

**Applied Science (Double Award)**

General Certificate of Secondary Education

Unit **B482/01** Science for the needs of Society

**Mark Scheme for June 2012**

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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	alternative wording
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

Question		Answer	Marks	Guidance
1	(a)	21% = oxygen; 0.03% = carbon dioxide; 78% = nitrogen	3	<b>accept</b> correct formulae
	(b)	<b>any two of:</b> <u>more</u> carbon dioxide;  <u>more</u> named pollutant e.g SO <sub>2</sub> , NO, CO, (tropospheric) ozone, smog, methane, hydrocarbons, greenhouse gases;  ozone layer damage;  increased temperature	2	<b>ignore</b> 'more pollution' / less oxygen <b>ignore</b> 'humans produce...'  <b>accept</b> (2) for TWO correctly NAMED pollutants  <b>ignore</b> references to global warming/climate change
	(c)	(i) <b>any two of:</b> coal gas oil peat	2	<b>accept</b> methane <b>accept</b> example of oil based fuel e.g. petrol/diesel
		(ii) combustion/burning	1	<b>ignore</b> 'as heat'
	(d)	crystallization evaporation photosynthesis respiration	1	

✓

Question		Answer	Marks	Guidance
	(e)	biofuels <input type="checkbox"/> biomass <input type="checkbox"/> hydroelectric <input checked="" type="checkbox"/> Petrol <input type="checkbox"/> wind turbines <input checked="" type="checkbox"/>	2	
		<b>Total</b>	<b>11</b>	

Question		Answer	Marks	Guidance
2	(a)	iron	1	ignore 1535
	(b)	2.70 stated somewhere in answer; x5 = 13.50	2	answer 13.5 scores (2)
	(c)	aluminium;  because much lighter AND good conductor/does not corrode;  allow (1) for <u>copper</u> because <u>excellent conductivity</u> and <u>corrodes slowly</u>	2	<b>allow</b> AW  <b>apply</b> list principle if incorrect properties are mentioned
	(d)	(i) expensive / cost	1	<b>apply</b> list principle if incorrect properties are mentioned
		(ii) excellent conductivity;  doesn't corrode	2	<b>apply</b> list principle if incorrect properties are mentioned  <b>allow</b> corrodes very slowly
	(e)	<p>polymers are made of carbon and hydrogen atoms <input type="checkbox"/></p> <p>polymers are insulators <input checked="" type="checkbox"/></p> <p>polymers are very flexible <input checked="" type="checkbox"/></p> <p>polymers have low melting points <input type="checkbox"/></p> <p>polymers are made from crude oil <input type="checkbox"/></p>	2	
		<b>Total</b>	<b>10</b>	

Question		Answer	Marks	Guidance
3	(a)	(yes because) she drinks more <u>per week</u> / more than the 14 maximum;  her total for the week is 21	2	<b>allow</b> (2) for 'she has 7 units too many'
	(b)	different body mass / weight / men are heavier/bigger	1	
	(c) (i)	glucose; oxygen	2	
	(ii)	pumps <u>blood</u>	1	
	(d)	<b>any two of:</b> no smell of smoke / hair / teeth / hands / skin cleaner;  clearer lungs/throat /no cough / easier breathing / no respiratory disease / more oxygen available;  inhales less carbon monoxide;  less likely to get cancer;  less likely to get heart disease / healthier heart / improved circulation;  improved taste/smell;  longer life expectancy;  less risk of infertility	2	<b>ignore</b> passive smoking  <b>ignore</b> fitter / healthier  lung cancer = (2)
<b>Total</b>			<b>8</b>	



Question		Answer	Marks	Guidance
4	(a)	wheat/crop/plants → greenfly → ladybirds	1	
	(b)	(i) increases	1	
		(ii) (greenfly) eat wheat/crops/plants	1	
	(c)	<b>any three of:</b> decreases yield / less wheat/crop/plants;  ladybirds eat greenfly;  more greenfly;  greenfly eat wheat	3	
	(d)	(i) nitrates; phosphates	2	
		(ii) the roots	1	
	(e)	less light / less space / less water / less minerals / less nutrients / competition idea	1	
	(f)	harms <u>other</u> plants / harms animals or humans / not organic	1	<b>ignore</b> taste <b>ignore</b> harms the wheat/crop <b>ignore</b> gets into water ideas
<b>Total</b>			<b>11</b>	

Question		Answer	Marks	Guidance
5	(a)	<p>advantage: no noise / less traffic / lose eyesore / more land available for development</p> <p>disadvantage: no jobs / less money available (locally)</p>	2	ignore CO <sub>2</sub> / pollution
	(b)	<p>research and development of new processes <input checked="" type="checkbox"/></p> <p>selling the steel to customers <input type="checkbox"/></p> <p>checking the quality of the steel <input checked="" type="checkbox"/></p> <p>interviewing new office employees <input type="checkbox"/></p> <p>arranging the transport of the steel around the country <input type="checkbox"/></p>	1	both needed
	(c)	<p>element: iron / carbon / calcium</p> <p>compound: carbon monoxide / carbon dioxide / calcium carbonate / iron oxide</p> <p>mixture: air / slag / limestone / iron ore / gases / coke</p>	1	one example of each required
	(d)	mixture of mineral with waste rock	1	
	(e) (i)	carbon dioxide	1	accept CO <sub>2</sub>
	(ii)	iron oxide + carbon monoxide → iron + carbon dioxide	1	allow ecf from (i)

Question	Answer	Marks	Guidance												
(f)	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><b>name</b></td> <td style="text-align: center; width: 50%;"><b>formula</b></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">iron</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">CaCO<sub>3</sub></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">calcium carbonate</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">Fe<sub>2</sub>O<sub>3</sub></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">iron oxide</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">CO<sub>2</sub></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">carbon dioxide</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">CO</td> </tr> <tr> <td></td> <td style="border: 1px solid black; padding: 2px; text-align: center;">Fe</td> </tr> </table>	<b>name</b>	<b>formula</b>	iron	CaCO <sub>3</sub>	calcium carbonate	Fe <sub>2</sub> O <sub>3</sub>	iron oxide	CO <sub>2</sub>	carbon dioxide	CO		Fe	2	all correct = 2 marks 3 correct = 1 marks 0,1 or 2 correct = 0 marks
<b>name</b>	<b>formula</b>														
iron	CaCO <sub>3</sub>														
calcium carbonate	Fe <sub>2</sub> O <sub>3</sub>														
iron oxide	CO <sub>2</sub>														
carbon dioxide	CO														
	Fe														
(g)	lead	1													
<b>Total</b>		<b>10</b>													

Question			Answer	Marks	Guidance
6	(a)	(i)	radio visible light	2	<b>allow</b> microwave
		(ii)	<b>any two of:</b> IR / infrared UV / ultraviolet x-ray gamma (rays) / $\gamma$	2	<b>allow</b> microwave
		(iii)	ultraviolet / uv	1	
		(iv)	radio waves have a longer wavelength than ultraviolet waves <input checked="" type="checkbox"/> radio waves can be seen by the human eye, ultraviolet waves cannot <input type="checkbox"/> ultraviolet waves have a higher frequency than radio waves <input checked="" type="checkbox"/> ultraviolet waves have a larger wavelength than radio waves <input type="checkbox"/> radio waves don't have a frequency, ultraviolet waves do <input type="checkbox"/> radio waves and ultraviolet waves travel at different speeds through space <input type="checkbox"/>	2	
	(b)	(i)	stars / named star / type of star (1)  galaxies / named galaxies / type of galaxy (1)	2	<b>accept</b> other correct examples e.g. black-hole, nebula
		(ii)	brightness <input type="checkbox"/> distance <input checked="" type="checkbox"/> spectrum <input type="checkbox"/> time <input type="checkbox"/>	1	
<b>Total</b>				<b>10</b>	

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