OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

Unit **A218/02:** Ideas in Context (Higher Tier)

Mark Scheme for June 2011

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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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

Available in scoris to annotate scripts:

	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

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			Answers	Mark	Guidance
1	a	i	**any three from:** exhaust gases sent out from rocket/exhaust gases at high speed; rocket engine produces <u>thrust</u> / implies that <u>thrust</u> is a force that makes the rocket move; (thrust) force acts against or is bigger than gravity/weight; rocket engine <u>increases</u> momentum of rocket; [not just changes] backwards force from gases pushes rocket up / these forces opposite in direction / interaction pair; these forces equal in size;	3	**accept** equivalent answer in terms of momentum e.g. total momentum zero; exhaust gases have momentum; momentum of rocket must be equal and opposite; **ignore** exhaust forces push on the ground; **allow** downward <u>force</u> for gravity / weight. **ignore** air resistance / drag
		ii	0 / zero / nothing (1)	1	
	b		5 to 7.5 (1)	1	

	c		**1st mark** mass gets smaller / it gets lighter / less weight (1) **2nd mark** thrust / force on rocket is not affected / force acting against the rocket is reduced (gravity) / needs less thrust/force (to make it move upwards) / F=ma (1) OR momentum = mass x velocity / momentum (of rocket) is the same (1)	**2**	**ignore** 'if the mass does not change…' but 'if the mass increases…' stops the first mark from scoring **allow** thrust stays the same **allow** 2 marks for 'less weight acting against the rocket'
	d	**i**	height = 3750 m (1) (correctly reads graph) w = 112500 ÷ 3750 **OR** 30 = 112500 ÷ 3750 **OR** 112500 = 30 x 3750 **OR** 112500 ÷ 30 = 3750 (1)	**1** **1**	1 mark for 3750 anywhere in answer; **allow** 3700 – 3800; 1 mark for calculation set out as shown **allow** ecf for incorrect height in calculation;

		ii	**For 1 mark** KE = ½mv^2 / k.e. = 0.5 x 3 x v^2 **OR** 112500J used in calculation; (1) **For 2 marks** correct substitution 112500 = 0.5 x 3 x v^2 **OR** v^2 = 112500 ÷ (0.5 x 3) **OR** v = √[112500 ÷ (0.5 x 3)] (1) **For 3 marks** V = 274 (1)	**3**	**allow** MP1 if wrong value of KE is used in correct equation but no further ecf **MP2** is (2) marks because it includes the answer for MP1 **accept** 273.86..... 3 marks for correct numerical answer
	e		**the Earth** (1)	**1**	
			Total	**[13]**	

Question			Answer	Mark	Guidance
2	a		spinal cord (1)	1	**ignore** backbone/spine
	b		sensory/receptor and motor/effector (neurons) (1)	1	both correct responses = 1 mark **accept** in either order **accept** relay for either sensory or motor
	c		**any three from:** neuron releases serotonin/ other neurotransmitter/ (synapse) chemical (into gap); (crosses gap by) diffusion; (the chemical) binds with receptor / fits into receptor (on another neuron); next/second/motor neuron transmits an (electrical) impulse / signal; Serotonin / neurotransmitter / chemical is reabsorbed / taken <u>in</u> (by first neuron);	3	**accept** taken in by… collected by… picked up by… received by… etc for binds idea **accept** 'other neuron' for receptor **ignore** 'the other side **ignore** 'goes <u>to</u>' or 'is taken <u>to</u>'. Look for idea of absorbed
	d		2 ÷ 30 x 100 (1) 6.67% (1)	2	correct answer with no working scores 2 **accept** 7**/**6.7/6.6*/6.6 recurring (%) as fully correct **allow** 6.6 for 1 mark
	e	i	storage OR learning <u>facts / information</u> (1) and retrieval / recall (of information) (1)	2	**accept** 'storage' alone **ignore** 'learning' alone **ignore** 'remembering'

		ii	memory is a function of the cerebral cortex whereas balance is a function of the cerebellum (1) cerebral cortex changes more with age (than the cerebellum) ORA (1)	2	**need idea of comparison**
		iii	**any two from:** long term memory is established (when younger) / before any damage to brain / does not need rehearsing or refreshing / already transferred; in older people… (for short term memory) less information is transferred / passes (from sensory to short term / from short term to long term memory); cannot refresh recently processed information / information less easily rehearsed; neurons/nervous pathways are damaged / neurons less likely to transmit impulses (in the brain) / there are fewer neuron (pathways); QWC	2 1	**accept** 'already there' **accept** we do not forget information stored in long term memory (this is shown on the diagram) but **ignore** keeps long term memory / does not lose long term memory (restates the question) Look at first two lines. Sentences should start with a capital letter and have a full stop at the end, with words spelled correctly. **allow** 1 error in non-technical terms. **ignore** errors in technical terms.
			Total	**[14]**	

Question			Answer	Mark	Guidance
3	a		too reactive / very reactive / more reactive (than carbon) (1)	1	**ignore** cannot extract by heating with carbon **ignore** purity of copper
	b		ore does not contain very much copper / only small amounts of copper (1)	1	**allow** need to remove overburden/rock which contains no ore **ignore** we are running out of copper / it is rare **ignore** contains more waste rock than copper (ORA)
	c		reacting with ore/malachite / reuse in the first stage (1)	1	**accept** used for leaching **ignore** reuse in the process or reaction
	d		blister: heat/hot air/high temperature/thermal energy (1) electrolysis: electrical energy/electricity (1)	2	 **ignore** for electrolysis
	e	i	reacts / combines / bonds / binds with oxygen / forms an oxide / forms sulfur dioxide / forms SO_2 / gains oxygen / loses electrons (1)	1	**accept** 'adds oxygen' **do not accept** 'mixes with oxygen'
		ii	copper sulfide+oxygen →copper + sulfur (di)oxide (1) $Cu_2S + O_2 \rightarrow 2Cu + SO_2$ (1)	2	**allow** $2CU + So_2$ **do not allow** SO^2 or Cu_2
	f		**1 mark** copper ions gain <u>electrons</u> / are reduced **2 mark** each copper ion gains **two** electrons	2	**allow** incorrect equation that shows addition of electrons for one mark e.g. Cu^+ / Cu^{2+} + e → Cu **allow** fully correct equation for 2 marks Cu^{2+} + 2e → Cu (2) **ignore** mention of which electrode is involved. **allow** (1) for mention of <u>two</u> electrons

	g		**any three from:** metals conduct when solid / ionic compounds do not conduct when solid; metals contain free / delocalised electrons / sea of electrons; metals conduct by electrons moving; ionic compounds conduct by ions moving; ionic compounds break down when they conduct;	**3**	 **do not allow** ions move in metals Electrons in metal are free to move = (2) **do not allow** electrons move in ionic compounds **Ignore** electricity passes through the ions / ions pass the current on – look for idea of movement
			Total	**[13]**	

			Paper Total	**[40]**	

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