



# GCSE

## Science B

General Certificate of Secondary Education

Unit **B622/02**: Unit 2: Modules B2, C2, P2 (Higher Tier)

## Mark Scheme for June 2012

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## Annotations

Annotation	Meaning
	Correct Response
	Incorrect Response
<b>BOD</b>	Benefit of the doubt
<b>NBOD</b>	benefit of the doubt <b>not</b> given
<b>ECF</b>	error carried forward
	Information omitted
<b>I</b>	Ignore
<b>R</b>	Reject
<b>CON</b>	Contradiction

**Abbreviations, annotations and conventions used in the detailed Mark Scheme**

<b>Annotation</b>	<b>Meaning</b>
/	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

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Question			Answer	Marks	Guidance
1	(a)		mammal(1) has fur / hair (1)	2	<b>allow</b> external ears (1) <b>ignore</b> 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 <b>and</b> Rosa (1)	1	<b>allow</b> 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:  <b>allow</b> decreased (rapidly) and so have the smallest population (1) <b>ignore</b> 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)		<b>any three from:</b> 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 <b>ignore</b> variation <b>ignore</b> strongest survive <b>allow</b> foxes with the mutation survive <b>allow</b> resistant foxes produce offspring
			<b>Total</b>	<b>9</b>	

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Question			Answer	Marks	Guidance
2	(a)		carbon dioxide and water on LHS (1) glucose and oxygen on RHS (1)	2	<b>ignore</b> references to chlorophyll, light and energy <b>allow</b> sugar (1) <b>allow</b> correct chemical symbols eg <b>not</b> CO <sup>2</sup>
	(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	<b>allow</b> Eastern mistletoe has more chlorophyll as it needs to produce (more) food (1) <b>allow</b> reverse argument  <b>allow</b> reverse argument
			<b>Total</b>	<b>6</b>	

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Question			Answer	Marks	Guidance
3	(a)		it moves (like an animal) <b>and</b> it photosynthesises / has chloroplasts (like a plant) (1)	1	<b>allow</b> has some plant and some animal characteristics (1) <b>allow</b> 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	<b>allow</b> compete (with) (1)
			<b>Total</b>	<b>5</b>	

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Question			Answer	Marks	Guidance
4	(a)		to show if something is hot or cold / signals temperature change (1)	1	<b>allow</b> 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)  <b>ignore</b> references to cooker hobs / fridges / freezers <b>ignore</b> detects temperature changes
	(b)		water (1)	1	<b>allow</b> correct formula
	(c)		safer (1)  as old pigments were radioactive (1)	2	<b>allow</b> less toxic / less harmful / ora (safer mark does not rely on giving correct reason)  ora
			<b>Total</b>	<b>4</b>	

Question			Answer	Marks	Guidance
5	(a)		they are less dense (than the mantle) / ora (1)	1	<b>ignore</b> 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	<b>ignore</b> references to investigating plate movement
			<b>Total</b>	<b>5</b>	



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

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Question			Answer	Marks	Guidance
7	(a)		<p><b>Either:</b> copper (1) <b>any two from:</b> tarnishes very slowly (1) shiny (1) strong (1) good thermal conductivity (1) high melting point (1)</p> <p><b>or</b> 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><b>ignore</b> does not tarnish / it tarnishes <b>allow</b> second strongest <b>ignore</b> relative strength of 4.8 <b>allow</b> third highest conductivity <b>ignore</b> conductivity of 5.7 <b>allow</b> second highest MP <b>ignore</b> 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 <b>not</b> reference to melting point <b>not</b> reference to dull light grey <b>not</b> 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><b>answer</b> must be comparative <b>ignore</b> it is strong <b>allow</b> both strength figures quoted</p> <p><b>allow</b> less damage / car withstands a crash <b>ignore</b> reference to protection of people</p>
		(ii)	<p><b>any two from:</b> idea that aluminium does not corrode / rust (1) idea that aluminium forms a protective layer (1) car body lasts longer (1)</p>	2	<p><b>allow</b> aluminium less dense / lightweight (1) <b>allow</b> so better fuel economy (1) <b>ignore</b> lighter <b>ignore</b> reference to speed</p>
			<b>Total</b>	<b>7</b>	

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

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

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

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

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