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

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, Diplomas, GCSEs, OCR Nationals, Functional Skills, 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 specifications 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 2011

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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
<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

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 <u>and</u> 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 <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**

MARK SCHEME:

Question			Answer	Mark	Guidance
1	a		chromosome — only one needed to have the feature it produces gene — two copies needed to have the feature it produces dominant allele — long strand of DNA recessive allele — instructions for a cell … … how to make a protein	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	

Question			Answer	Mark	Guidance
1	d		**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)	3	do **not** allow 'become specialised'
	e		<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>	3	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
			Total	12	

| 2 | | | **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) | 2 | do **not** allow vague references to 'putting back into mother' |
| | | | **Total** | 2 | |

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
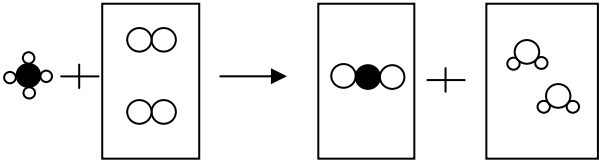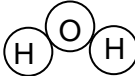
Question			Answer	Mark	Guidance
4	b		method one (1) correct explanation of method one (1) method two (1) correct explanation of method two (1) maximum 3 marks	3	award max 2 marks for methods for explanations, do not allow reference to 'lowering pollution' *methods:* car-sharing – fewer vehicles on the 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**	

8

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: or Ⓒ **accept** for oxygen: ◯ or Ⓞ 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

Question			Answer	Mark	Guidance
5	b		photosynthesis (1) dissolving / reacting with water (1)	2	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
			Total	**4**	

Question			Answer	Mark	Guidance
6			<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.	4	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
			Total	**4**	

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 9.6×10^{15} m or 9.6×10^{12} km
	c		Far-away stars appear very dim. ☑ ☐ ☐ The parallax seen ... ... very small. ☑ ☐	1	both correct for 1 mark
			Total	**3**	

				Mark	Guidance
8			<table><tr><th>statement</th><th>Dr Adams</th><th>Dr Baker</th><th>both</th><th>neither</th></tr><tr><td>asteroid ...</td><td></td><td></td><td></td><td>✓</td></tr><tr><td>data ...</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>explanation ...</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>volcanic eruptions ...</td><td></td><td>✓</td><td></td><td></td></tr></table>	3	all four correct = 3 marks three correct = 2 marks two correct = 1 mark
			Total	**3**	

Question			Answer	Mark	Guidance
9	a			3	all four correct = 3 marks three correct = 2 marks two correct = 1 mark

	Wegener's explanation	fixed continents	neither explanation
Rock layers in different …	✓		
… whole world have fossils			✓
The continents did not …		✓	
The continents of Africa …	✓		

Question			Answer	Mark	Guidance
	b		**C E A D B** (1)	1	
			Total	4	

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