OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A

General Certificate of Secondary Education

Unit **A211/02:** Unit 1: Modules B1, C1, P1 (Higher Tier)

Mark Scheme for June 2011

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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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1. 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
words	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

2. Subject-specific Marking Instructions

a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

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

c. 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.

d. 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.

e. 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.

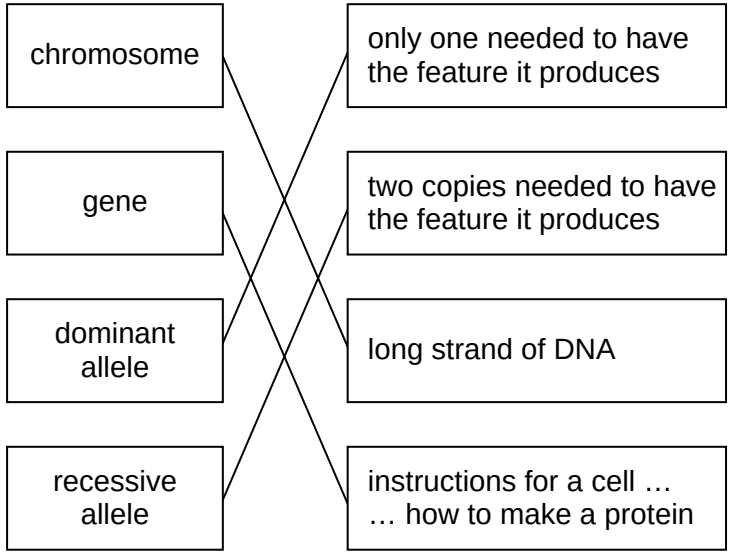
e.g. if a question requires candidates to identify cities in England:

Edinburgh	
Manchester	
Paris	
Southampton	

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

MARK SCHEME:

Question			Answer	Mark	Guidance
1	a			3	four correct = 3 marks three correct = 2 marks two correct = 1 mark
	b	i	**all** of 1, 2 and 6 (1)	1	any order allowed if more than three answers then no marks can be awarded
		ii	50% / 0.5 / ½	1	**accept** 1 to 1 **accept** any correct fraction/ratio, e.g. 1 in 2 / 5 in 10 **do not accept** 50 without the % symbol
	c	i	☐ ... make the missing protein. ☑ (1) ☐ ☐	1	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>1</td><td>d</td><td></td><td>any three from:
embryonic stem cells:
are unspecialised/undifferentiated (1)
can develop into any kind of cell (1)

may be able to replace damaged cells / tissues (1)
idea of nuclear replacement (1)
no issues of tissue rejection (1)</td><td>3</td><td>

do not allow ‘become specialised’</td></tr>
<tr><td></td><td>e</td><td></td><td><table><tr><th>risk</th><th>reliability</th><th>ethics</th></tr><tr><td>Elaine</td><td>Richard
Sanjay</td><td>Greta
Barry</td></tr></table></td><td>3</td><td>all 5 correct = 3 marks
4 correct = 2 marks
2 or 3 correct = 1 mark

if the same name appears in more than one box then that name is not given credit.

allow any unambiguous indication of choice e.g. E for Elaine</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>12</td><td></td></tr>
</table>

<table>
<tr><td>2</td><td></td><td></td><td>any two from:
nucleus removed from egg (cell) (1)
nucleus removed from adult body cell (1)

(adult body cell) nucleus put into (empty) egg cell (1)

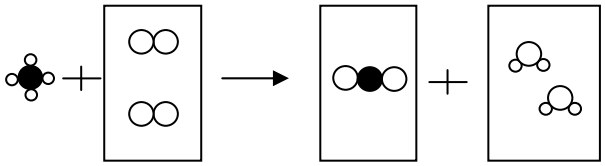
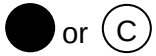
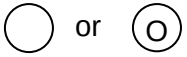
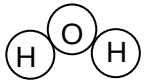
embryo implanted into (surrogate) mother/put into uterus (1)
embryo grows into clone of adult from which body cell nucleus was taken (1)</td><td>2</td><td>

do not allow vague references to ‘putting back into mother’</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>2</td><td></td></tr>
</table>

Question			Answer	Mark	Guidance
3	a	i	Josh (1) Rajid (1)	2	1 mark for each correct answer in either order
		ii	Rajid (1)	1	
		iii	Sara (1)	1	
	b		nitrogen and oxygen from the air… ✓ ☐ ☐ ☐ nitrogen monoxide is oxidised… ✓ ☐	1	both needed for one mark
			Total	5	

Question			Answer	Mark	Guidance
4	a		*advantages:* example of improved health, e.g. less asthma/breathing problems/carbon monoxide poisoning or less (photochemical) smog or cleaner buildings (due to fewer particulates) or less acid rain (due to lower nitrogen oxide emissions) (1) *disadvantages:* extra costs to bus/lorry companies, e.g. extra servicing, purchase of newer vehicles, scrapping old vehicles or idea that companies will pay fines/ignore limits (so emissions won't reduce) or jobs lost/companies may go out of business or costs passed onto customers, e.g. increased bus fares/increased costs of transported products (1)	2	one mark for an advantage and one mark for a disadvantage do **not** credit unqualified reference to 'better health' **ignore** references to cars

Question			Answer	Mark	Guidance
4	b		method one (1) correct explanation of method one (1) method two (1) correct explanation of method two (1) maximum 3 marks	3	award max 2 marks for methods for explanations, do not allow reference to 'lowering pollution' *methods:* car-sharing – fewer vehicles on the road / fuel per person per mile is less use public transport – fewer vehicles on the road / fuel per person per mile is less walk/cycle - fewer vehicles on the road / fuel per person per mile is less congestion charge – fewer vehicles on the road / fuel per person per mile is less catalytic converters – oxidise CO to CO_2 / reduce NO to N_2 low S fuels – less SO_2 made electric/hybrid/more efficient/hydrogen fuelled cars – fewer emissions from car exhaust higher vehicle/road tax – encourages people to use cars less increase fuel prices – encourages people to use cars less scrappage schemes – encourages people to get rid of their older cars (which release more emissions)
			Total	**5**	

Question			Answer	Mark	Guidance
5	a			2	correct representation of **one** molecule of carbon dioxide in one box = 1 mark and correct representation of **two** molecules of water in other box = 1 mark **ignore** whether circles are joined in line or at an angle but circles must be joined in correct order e.g. OOC is wrong for carbon dioxide and HHO is wrong for water. **note**: circles should be touching for carbon dioxide, molecule must include one carbon atom and two oxygen atoms **accept** for carbon:  **accept** for oxygen:  e.g. for carbon dioxide this could be any of:   for water, molecule must include one oxygen atom and two hydrogen atoms. Molecules of hydrogen atoms should be clearly smaller than oxygen atoms, unless correct labelled. e.g.  is correct

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>5</td><td>b</td><td></td><td>photosynthesis (1)
dissolving / reacting with water (1)</td><td>2</td><td>1 mark for each correct answer in either order
accept carbon dioxide taken in by plants <u>and</u> oxygen released
water can be sea/lake/river/rain</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
<tr><td>6</td><td></td><td></td><td>
<table>
<tr><th>factors</th><th>stars</th><th>galaxies</th><th>asteroids</th></tr>
<tr><td>where?</td><td>in galaxies outside Solar System very far away</td><td>very far away outside Milky Way</td><td>in Solar System between Mars and Jupiter</td></tr>
<tr><td>how big? *</td><td>smaller than galaxies bigger than asteroids</td><td>bigger than stars bigger than asteroids</td><td>smaller than galaxies stars</td></tr>
<tr><td>around Sun?</td><td>don’t orbit around the Sun</td><td>don’t orbit around the Sun moving away (from the Sun)</td><td>orbit the Sun</td></tr>
<tr><td>made from?</td><td>(hot) gases</td><td>made from many stars</td><td>rock/dust/ rubble</td></tr>
</table>
* ‘How big?’ must be a sensible comparison with some other body (but not the Universe)
Note. Unless statements are made about all 3 bodies then only one mark can be awarded.
</td><td>4</td><td>4 Marks
two factors for two of asteroids, stars and galaxies
plus one for the remaining one

3 Marks
two factors for one of asteroids, stars and galaxies
plus one for the remaining two

2 Marks
one factor for each of asteroids, stars and galaxies

1 Mark
one factor for two of asteroids, stars and galaxies</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
</table>

Question			Answer	Mark	Guidance
7	a		300 000 (1)	1	
	b		distance light travels in a year (1)	1	**allow** one year as 365 days / 52 weeks credit the correct calculation 9.6 x10 ^{15} m or 9.6 x10 ^{12} km
	c		Far-away stars appear very dim. ☑ ☐ ☐ The parallax seen ... ... very small. ☑ ☐	1	both correct for 1 mark
			Total	3	

8				3	all four correct = 3 marks three correct = 2 marks two correct = 1 mark

statement	Dr Adams	Dr Baker	both	neither
asteroid ...				✓
data ...			✓	
explanation ...			✓	
volcanic eruptions ...		✓		

			Total	3	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>9</td><td>a</td><td></td><td>
<table>
<tr><th></th><th>Wegener's explanation</th><th>fixed continents</th><th>neither explanation</th></tr>
<tr><td>Rock layers in different …</td><td>✓</td><td></td><td></td></tr>
<tr><td>… whole world have fossils</td><td></td><td></td><td>✓</td></tr>
<tr><td>The continents did not …</td><td></td><td>✓</td><td></td></tr>
<tr><td>The continents of Africa …</td><td>✓</td><td></td><td></td></tr>
</table>
</td><td>3</td><td>all four correct = 3 marks
three correct = 2 marks
two correct = 1 mark</td></tr>
<tr><td></td><td>b</td><td></td><td>C E A D B (1)</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
</table>

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