OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A (Twenty First Century)

General Certificate of Secondary Education **J630**

Mark Scheme for the Units

January 2009

J630/MS/R/09J

Oxford Cambridge and RSA Examinations

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, GCSEs, OCR Nationals, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new syllabuses to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

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.

© OCR 2009

Any enquiries about publications should be addressed to:

CONTENTS

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 a (1) at the end of that marking point.

4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

ORA	= or reverse argument
NOT	= point that is not given credit
AW/owtte	= alternative wording/or words to that effect: allow any expression that is clearly equivalent
/	= alternative and acceptable answers for the same marking point
point	= point must be present to gain the mark
(description)	= description which need not be present to gain the mark

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

6. 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.

7. If an answer is crossed out but not replaced, mark the crossed out answer.

A211/01   **Mark Scheme**   **January 2009**

A211/01 Modules B1, C1, P1 Foundation

Question			Expected Answers	Marks	Rationale
1	**a**		nucleus ✓ (1)	1	if more than one box ticked, no mark
	b		1 ✓ (1)	1	if more than one box ticked, no mark
	c		only one parent was involved ✓ (1)	1	if more than one box ticked, no mark

Question			Expected Answers	Marks	Rationale
1	d	i	male ZZ (1) 	W	Z	 Z	WZ	ZZ	 Z	WZ	ZZ	 (1)	2	1 mark for male ZZ 1 mark for **both** boxes in grid ZZ
		ii	1:1 ✓ (1)	1	if more than one box ticked, no mark
	e		males XY females XX	1	both required for 1 mark
			Total	**7**	

A211/01   **Mark Scheme**   **January 2009**

Question			Expected Answers	Marks	Rationale
2	**a**		**T (true) or** statement **F (false)** … made of DNA. [T] … instructions to make DNA. [F] … instructions to make proteins. [T] … made of chromosomes. [F] … found in chromosomes. [T]	2	all five correct = 2 marks three or four correct = 1 mark two or less = 0 marks **accept** tick for T and cross for F **reject** blank for F
	b		4 (1)	1	
	c			2	4 correct = 2 marks 2 or 3 correct = 1 mark 1 correct = 0 marks

for testing	against testing
Yasmin	Jon
Sanath	Chloe

			Total	**5**	

Question	Expected Answers	Marks	Rationale
3		2	1 mark for … unspecialised cells that … 1 mark for … can grow into new tissue types to …
	Total	**2**	

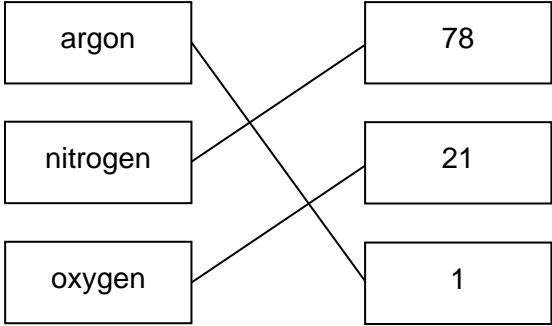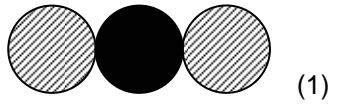A211/01   Mark Scheme   January 2009

Question			Expected Answers	Marks	Rationale
4	a		They will reduce air pollution in towns ☑ (1)	1	if more than one box ticked, no mark
	b	i	hydroelectric power station ☑ (1)	1	if more than one box ticked, no mark
	b	ii	use low energy light bulb ☑ (1) insulate his house ☑ (1)	2	each extra tick beyond 2, deduct 1 mark
			Total	**4**	

Question			Expected Answers	Marks	Rationale
5	**a**			2	all three lines correct = 2 marks 2 or 1 line(s) correct = 1 mark
	b	**i**	(1)	1	if more than one indicated, no mark
		ii	water (1)	1	if more than one indicated, no mark
			Total	**4**	

Question			Expected Answers	Marks	Rationale
6	a		Bridge Street (1)	1	if more than one street indicated, no mark
			… is not trapped by buildings ✓ (1)	1	if more than one box ticked, no mark
	b		70 - 124 (1)	1	both numbers needed **allow** 124 - 70
	c	i	C (1) and F (1)	2	1 mark for each correct answer **accept** either order
		ii	E (1)	1	
			Total	**6**	

Question	Expected Answers	Marks	Rationale
7 **a**	Edward ✓ (1)	1	if more than one box ticked, no mark
b	Alex ✓ (1) Dan ✓ (1)	2	each extra tick beyond 2, deduct 1 mark
c	Bernie ✓ (1)	1	if more than one box ticked, no mark

Question	Expected Answers	Marks	Rationale
7 d	Alex ✓ Bernie ✓ ☐ Dan ✓ ☐	2	three correct ticks = 2 marks two correct ticks = 1 mark each extra tick beyond 3, deduct 1 mark
	Total	**6**	

Question	Expected Answers	Marks	Rationale
8	Helium... / Hydrogen... linked to: … is the 'fuel that is powering our Sun. / …in the Universe before there were any stars. / …is made inside stars.	2	hydrogen - linked to top two boxes only = 1 mark helium - linked to one or both of bottom two boxes **only** = 1 mark
	Total	**2**	

Question			Expected Answers	Marks	Rationale
9	**a**		Alfred Wegener ✓ (1)	1	if more than one box ticked, no mark
	b	**i**	A (1) D (1)	2	1 mark each each extra letter beyond 2, deduct 1 mark
		ii	C (1)	1	
	c	**i**	2 and 4 (1)	1	both required for 1 mark
		ii	fossils ✓ (1)	1	
			Total	**6**	

11

Mark Scheme

A211/02 Modules B1, C1, P1 Higher

Question			Expected Answers	Marks	Rationale
1	a	i	male ZZ (1) |	W	Z
Z	WZ	ZZ
Z	WZ	ZZ	 (1)	2	1 mark for male ZZ 1 mark for **both** boxes in grid ZZ
		ii	1:1 (1)	1	**allow** $\frac{1}{2}$ or 0.5 or 50% or 2:2 or 50:50 any correct ratio
	b		WW, ZZ ✓ (1)	1	more than one tick = no marks **allow** any correct indication of choice e.g. WW, ZZ circled or cross rather than tick
	c		Y (1) testes (1) ovaries (1)	3	**allow** SRY (sex determining region of Y chromosome) **allow** testicles **allow** ovary / female sex organs
			Total	**7**	

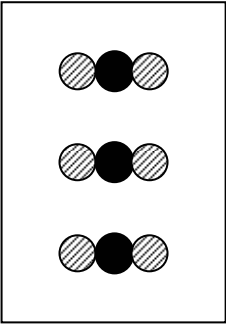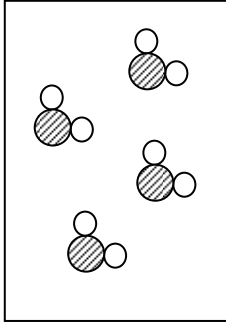| Question			Expected Answers	Marks	Rationale
2	**a**		statement **T (true) or F (false)** … made of DNA. **T** … instructions to make DNA. **F** … instructions to make proteins. **T** … made of chromosomes. **F** … found in chromosomes. **T**	2	all five correct = 2 marks three or four correct = 1 mark two or less = 0 marks **accept** tick for T and cross for F **reject** blank for F
	b		diet (1)	1	
	c		therapeutic cloning — produces stem cells for treatment gene therapy — replaces faulty alleles pre-implantation genetic diagnosis — help select embryos	2	count the number of left hand boxes which are correctly linked all three correct = 2 marks one or two correct = 1 mark more than one line from a box on the left means that box is incorrect

Question			Expected Answers	Marks	Rationale
2	**d**			2	count the number of left hand boxes which are correctly linked all three correct = 2 marks one or two correct = 1 mark more than one line from a box on the left means that box is incorrect
			Total	**7**	

Question			Expected Answers	Marks	Rationale
3	a		hydrocarbon (1)	1	
	b		carbon dioxide water	3	number and type of atoms in carbon dioxide correct = 1 mark **accept** **accept** (C) for ● similarly accept circle with O in for circle with diagonal lines and circle with H for open circle number and type of atoms in water correct = 1 mark number of molecules in both boxes correct = 1 mark
	c		carbon monoxide (1) soot / carbon / particulate carbon / particulate(s) (1)	2	answers in either order **accept** CO for carbon monoxide if both clearly capital letters **reject** Co **accept** C for carbon (should be capital C)
	d		carbon is soluble ☑ (1) ☐ … increases the rate of photosynthesis ☑ (1) ☐ ☐	2	note point 7 in Guidance for Examiners if more than two ticks lose a mark for each extra tick
			Total	**8**	

Question			Expected Answers	Marks	Rationale
4	**a**		70 - 124 (1)	1	both numbers needed **allow** 124 - 70
	b	**i**	C (1) and F (1)	2	1 mark for each correct answer **accept** either order
		ii	E (1)	1	
	c		real difference in NO_2 between Bridge and Mill St range for Bridge St outside range for Mill St	2	1 mark for 2nd box on left 1 mark for 4th box on right more than one line between boxes on the left and right = no marks
Total				**6**	

Question			Expected Answers	Marks	Rationale
5	**a**		Alex ✓ Bernie ✓ ☐ Dan ✓ ☐	2	note that for Claire and Edward a blank box is a correct response, accept a cross. five correct responses = 2 marks three or four correct responses = 1 mark
	b		Alex ✓ ☐ ☐ Dan ✓ ☐	1	tick by **both** Alex and Dan one mark (1) more than two ticks no marks
	c		Claire (1) Edward (1)	2	one mark per correct tick for each additional tick, beyond two, lose a mark

Question	Expected Answers	Marks	Rationale
5 **d**	Bernie ☑ Claire ☑	1	tick or any other clear indication of choice by Bernie and Claire only both needed for 1 mark
	Total	**6**	

Question	Expected Answers	Marks	Rationale
6	Helium ... — Hydrogen ... linked to "… is the 'fuel that is powering our Sun.", "…in the Universe before there were any stars.", "…is made inside stars."	2	hydrogen - linked to top two boxes only = 1 mark helium - linked to one or both of bottom two boxes **only** 1 mark
	Total	**2**	

Mark Scheme

Question			Gd	Expected Answers	Marks	Rationale
7	a	i	D	4 (1)	1	
		ii	CB	1 (1) and 5 (1)	2	one mark for each answers can be in either order
	b		B	South America and Africa ☑ (1)	1	No mark if more than one tick
	c		BA	B E D F A C	2	E before D = 1 mark F **before** A but **after** D = 1 mark
				Total	**6**	

A212/01 Modules B2, C2, P2 Foundation

Question			Expected Answers	Marks	Rationale
1	a		<table><tr><td>**material**</td><td>**synthetic**</td><td>**made from living things**</td></tr><tr><td>cotton</td><td></td><td>✓</td></tr><tr><td>paper</td><td></td><td>✓</td></tr><tr><td>poly(ethene)</td><td>✓</td><td></td></tr><tr><td>PVC</td><td>✓</td><td></td></tr><tr><td>silk</td><td></td><td>✓</td></tr></table>	3	all five correct = 3 marks 4 or 3 correct = 2 marks 2 or 1 correct = 1 mark
	b		Synthetic materials are made from … → … polymers. The molecules in crude oil are a mixture of … → … hydrocarbons. Crude oil is refined to make … → … fuels, lubricants and chemicals.. Small molecules can be joined together to make … → … crude oil.	2	3 lines correct = 2 marks 1 or 2 lines correct = 1 mark if any left-hand box has more than one line coming from it, **ignore** all those lines

Question			Expected Answers	Marks	Rationale
1	c	i	melting point ✓ (1)	1	no extra ticks allowed
1	c	ii	flexibility ✓ (1)	1	no extra ticks allowed
		iii	A (1)	1	
		iv	It does not break easily. ✓ (1)	1	no extra ticks allowed
			Total	**9**	

Question			Expected Answers	Marks	Rationale
2	**a**		The starting temperatures were different ✓ (1)	1	no extra ticks allowed
	b	**i**	32 - 38 (1)	1	**allow** 38 to 32
		ii	35 (1)	1	
		iii	… best estimate of the true value ✓ (1)	1	no extra ticks allowed
	c		✓ The starting temperature is the same. ✓ (1) The amounts of wool and fleece are the same. ✓ (1)	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
			Total	**6**	

Question			Expected Answers	Marks	Rationale
3	a	i	<u>photon</u>(s) (1)	1	**allow** photon, UV photon, UVA photon, UVB photon the word 'photon' is essential, however spelled
		ii	(uv) filter (1)	1	**not** sunscreen (also has reflector) unless qualified e.g. 'acts as filter'
		iii	reflect(s) (1)	1	**allow** titanium dioxide (not just titanium) or white powder
	b		Put fresh sunscreen on more often ☑ (1) ☐ Don't stay out too long in the Sun … ☑ (1) ☐	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
	c		Ultraviolet radiation is ionising ☑ (1) ☐ ☐ ☐	1	no extra ticks allowed
			Total	**6**	

A212/01 | Mark Scheme | January 2009

Question	Expected Answers	Marks	Rationale
4 a	<table><tr><th>statement</th><th>Dr Round</th><th>Prof Price</th><th>neither</th><th>both</th></tr><tr><td>Carbon dioxide …</td><td></td><td>✓</td><td></td><td></td></tr><tr><td>Some data show the Earth …</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>… has never gone up at all.</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>… has gone up at some time.</td><td></td><td></td><td></td><td>✓</td></tr></table>	4	each correct row = 1 mark **ignore** any row with more than one indication of choice unless extra ones are clearly crossed out
b	<table><tr><th>factor</th><th>outcome</th><th>correl-ation</th><th>caused</th></tr><tr><td>burning fuel</td><td>CO$_2$ increases</td><td>✓</td><td>✓</td></tr><tr><td>CO$_2$ in atmosphere</td><td>global warming</td><td>✓</td><td></td></tr><tr><td>industrial & agri dust</td><td>global warming</td><td>✓</td><td></td></tr></table>	3	each correct row = 1 mark
	Total	**7**	

A212/01   Mark Scheme   January 2009

Question			Expected Answers	Marks	Rationale
5	a	i	immune (1)	1	
		ii	white blood cells (1)	1	
	b	i	D (1)	1	
		ii		2	middle box in 2nd column = 1 mark middle box in 3rd column = 1 mark if either column has more than one box indicated, **ignore** that column
			Total	**5**	

6	a		bacteria ✓ (1) fungi ✓ (1)	1	both ticks correct and no extra tick = 1 mark
	b			3	C anywhere before A = 1 mark A anywhere before E = 1 mark E anywhere before D = 1 mark e.g. (B)DACE gets 1 for 'A before E' if any letter is used twice, **ignore** it each time
			Total	**4**	

25

Question			Expected Answers	Marks	Rationale
7	a		… evaluate the methods used. ✓ (1) ☐ … evaluate the analysis of the results. ✓ (1) ☐ ☐	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
	b		(see table below)	3	all 5 rows correct = 3 marks 4 or 3 row correct = 2 marks 2 or 1 row correct = 1 mark **ignore** any row with more than one tick

factor	increase	decrease
cigarette smoking	✓	
regular moderate exercise		✓
poor diet	✓	
stress	✓	
excessive alcohol drinking	✓	

Total	5

A212/02 Modules B2, C2, P2 Higher

Question			Expected Answers	Marks	Rationale
1	a		The starting temperatures … ☑ (1)	1	no extra ticks allowed
	b	i	32-38 (1)	1	**allow** 38 to 32
		ii	35 (1)	1	
		iii	… best estimate of the true value ☑ (1)	1	no extra ticks allowed

Question			Expected Answers	Marks	Rationale
1	c	i	thicker … → increases … / … stays the same / decreases … → … better than it is / … worse than it is	2	one mark for each correct line thicker - increases – better (1) smaller - decreases – worse (1)
		ii	☐ ☐ ☐ ☐ **no** difference because the ranges … ☑ (1)	1	more than one tick = 0 marks
			Total	**7**	

Question			Expected Answers	Marks	Rationale
2	a	i	There are stronger forces … ✓ (1) … structure is higher in hdpe ✓ (1)	2	1 mark for each correct tick if 3 ticks present, deduct 1 mark more than 3 ticks = 0 marks
		ii	increased crystallinity (1)	1	allow crystallinity on its own **accept** cross-linking do **not** allow vulcanisation
	b	i	plasticiser (1)	1	**allow** mis-spellings if answer is clear
		ii	how long the PVC is in use ✓ (1)	1	more than one tick = 0 marks

Question			Expected Answers	Marks	Rationale
2	b	iii	The energy released when they … ✓ (1) The need for burning other fuels … ✓ (1)	2	1 mark for each correct tick. if 3 ticks present, deduct 1 mark more than 3 ticks = 0 marks
			Total	**7**	

Question			Expected Answers	Marks	Rationale
3	a	i	cinnamate(s) / dibenzoylmethane(s) (1)	1	**allow** ozone/ozone layer **allow** mis-spellings if answer is clear.
		ii	photochemistry (1)	1	do **not** allow protochemistry or protonchemistry **allow** mis-spellings if answer is clear.
	b		B A E F C D	2	all correct = 2 marks only one pair of letters misplaced (transposed) = 1 mark
	c	i	4 (1)	1	
		ii	1 (1)	1	
			Total	**6**	

Question			Expected Answers	Marks	Rationale
4	a			3	each correct row = 1 mark **ignore** any row with more than one indication of choice unless extras are clearly crossed out

statement	Dr Round	Prof Price	neither	both
Carbon dioxide is ...		✓		
There is evidence for ...				✓
Reducing carbon dioxide ...			✓	

Question			Expected Answers	Marks	Rationale
	b			3	each correct row = 1 mark

factor	outcome	correl-ation	caused
burning fuel	carbon dioxide increase	✓	✓
CO_2 increase in the …	global warming	✓	
… dust in the atmosphere	global warming	✓	

31
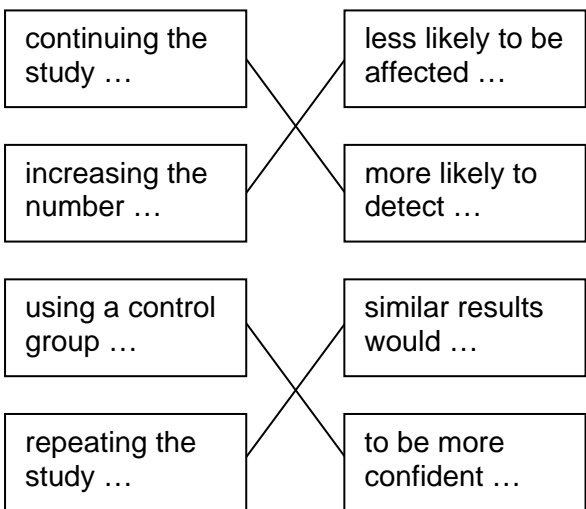
Question			Expected Answers	Marks	Rationale
4	c		clear scientific theory … ✓ (1)	1	more than one tick = 0 marks
			Total	**7**	

Question			Expected Answers	Marks	Rationale
5	a	i	immune (1)	1	**allow** mis-spellings if answer is clear
		ii	**white** blood cells (1)	1	**allow** macrophages **allow** mis-spellings if answer is clear
	b			2	middle box in 2nd column = 1 mark middle box in 3rd column = 1 mark if either column has more than one box indicated, **ignore** that column
			Total	**4**	

Question			Expected Answers	Marks	Rationale
6	a		… evaluate the methods used. ✓ (1) … evaluate the analysis … ✓ (1)	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
	b		continuing the study … → less likely to be affected … increasing the number … → more likely to detect … using a control group … → similar results would … repeating the study … → to be more confident …	3	all four lines correct = 3 marks three correct = 2 marks two correct = 1 mark
			Total	**5**	

Question			Expected Answers	Marks	Rationale
7	**a**		viruses (1)	1	do **not** allow examples of viruses alone **allow** mis-spellings if answer is clear
	b	**i**	 B C A E D	1	all four correct = 1 mark
		ii	This will clearly show any side … ✓ (1)	1	more than one tick = 0 marks

A212/02   Mark Scheme   January 2009

Question			Expected Answers	Marks	Rationale
7	b	iii	neither the doctor nor the patient … ——— … changes to symptoms reliably	2	left hand box correct = 1 mark right hand box correct = 1 mark more than one line = 0 marks
	c		Genetic mutations can result in … ☑ (1)	1	more than one tick = 0 marks
			Total	**6**	

35

A213/01 Modules B3, C3, P3 Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	more power, less CO_2 ✓ (1)	1	**accept** any clear indication of choice no extra choices allowed
		ii	coal burns, produces CO_2 ✓ (1)	1	**accept** any clear indication of choice no extra choices allowed
	b		… release radioactive material ✓ (1) Taking apart nuclear … ✓ (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
			Total	**4**	

Question			Expected Answers	Marks	Rationale
2	a	i	1.6 (mSv) (1)	1	**accept** correct figures written into table check table if answer line is blank
		ii	0.7 to 10 (mSv) (1)	1	both numbers required, in either order
	b	i	outlier (1)	1	**accept** anomaly
		ii	Grant working closer to reactor … ✓ (1)	1	**accept** any clear indication of choice no extra choices allowed
		iii	indication of adding first 6 and dividing by 6 (1) 2.1 (mSv) (1)	2	if all 7 results are averaged to give a mean of 2.8 (mSv), give 1 mark even if no working shown 2.1 with no working gets 2 marks
			Total	**6**	

Question			Expected Answers	Marks	Rationale
3	**a**		… slight risk of cancer worthwhile ☐ ☐ ✓ (1) ☐	1	**accept** any clear indication of choice no extra ticks allowed
	b		radioactivity very small within … ✓ (1) ☐ ☐ ☐ family not as close to source ✓ (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	c		☐ ☐ ☐ … radioactive chemicals everyday ✓ (1)	1	**accept** any clear indication of choice no extra ticks allowed.
			Total	**4**	

Question			Expected Answers	Marks	Rationale
4	**a**		environmental conditions changed ✓ (1) … organisms in food web died out ✓ (1) ☐ ☐	2	each correct tick = 1 mark if 3 ticks present, deduct 1 mark 4 ticks present = 0 marks
	b		common (1) diverge (1) extinct (1)	3	**accept** any clear method of choice, e.g. underlining if one choice is circled and another underlined, mark circled choice
			Total	**5**	

Question			Expected Answers	Marks	Rationale
5			… results could not be repeated. ✓ ☐ ☐ … only genetic variation passed on. ✓ … were growing more crops. ✓	2	any two points **allow** full marks if all three possible answers are ticked two correct ticks plus an extra incorrect tick = 1 mark four ticks = 0 marks
			Total	**2**	

A213/01 Mark Scheme January 2009

Question			Expected Answers	Marks	Rationale
6	a	i	3 (1)	1	**accept 1**, or both **1** and **3** **accept** any clear indication of choice, e.g. ringing number in list above answer line
		ii	4 (1)	1	**accept** any clear indication of choice, e.g. ringing number in list above answer line
	b			2	each correct line = 1 mark if a left-hand box has more than one line coming from it **ignore** all lines from that box
	c			3	each correct row= 1 mark **accept** any clear indication of choice **ignore** any row with two choices
			Total	**7**	

sustainable — using resources so they can continue to be used

biodiversity — variety of living things within and between species

(other boxes: using resources in the best most profitable way; gradual change of a population over time)

	NS	SB
(changes affected ...)	(✓)	
over many …		✓
humans choose …		✓
plants or animals …	✓	

Question			Expected Answers	Marks	Rationale
7	**a**		<table><tr><td></td><td>carbon</td><td>hydro</td><td>nitro</td><td>oxygen</td></tr><tr><td>carb</td><td>✓</td><td>✓</td><td></td><td>✓</td></tr><tr><td>protein</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr></table>	2	1 mark for each correct row
	b		<table><tr><td>E</td><td>C</td><td>D</td><td>B</td><td>A</td></tr></table>	3	C before D = 1 mark D before B = 1 mark B before A = 1 mark
			Total	**5**	

8	**a**		Sally and Sam (1)	1	both required for 1 mark either order no extra names allowed
	b		Emily (1)	1	no extra names allowed
	c		Ali (1)	1	no extra names allowed
	d		Shaun (1)	1	no extra names allowed
			Total	**4**	

Question			Expected Answers	Marks	Rationale
9	a		prevent the growth of microorganism ☑ (1)	1	**accept** any clear indication of choice
	b		It has passed a safety test ☑ (1)	1	**accept** any clear indication of choice
	c		to protect the health of the public ☑ (1)	1	**accept** any clear indication of choice

Question			Expected Answers	Marks	Rationale
9	d		read list of additives on food labels ✓ (1) know which additives may harm ✓ (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks **accept** any clear indication of choice
			Total	**5**	

A213/02   **Mark Scheme**   **January 2009**

A213/02 Modules B3, C3, P3 Higher

Question			Expected Answers	Marks	Rationale
1	**a**		… slight risk of cancer worthwhile ✓ (1)	1	**accept** any clear indication of choice no extra ticks allowed
	b		radioactivity very small within ✓ (1) family not as close to source ✓ (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	c		… radioactive chemicals everyday ✓ (1)	1	**accept** any clear indication of choice no extra ticks allowed
			Total	**4**	

A213/02 Mark Scheme January 2009
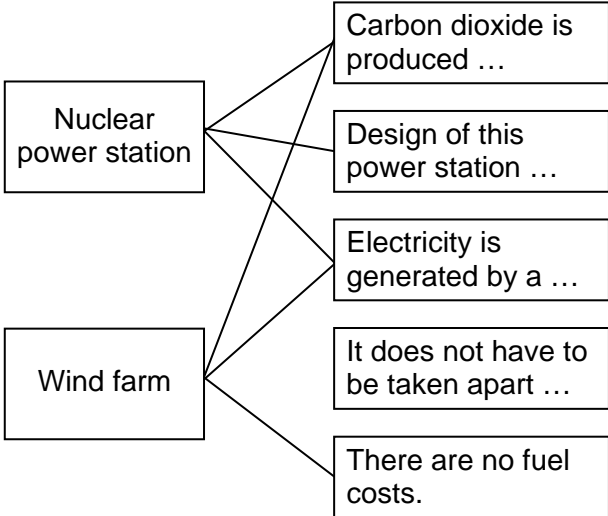
Question			Expected Answers	Marks	Rationale
2	a	i	nuclear fuel processor: ½ small square below 3 - should be in space between grid lines nuclear reactor operator: 1 small square above 2 - should be on the grid line uranium miner: 2 small squares below 10 - should be on the grid line	1	any 2 bars correct = 1 mark
		ii	0.7 to 9.6 (mSv) (1)	1	**not** 0.7 to 8.9
	b		indication of adding first 6 and dividing by 6 (1) 2.1 (mSv) (1)	2	if all 7 are averaged to give a mean of 2.8 (mSv) give 1) mark even if no working shown 2.1 (mSv) with no working gets 2 marks
			Total	**4**	

						Marks	Rationale
3	a			supports government	supports environmental group	4	1 mark for each correct row
			… do not produce CO_2 …	✓			
			an accident …		✓		
			… for global warming	✓	✓		
			… much more expensive	✓			

45

Question			Expected Answers	Marks	Rationale
3	b			2	nuclear goes to top three boxes any two of the three correct boxes **and no incorrect boxes** for 1 mark wind farm goes to top middle and bottom boxes any two of the three correct boxes **and no incorrect boxes** for 1 mark
			Total	**6**	

Question			Expected Answers	Marks	Rationale
4			Lysenko's results could not be … ✓ Breeding experiments with wheat … ✓ Other countries that did not use … ✓	2	any two points = 2 marks **allow** full marks if all three possible answers are ticked two correct ticks plus an extra incorrect tick = 1 mark four ticks = 0 marks
			Total	**2**	

46

Question			Expected Answers	Marks	Rationale
5	**a**	**i**	homeostasis (1)	1	
		ii	<table><tr><td>electrical</td><td>✓</td><td></td><td></td></tr><tr><td>chemicals</td><td></td><td>✓</td><td></td></tr><tr><td>short-lived</td><td>✓</td><td></td><td></td></tr><tr><td>slow</td><td></td><td>✓</td><td></td></tr><tr><td>receptor</td><td></td><td></td><td>✓</td></tr></table>	3	1 mark for each correct column (including blanks)
	b		brain spinal cord	1	both required for 1 mark either order 'spine' is **not** 'spinal cord'
			Total	**5**	

Question			Expected Answers	Marks	Rationale
6	**a**		Statement 4 accounts for all the data … ✓ (1)	1	**accept** any clear indication of choice no extra ticks allowed
	b		sustainable — the variety of living … biodiversity — … be used in the future … most profitable way the gradual change …	2	each correct line = 1 mark if a left hand box has more than one line coming from it **ignore** all lines from that box
	c	**i**	sex cell / gamete / reproductive cell / egg / sperm / ovum / ovule / pollen (1)	1	**not** zygote, i.e. fertilised egg/ovum/ovule
		ii	… would compete equally well. ✓ (1)	1	**accept** any clear indication of choice no extra ticks allowed

Question			Expected Answers	Marks	Rationale
6	**d**	**i**	Brian Zoe (1)	1	both required for 1 mark either order
		ii	Mark (1)	1	
			Total	**7**	

Question			Expected Answers	Marks	Rationale
7	**a**		Sally Sam (1)	1	both required for 1 mark either order no extra names allowed
	b		Emily (1)	1	no extra names allowed
	c		Ali (1)	1	no extra names allowed
	d		Shaun (1)	1	no extra names allowed
			Total	**4**	

Question			Expected Answers	Marks	Rationale
8	a		carbon oxygen hydrogen	2	any order **allow** symbols C H O 3 correct = 2 marks 2 correct = 1 mark
	b	i	A B E F	2	any order any 3 correct = 2 marks any 2 correct = 1 mark only 1 correct scores 0 marks
		ii	C or D	1	**allow** either or both no other letters allowed
	c		Dig in manure. ✓ Spread compost and dig in. ✓ Grow leguminous crops such as clover. ✓	1	two or three correct choices = 1 mark
			Total	**6**	

Question			Expected Answers	Marks	Rationale
9	**a**		They stop the growth of harmful … ✓ (1) They keep food safe for longer. ✓ (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	b		How much harm the chemical may cause. ✓ Whether some people are more affected … ✓ How likely it is that people will suffer harm … ✓	1	three correct choices and four blanks = 1 mark no other combination scores any marks
	c		D (1)	1	**accept** any clear indication of choice
			Total	**4**	

Grade Thresholds

General Certificate of Secondary Education
Science A (Specification Code J630)
January 2009 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	28	24	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A211/02	Raw	42	32	28	22	17	14	12	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
A212/01	Raw	42	N/A	N/A	N/A	31	27	23	19	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A212/02	Raw	42	32	28	22	16	11	8	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
A213/01	Raw	42	N/A	N/A	N/A	29	24	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A213/02	Raw	42	33	29	23	17	12	9	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A

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	0.4	4.9	23.1	56.2	77.5	89.9	96.4	99.6	100.0	445

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.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance
programme your call may be recorded or monitored