OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A

General Certificate of Secondary Education

Unit **A141/01:** Unit 1: Modules B1, C1, P1 (Foundation Tier)

Mark Scheme for June 2013

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

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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.

Annotations

Available in scoris to annotate scripts

Annotation	Meaning
	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

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	alternative wording
ORA	or reverse argument

ADDITIONAL OBJECTS: You **must** assess and annotate the additional objects for each script you mark. Where credit is awarded, appropriate annotation must be used. If no credit is to be awarded for the additional object, please use annotation as agreed at the SSU.

Subject-specific Marking Instructions

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

b. 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.

Eg For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.
☐	☐	☒
☐	☐	☒
☒	✓	✓
☒	☒	✓
☐	☐	☐
This would be worth 1 mark.	This would be worth 0 marks.	This would be worth 1 mark.

d. Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses.
Credit should be given for each box correctly ticked. 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.
Eg If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

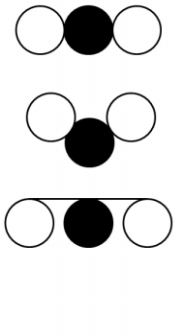
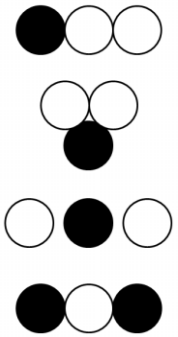
the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

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

Question			Answer	Marks	Guidance
1	(a)		A D B C / cell; nucleus; chromosome; DNA	2	look for A before D, D before B, B before C all correct = 2 marks 2 correct = 1 mark **allow** any indication of a correct answer
	(b)		proteins (1) genes (1)	2	answers must be in correct order
			Total	**4**	

Question			Answer	Marks	Guidance
2	(a)		hh (1)	1	if more than one box is ticked = 0 marks
	(b)		*any two from:* late onset (1) tremor (1) clumsiness (1) memory loss (1) inability to concentrate (1) mood swings (1)	2	**allow** any other correct symptom **allow** muscle spasms/shaking/jerky
	(c)		**Level 3 (5–6 marks)** Answer considers implications to Heather and her family using examples across different areas to develop the consequences. Quality of written communication does not impede communication of science at this level. **Level 2 (3–4 marks)** Answer considers implications to Heather and to her family using an example to develop the consequences. Quality of written communication partly impedes communication of science at this level. **Level 1 (1–2 marks)** Answer considers an implication to Heather or her family. Quality of written communication impedes communication of science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** family = principally Heather's partner and children in this context, but allow siblings and mother ignore use of the term 'carrier' to mean 'having the affected allele' **Indicative scientific points may include:** • will know if she has the disease • will enable her to prepare • will enable her to plan treatment • will allow her to plan a family • results may not be accurate (false positives/negatives) • may not want her family to know • may not want to know herself • could cause stress or anxiety • employer could obtain information • might mean less chance of promotion • might mean more chance of losing job • could increase insurance premiums **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**9**	

Question			Answer	Marks	Guidance
3	(a)		Two mothers weighed exactly 3kg when they were born. ☐ The birth weight of a baby is generally greater than the birth weight of its mother. ✓ There is a correlation between birth weight of a baby and the birth weight of its mother ✓	2	3 correct = 2 marks 2 or1 correct = 1 mark if 4 ticks deduct 1 mark 5 ticks = 0
	(b)		*any two from:* diet of the mother (1) whether the mother smoked (1) how much rest the mother had / how much exercise the mother has done (1) whether the mother took drugs (1) whether the mother drank alcohol (1)	2	**accept** any reasonable suggestion clearly relating to the mother
	(c)		*don't agree with Leila because:* father's genes/DNA will also have an influence (1)	1	**accept** answers that indicate genes are from both parents
	(d)		twins will be smaller/will weigh less (1) idea that twin will share resources (1)	2	look for answers comparing twins with single births rather than comparing the two twins
			Total	**7**	

Question			Answer	Marks	Guidance
4	(a)		water (1); carbon particulates (1)	2	answers must be in correct order
	(b)		one correctly drawn carbon dioxide molecule  (1); second correctly drawn CO_2 molecule (1)	2	acceptable  not acceptable 
			Total	**4**	

Question			Answer	Marks	Guidance
5	(a)		*any two from:* these are factors that may change the outcome (1) more coal burned in one day releases more SO_2/amount of SO_2 in the flue gas (1) only one factor (the new equipment) must be changed (1) to allow a comparison to be made (1)	2	**accept** 'gases' for SO_2 **allow** a description of how this is a comparative test **ignore** fair test
	(b)		☐ ☐ ☐ Pieces of coal have different amounts of sulfur in them. ✓ (1) The more sulfur there is in the coal the more sulfur dioxide is made. ✓ (1)	2	1 mark for each correct tick if 3 ticks deduct 1 mark 4 or 5 ticks = 0

Question			Answer	Marks	Guidance
	(c)		**Level 3 (5–6 marks)** Most pollutants named **AND** some descriptions of how pollution from power stations may be reduced. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Some pollutants named **AND** a description of how pollution from power stations may be reduced. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Some pollutants named **OR** a description of how pollution from power stations could be reduced Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Indicative scientific points may include:** **Pollutants** • carbon dioxide, • carbon monoxide • particulate carbon • nitrogen oxides **ignore** reference to sulfur dioxide **Methods to reduce pollution from power stations (including sulfur dioxide)** • less fuel burned so less pollution made • more oxygen supplied to lower carbon monoxide and soot • removal of solid particulates by electrostatic filter • removal of sulfur dioxide by wet scrubbing: using an alkaline slurry e.g a spray of calcium oxide and water or using sea water • renewable energy resources provide electricity without burning fossil fuels so less fuel burned and less pollution • an example of a renewable energy resource(eg solar panels on roofs, hydroelectric power station) for the second point • using nuclear energy • using less electricity lowers pollution from power stations that burn fossil fuels • an example of saving electricity (eg more insulation in houses) **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**10**	

Question			Answer	Marks	Guidance
6	(a)		increases/goes up/gets bigger/rises/faster; increases/goes up/gets bigger/rises/higher;	1	both words needed for 1 mark
	(b)	(i)	41 mpg	1	**accept** 40–42
		(ii)	48 mph	1	**accept** any number between 44–52
	(c)		*any three from:* (from graph) fewer miles/gallon at 80mph than 70mph/ mpg goes down after 53 mpg/48 mph (1); so more fuel burnt (for a given trip) (1); burning fuel makes pollutants/the more fuel burned the more pollutants released (1); so more pollution with speed increased (1)	3	For maximum marks ideas must be linked Ignore any reference to Joe or Anne and look for marking points on the left. 'the faster you go the more fuel burnt' earns the first two marks as this answer clearly interprets a decrease in miles/gallon
			Total	**6**	

Question			Answer	Marks	Guidance
7	(a)	(i)	Wegener was not a geologist. ✓ The older explanations were simpler than Wegener's. ✓	2	1 mark for each correct tick if 3 ticks deduct 1 mark 4 or 5 ticks = 0
		(ii)	 The American and European continents are moving apart. ✓	1	2 ticks = 0
	(b)	(i)	 both P-waves and S-waves ✓ 	1	2 ticks = 0

Question			Answer	Marks	Guidance
		(ii)	The S-waves are slower than the P-waves. ✓ The S-waves will travel 15 km in 3 seconds. ✓	2	1 mark for each correct tick if 3 ticks deduct 1 mark 4 or 5 ticks = 0
			Total	**6**	

Question			Answer	Marks	Guidance
8	**(a)**		as distance goes up, time goes up owtte (1); line gets steeper as the distance increases/ orbit time gets even greater	2	**accept** '<u>positive</u> correlation between distance and time' for first marking point **accept** reverse argument look for a comparative gradient observation accept twice as far away means it goes more than twice as fast 'as you get further from the Sun, the time for an orbit increases more and more rapidly' = (2)
	(b)		*any two from* correct plotting of Encke (1); (comet is not a planet) so has an elliptical orbit/ doesn't go round in a circle (1) average distance from the Sun is less than 4.1. AU/should have used the average distance from sun/not always at 4.1 AU from Sun (1)	2	**allow** tolerance of half a square in any direction
			Total	**4**	

Question			Answer	Marks	Guidance
9			**Level 3 (5–6 marks)** Identifies some features that have occurred in rocks, describes some of the processes involved **AND** concludes that this must have taken a long time. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Identifies some features that have occurred in rocks **AND** gives some idea of the processes that have occurred. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Identifies some features **OR** processes that have occurred in rocks, and may indicate that the Earth is older than stated. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to E** **Features** • layers in rocks • fossils in rocks • bends in rocks **Process** • layers of rock in cliff produced from sediments in seas/idea of sedimentation • fossils – reference to sedimentation and continental drift • bend shows forces acting on/changes in Earth's crust • discussion of Wegener's ideas if qualified with current acceptance of tectonic plates changing the rocks/folding • erosion **Conclusion** • must have taken many years to produce all these layers • layers of rocks at the bottom will be older than those at the surface **Age of Earth** • Earth must be much older than a few thousand years ('deep time') • Earth now reckoned to be about 4½ billion years old • Evidence for age of the earth -reference to radioactive dating, magnetic stripes or other technological evidence for age of Earth (eg radioactive dating) **Use the L1, L2, L3 annotations in Scoris; do not use ticks**.
			Total	**6**	

Question			Answer	Marks	Guidance
10	(a)		Betelgeuse closer (to Earth) than Rigel (1); further stars appear/look/seem dimmer /closer stars appear/look/seem brighter (than they actually are) (1)	2	accept reverse argument 2nd mark is for an explanation – should have the generalisation that closer things look brighter than they really are : accept eye is more sensitive to red light/red light is less absorbed by atmosphere owtte **ignore** reference to redshift **allow** light spreads out with distance
	(b)		*any two from:* mention of parallax / full description of lab demonstration of parallax(1); star appears in a different position/angle (1); compared with distant star (1); can calculate distance from distance H has moved (1); the further away the star is, the less it appears to move. (1)	2	full description e.g. viewing thumb from alternate eyes compared with distant part of the room
			Total	**4**	

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