factors in common ✓ (1) no mechanism has been suggested ✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
		ii	B (1)	1	
			Total	**6**	

			Paper Total	**42**	

Mark Scheme A213/01 Modules B3, C3, P3 Foundation

Question			Expected Answers	Marks	Rationale
1	a		receptor stimuli nervous	3	one mark for each correct response **allow** incorrect spelling if intention clear more than one response from the list in any space =0 **ignore** words not from list
	b		(E) D B A C D before B (1) B before A (1) A before C (1)	3	
			Total	**6**	

Question			Expected Answers	Marks	Rationale
2	a		herring	1	one mark for correct response **allow** incorrect spelling if intention clear more than one response from the list =0 **ignore** words not from list
	b		Fran	1	one mark for correct response **allow** incorrect spelling if intention clear more than one response from the list =0 **ignore** words not from list
	c	i	food chains always start with plants ✓	1	one mark for correct response more than one response = 0
		ii	fewer mackerel ✓	1	one mark for correct response more than one response = 0
			Total	**4**	

Question			Expected Answers	Marks	Rationale
3	a		Upright man / Heidelberg man / Neanderthal man → extinct ✓; Modern man → not extinct ✓	1	one mark for a correct response in BOTH columns **ignore** any further correct responses any incorrect response given = 0 mark **allow** any clear statement e.g. ✓ or x or shading etc **ignore** x if combination of ✓ and x used
	b		Upright man ✓	1	one mark for correct response more than one response = 0
	c	i	A **and** C	1	**both** needed for one mark any order is acceptable
		ii	B	1	**allow** any clear indication of correct response more than one response = 0
			Total	**4**	

25

Question			Expected Answers	Marks	Rationale
4	a		salt	1	**allow** any clear indication of correct response more than one response = 0
	b	i	<table><tr><td></td><td>high</td><td>low</td></tr><tr><td>sugar</td><td></td><td>✓</td></tr><tr><td>fat</td><td>✓</td><td></td></tr><tr><td>salt</td><td>✓</td><td></td></tr></table>	2	3 correct = 2 marks 1 or 2 correct = 1 mark **allow** any clear statement e.g. ✓ or x or shading etc **ignore** x if combination of ✓ and x used
		ii	does not know the outcomes ✓ amount of crisps that she eats ✓	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
	c		correlation ✓ large numbers, not individuals ✓	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
			Total	**7**	

Question	Gd	Expected Answers	Marks	Rationale
5 a	G	<table><tr><td></td><td>increases</td><td>decreases</td></tr><tr><td>nitrogen compounds</td><td>✓</td><td></td></tr><tr><td>fungal disease</td><td></td><td>✓</td></tr><tr><td>manure</td><td>✓</td><td></td></tr></table>	1	all 3 correct for one mark any extra responses = 0 **allow** any clear statement e.g. ✓ or x or shading etc **ignore** x if combination of ✓ and x used
b	FF	<table><tr><td></td><td>for</td><td>against</td></tr><tr><td>greenfly damage</td><td>✓</td><td></td></tr><tr><td>may leave residues</td><td></td><td>✓</td></tr><tr><td>greenfly eaten by ladybirds</td><td></td><td>✓</td></tr><tr><td>market crops as 'organic'</td><td></td><td>✓</td></tr></table>	2	4 correct = 2 marks 2 or 3 correct = 1 mark 1 correct = 0 mark **allow** any clear statement e.g. ✓ or x or shading etc **ignore** x if combination of ✓ and x used
c	EE	aflatoxin from mould (1) herbicide (1)	2	one mark for each correct response **allow** any clear indication of correct response if more than 2 responses given, deduct one mark for each incorrect response
d	EE		2	one mark for each correct link 2 lines from box on left loses mark for that link
		Total	**7**	

Question			Expected Answers	Marks	Rationale
6	a	i	absorbed by a sheet of paper ✓	1	one mark for correct response more than one response = 0
		ii	can break up molecules ✓	1	one mark for correct response more than one response = 0
		iii	cancer may develop ✓ cells may die ✓	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
	b		Cambs / Norfolk / Yorks table: Cambs ✓ Cambs ✓, Norfolk ✓ Norfolk ✓	4	mark each row separately 1st row – 1mark for each correct response (2 responses =0) 2nd row - 1mark for each correct response (3 responses =1) 3rd row - 1mark for each correct response (2 responses =0) **allow** any clear statement e.g. ✓ or x or shading etc **ignore** x if combination of ✓ and x used
	c	i	Julian ✓ Marion ✓	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
		ii	Steve ✓	1	one mark for correct response more than one response = 0
			Total	**11**	

Question			Expected Answers	Marks	Rationale
7			C B D A E	3	shaded box is given on question paper so **ignore** 4 correct = 3 marks 2 or 3 correct = 2 mark 1 correct = 1 mark
			Total	**3**	

| | | | **Paper Total** | **42** | |

Mark Scheme A213/02 Modules B3, C3, P3 Higher

Question			Expected Answers	Marks	Rationale
1	a		receptor / sensory (1)	1	**allow** – sense **reject** – nerve
	b		(E) D B A C	3	D before B = 1 mark B before A = 1 mark A before C = 1 mark
	c		4 **and** 5	2	ane mark for **each** correct response **allow** either order for correct responses **allow** – a clear indication of the correct response eg underline or circle numbers 4 and 5 in the question, if responses are not provided in the correct spaces if more than two responses - **deduct** one mark
			Total	**6**	

Question			Expected Answers	Marks	Rationale
2	a	i	gene / allele	1	**reject** – chromosome
		ii	mutation	1	**allow** – mutate **reject** – mutant
	b		correct: Ian, Fran, Jim incorrect: April	2	all 4 correct = 2 marks **deduct** one mark for each incorrect or missing response
			Total	**4**	

Question			Expected Answers	Marks	Rationale
3	a		B	1	**allow** – a clear indication of the correct answer eg underline or circle letter B in the question more than 1 response = 0 marks
	b		become taller ✓ developed larger brains ✓	1	two correct responses = 1 mark more than 2 response = 0 marks **allow** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	c		C **and** F	2	one mark for **each** correct response **allow** either order for correct responses **allow** – a clear indication of the correct response eg underline or circle numbers 4 and 5 in the question, if responses are not provided in the correct spaces if more than two responses - **deduct** one mark
			Total	**4**	

Question			Expected Answers	Marks	Rationale
4	a	i	<table><tr><td></td><td>high</td><td>low</td></tr><tr><td>sugar</td><td></td><td>✓</td></tr><tr><td>fat</td><td>✓</td><td></td></tr><tr><td>salt</td><td>✓</td><td></td></tr></table>	2	3 correct = 2 marks 1 or 2 correct = 1 mark **accept** a clear response eg ✓ or X or shading etc **ignore** X if combination of ✓ and X used
		ii	does not know the outcome ☐✓ amount of crisps that she eats ☐✓ ☐	2	one mark for **each** correct tick **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used if more than two responses - **deduct** one mark
	b	i	<table><tr><td></td><td>carbohydrates</td><td>proteins</td></tr><tr><td>carbon</td><td>✓</td><td>✓</td></tr><tr><td>hydrogen</td><td>✓</td><td>✓</td></tr><tr><td>oxygen</td><td>✓</td><td>✓</td></tr><tr><td>nitrogen</td><td></td><td>✓</td></tr></table>	2	one mark for **each** correct column **accept** a clear response eg. ✓ or X or shading etc **ignore** X if combination of ✓ and X used
		ii	amino acids amino acids tendons liver urea	3	5 correct responses = 3 marks 3 or 4 correct responses = 2 marks 2 correct responses = 1 mark **accept** a clear response eg. underline, shading, ticks etc
	c		proves the article wrong ☐F too much fat is only one factor ☐T heart disease in the future ☐F correlation ☐T	2	4 correct responses = 2 marks 2 or 3 correct responses = 1 mark **accept** ✓ and X if used together **reject** ✓ or X if used alone
			Total	**11**	

Question			Expected Answers	Marks	Rationale
5	a		E220 — emulsifier — stops deterioration E350 — antioxidant — harmful organisms E410 — preservative — mixes ingredients	2	mark left and right hand sides separately correct responses on left hand side = 1 mark correct responses on right hand side = 1 mark any other combination on a side – **deduct** 1 mark
	b		highest risk chemicals x fresh food always safer x never cause health problems x	1	all 3 correct responses = 1 mark **accept** a clear response eg ✓ or shading etc.
			Total	**3**	

Question			Expected Answers	Marks	Rationale
6	a	i	protons neutrons	1	two correct responses in correct order = 1 mark
		ii	quarter of its activity at start ✓ impossible to predict exact activity ✓	2	one mark for **each** correct tick **deduct** one mark for each incorrect tick if more than two ticks used **allow** a clear response eg. X or shading etc **ignore** X if combination of ✓ and X used
	b		Cambs / Norfolk / Yorks table (see scheme)	4	mark each row separately first row – 1 mark for correct ✓ (2 or 3 ✓ = 0 marks) second row - 1 mark for each correct ✓ (3 ✓ = 1 mark) third row – 1 mark for correct ✓ (2 or 3 ✓ = 0 marks) **allow** a clear response eg. ✓ or X or shading etc **ignore** X if combination of ✓ and X used
	c	i	Steve ✓ Marion ✓	2	one mark per correct tick **deduct** one mark for each incorrect tick if more than two ticks used **allow** a clear response eg. X or shading etc **ignore** X if combination of ✓ and X used
		ii	Debbie ✓	1	more than one response = 0 marks **allow** a clear response eg. ✓ or X or shading etc **ignore** X if combination of ✓ and X used
			Total	**10**	

Table for 6b:

Cambs	Norfolk	Yorks
✓		
✓	✓	
	✓	

Question			Expected Answers		Marks	Rationale
7			burnt to release heat energy	F	4	5 correct responses = 4 marks
			steam used to turn turbines	T		
			dangerous radioactive waste	T		4 correct responses = 3 marks
			radioactive for thousands of years	T		
			can cause cancer	T		3 correct responses = 2 marks
						2 correct responses = 1 mark
						allow ✓ and X if used together
						reject ✓ or X if used alone
			Total		**4**	

| | | | **Paper Total** | **42** | |

Grade Thresholds

General Certificate of Secondary Education
Science A (Specification Code J630)
January 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A211/01	Raw	42	N/A	N/A	N/A	29	25	21	17	13	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A211/02	Raw	42	32	27	22	18	15	13	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A212/01	Raw	42	N/A	N/A	N/A	32	27	23	19	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A212/02	Raw	42	33	28	23	18	13	10	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A213/01	Raw	42	N/A	N/A	N/A	30	26	22	18	14	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A213/02	Raw	42	34	29	24	20	16	14	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J630	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J630	0.0	1.9	19.6	43.9	67.3	85.5	95.8	99.5	100.0	214

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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