

Mark Scheme for June 2012

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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.

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Annotations

Annotation	Meaning
	Correct Response
	Incorrect Response
	Benefit of the doubt
	benefit of the doubt not given
	error carried forward
	Information omitted
	Ignore
	Reject
	Contradiction

Abbreviations, annotations and conventions used in the detailed Mark Scheme

Annotation	Meaning
/	alternate and acceptable answers for the same marking point
(1)	separates marking points
allow	answers that can be accepted
not	answers which are not worthy of credit
reject	answers which are not worthy of credit
ignore	statements which are irrelevant
()	words which are not essential to gain credit
—	underlined words which are not essential to gain credit
ecf	error carried forward
AW	alternative wording
ora	or reverse argument

Question		Answer	Marks	Guidance
1	(a)	mammal(1) has fur / hair (1)	2	allow external ears (1) ignore mammary glands / produces milk / give birth to live young other features eg reference to teeth, negates correct answer
	(b)	population (1)	1	
	(c)	(i) Miguel and Rosa (1)	1	allow either order
		(ii) have the smallest population in 2000 / 2006 (1)	1	Answers must be comparative and be clear that the smallest population refers to later time so: allow decreased (rapidly) and so have the smallest population (1) ignore unqualified they have the smallest population
		(iii) captive breeding of foxes <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> capturing golden eagles and releasing them a long distance away <input checked="" type="checkbox"/>	1	
	(d)	any three from: mutation (produces resistance) (1) resistant foxes are more likely to survive / non resistant die (1) resistant foxes reproduce (1) pass on the gene (for resistance) (1)	3	penalise immune as an alternative to resistant once only ignore variation ignore strongest survive allow foxes with the mutation survive allow resistant foxes produce offspring
		Total	9	

Question		Answer	Marks	Guidance
2	(a)	carbon dioxide and water on LHS (1) glucose and oxygen on RHS (1)	2	ignore references to chlorophyll, light and energy allow sugar (1) allow correct chemical symbols eg not CO ²
	(b)	host (1)	1	
	(c)	(i) dwarf mistletoe takes more sugar (from the tree) (1)	1	answer must be comparative
		(ii) Eastern mistletoe has more chlorophyll as it needs to photosynthesise (more) (1) as it gets less sugar from the tree (1)	2	allow Eastern mistletoe has more chlorophyll as it needs to produce (more) food (1) allow reverse argument allow reverse argument
		Total	6	

Question		Answer	Marks	Guidance
3	(a)	it moves (like an animal) and it photosynthesises / has chloroplasts (like a plant) (1)	1	allow has some plant and some animal characteristics (1) allow chlorophyll
	(b)	(i) tick in top box in the left column (<i>Euglena</i> reproduces more slowly than <i>Selenastrum</i> but achieves the same number of individuals eventually). (1) tick in third box in the right column (<i>Euglena</i> reproduces faster than <i>Selenastrum</i> and exists in larger numbers throughout the experiment). (1)	2	every incorrect tick negates a correct tick
		(ii) niche (1) out-compete(1)	2	allow compete (with) (1)
		Total	5	

Question		Answer	Marks	Guidance
4	(a)	to show if something is hot or cold / signals temperature change (1)	1	allow cups / (electric) kettles / pans / thermometer (on someone's head) / baby baths / battery testing / T-shirts / mood rings / drink cans / food spoons / mugs / wallpaper / radiators / paint walls (1) ignore references to cooker hobs / fridges / freezers ignore detects temperature changes
	(b)	water (1)	1	allow correct formula
	(c)	safer (1) as old pigments were radioactive (1)	2	allow less toxic / less harmful / ora (safer mark does not rely on giving correct reason) ora
Total			4	

Question		Answer	Marks	Guidance
5	(a)	they are less dense (than the mantle) / ora (1)	1	ignore lighter (than the mantle)
	(b)	lithosphere (1)	1	
	(c)	convection currents (in the mantle) (1)	1	
	(d)	predict future (volcanic) eruptions (1) gain information about the structure of the Earth / gain information about processes under the surface of the Earth (1)	2	ignore references to investigating plate movement
Total			5	

Question		Answer	Marks	Guidance
6	(a)	13.75(°C) (1)	1	allow answer in range 13.5 – 14.0
	(b)	more frequent collisions (1) more energetic / successful / effective collisions (1)	2	allow collide more often / more chance of a collision (1) ignore more collisions allow more energetic / successful / effective collisions per second (2)
	(c)	any time less than 17.75 (minutes) (1)	1	allow a range of times if range lies below 17.75 minutes (1) units not required but if incorrect units = 0
		Total	4	

Question		Answer	Marks	Guidance	
7	(a)	<p>Either: copper (1) any two from: tarnishes very slowly (1) shiny (1) strong (1) good thermal conductivity (1) high melting point (1)</p> <p>or aluminium (1)</p> <p>protective oxide layer (1) good thermal conductivity (1)</p>	3	<p>copper / aluminium must be stated to score marks for properties.</p> <p>ignore does not tarnish / it tarnishes allow second strongest ignore relative strength of 4.8 allow third highest conductivity ignore conductivity of 5.7 allow second highest MP ignore MP = 1083</p> <p>stand alone mark</p> <p>each of the following references negates a correct property if three or more properties are given not reference to melting point not reference to dull light grey not references to strength i.e. one correct and one incorrect scores 1 two correct and one incorrect scores 1 two correct and two or more incorrect scores 0</p>	
	(b)	(i)	<p>advantage – stronger (1)</p> <p>explanation – idea that car more resistant to collision / less denting (1)</p>	2	<p>answer must be comparative ignore it is strong allow both strength figures quoted</p> <p>allow less damage / car withstands a crash ignore reference to protection of people</p>
		(ii)	<p>any two from: idea that aluminium does not corrode / rust (1) idea that aluminium forms a protective layer (1) car body lasts longer (1)</p>	2	<p>allow aluminium less dense / lightweight (1) allow so better fuel economy (1) ignore lighter ignore reference to speed</p>
			Total	7	

Question		Answer	Marks	Guidance
8	(a)	kinetic (1)	1	allow movement
	(b)	Advantage any one from: renewable / sustainable (1) no (polluting) waste (1) Disadvantage any one from: visual pollution (1) dependant on wind speed (1) need space (for wind farm) (1)	2	allow no greenhouse gases / does not cause global warming (1) allow free energy source (1) allow fields can be used for cattle (1) ignore environmentally friendly / no pollution (1) allow will not work if no wind (1) allow noisy (1) allow harms wildlife (1)
	(c)	glass (1) mirrors (1)	2	allow lenses
		Total	5	

Question			Answer	Marks	Guidance
9	(a)	(i)	uranium (1)	1	allow plutonium (1)
		(ii)	cancer (1)	1	allow higher level answers eg cells / DNA mutates (1)
	(b)	(i)	6 384 000 (2) but if answer is incorrect 38 000 x 24 x 7 (1) or 38 000 x 168 (1)	2	calculation in megawatthours ie 6384 allow 1 mark
		(ii)	fermentation (1)	1	allow description of fermentation eg mixed with yeast / bacteria (1) placed in a fermenter / digester (1) allow produces methane (1) allow produces gas which can be burned (1)
			Total	5	

Question		Answer	Marks	Guidance
10	(a)	large gravity (of Jupiter disrupts formation of planet / AW) (1)	1	ignore just gravity of Jupiter
	(b)	(i) any two from: maintenance – if anything goes wrong, difficult to fix (1) unable to adapt to unforeseen circumstances as quickly as manned (1)	2	allow any sensible unforeseen circumstance ignore harder to control / needs to be remote controlled
		(ii) any two from: temperature (1) magnetic field (1) radiation (1) gravity (1) atmosphere (1) surface features (1) photographs / images / video (1) composition of surface (1) information about possible life forms (1) information about moons (1)	2	allow weather / heat (1) allow gas levels / reference to named gas (1) ignore takes samples
	(c)	(light from) galaxies / stars exhibits red shift (1) any one from galaxies / stars are moving away (1) (extrapolate to find all) galaxies /stars started at a point (1)	2	any reference to planets penalise once allow higher level answers in terms of frequency or wavelength ignore Universe expanding
		Total	7	

Question		Answer	Marks	Guidance
11	(a)	4 (V) (1)	1	allow -4 (V)
	(b)	movement / turning / oscillation / rotation AW (1) of coil relative to magnet / of magnet relative to coil (1)	2	allow any reference to movement
		Total	3	

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