



GCSE

## Science B

General Certificate of Secondary Education

Unit **B622/01**: Unit 2: Modules B2, C2, P2 (Foundation Tier)

# Mark Scheme for January 2011

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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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1 Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
<b>not</b>	= answers which are not worthy of credit
<b>reject</b>	= answers which are not worthy of credit
<b>ignore</b>	= statements which are irrelevant
<b>allow</b>	= answers that can be accepted
( )	= words which are not essential to gain credit
<u>  </u>	= underlined words must be present in answer to score a mark
<u>ecf</u>	= error carried forward
<u>AW</u>	= alternative wording
<u>ora</u>	= or reverse argument

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Question		Expected answers	Marks	Additional Guidance
1	(a)	C, D and F (1)	1	must have all three correct letters for one mark <b>reject</b> any incorrect letters if answer line blank allow correct letters or pictures circled, underlined or ticked
	(b)	Most animals are more compact than plants so they can move (1)	1	more than one tick scores zero
	(c) (i)	glucose (1)	1	<b>allow</b> $C_6H_{12}O_6$
	(ii)	for storage (1)	1	<b>allow</b> easier to store (1) <b>ignore</b> store as fats or oils <b>allow</b> higher level answers eg sugar is soluble (1) eg starch is insoluble / stays inside the cell (1) eg so starch does not affect osmosis (1)  assume it refers to starch unless otherwise stated
		<b>Total</b>	4	

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Question		Expected answers	Marks	Additional Guidance
2	(a)	endangered (1) ecosystem (1)	2	
	(b) (i)	predator (1)	1	<b>allow</b> secondary consumer / carnivore <b>ignore</b> hunter
	(ii)	<b>any two from:</b> (sharp or large or strong or long) claws or talons (1)  eyes at front of head / binocular vision (1)  sharp or strong or hooked or pointed beak (1)  large or wide or strong or long wings (1)	2	<b>allow</b> strong or large or long feet (1)  <b>allow</b> idea of being able to judge distance (1) <b>ignore</b> just good / sharp eyesight  <b>ignore</b> large or long beak  <b>allow</b> camouflage (1) <b>ignore</b> streamlined / aerodynamic
	(c)	they eat the(ir) fish / less fish for the fishermen (1)	1	<b>allow</b> reverse argument (1) eg <b>if not protected</b> there will be more fish for the fishermen (1) so the fishermen can catch more fish <b>allow</b> they eat all the fish (1) <b>allow</b> because they want the fish (for themselves) (1)
		<b>Total</b>	6	

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Question		Expected answers	Marks	Additional Guidance
3	(a)	1967 (1)	1	
	(b)	5500 (1)	1	<b>ignore</b> minus sign
	(c) (i)	burning (fossil) fuels / volcanoes (erupting) (1)	1	<b>allow</b> any named fossil fuel (1) <b>ignore</b> uses such as from cars / cooking / heating / factories / power stations <b>allow</b> burning sulfur (1)
	(ii)	<b>any one from:</b> idea of more use of fossil fuels (1)  increased population (1)	1	must have the idea of increase eg <b>allow</b> more cars / more electricity used / more factories / more electricity generated (1) <b>allow</b> burning more sulfur <b>allow</b> more volcanoes erupting (1)  <b>allow</b> more people (1)
	(iii)	idea that catches starting to increase (1)	1	<b>allow</b> number of salmon increasing (1) <b>allow</b> graph is going up (1)
		<b>Total</b>	5	

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Question		Expected answers	Marks	Additional Guidance
4	(a)	<u>binomial</u> (1)	1	
	(b)	<b>any two from</b> idea of competing (1) <b>BUT</b> idea of competing for food / space / shelter (2)  brown rats better adapted / survival of the fittest (1)	2	<b>USE TICKS ON THIS QUESTION</b>  <b>allow</b> idea that brown rats are better camouflaged (1)  <b>allow</b> brown rats breed <b>faster</b> (1) <b>allow</b> brown rats brought in diseases (1) <b>ignore</b> black rats catch plague <b>ignore</b> brown rats kill / fight black rats
	(c)	poison / kill (1)  idea of resistance (1)	2	<b>USE TICKS ON THIS QUESTION</b>  <b>allow</b> higher level answers e.g. anticoagulant / AW (1)  <b>ignore</b> reference to immunity / tolerance  <b>allow</b> selection of the best or fittest rat / better adapted (to survive) / survival of the fittest (1)  <b>allow</b> idea of variation / mutation (1)  <b>allow</b> pass on adaptation to next generation / change in gene frequency / more resistant rats in each new generation (1)
		<b>Total</b>	5	

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Question		Expected answers	Marks	Additional Guidance
5	(a)	water (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank.
	(b) (i)	calcium carbonate → carbon dioxide + calcium oxide (1)	1	<b>allow</b> $\text{CaCO}_3 \rightarrow \text{CO}_2 + \text{CaO}$ (1) <b>allow</b> mix of formulae and names symbols must be correct and numbers as subscript <b>allow</b> = sign for arrow <b>not</b> and for + <b>not</b> + heat in equation but <b>allow</b> heat above arrow
	(ii)	a reaction in which one substance is changed into two or more new substances (by heat) (1)	1	<b>allow</b> breaking down / up / split (a substance using heat) (1) <b>allow</b> decomposes (1) <b>allow</b> making two (or more) substances from one (1) <b>not</b> breaks down into two elements <b>ignore</b> disintegrate <b>ignore</b> rot / decay <b>ignore</b> just bonds are broken
	(c)	<b>any two from:</b> landscape destroyed (1)  habitats destroyed (1)  (increased) noise (1)  traffic (1)  dust (1)  idea of eyesore (1)	2	<b>allow</b> a problem (1) and an explanation why it is a problem (1) eg (increased) noise (1) means people not able to relax / sleep (1)  <b>allow</b> killing animals living in the area (1) <b>ignore</b> just killing animals or plants  <b>allow</b> (increased) air pollution (1) <b>ignore</b> just pollution
		<b>Total</b>	5	

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Question		Expected answers	Marks	Additional Guidance
6	(a)	1.0 or 1g.(1)	1	mark second answer line no mark for 199.00 on first answer line
	(b) (i)	answer in the range 2.8 - 3.0 (1)	1	<b>allow</b> answer in the range 2mins 48s and 3mins 0s (1) <b>allow</b> range within range specified (1)
	(ii)	powdered chip curve is steeper / has a larger gradient (1)	1	<b>allow</b> same volume of gas produced in a shorter time / reaction finishes in a shorter time (1) <b>allow</b> levels off / becomes straight in shorter time (1) <b>ignore</b> faster time <b>allow</b> reverse argument (1)
	(iii)	larger (surface) area (1) more collisions (1)	2	<b>USE TICKS ON THIS QUESTION</b>  <b>allow</b> more particles exposed (1)  <b>allow</b> more chance of collisions (1) <b>allow</b> higher level answer increases frequency of collisions (1) <b>ignore</b> faster collisions
		<b>Total</b>	5	

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Question		Expected answers	Marks	Additional Guidance
7	(a)	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 150px; display: flex; flex-direction: column; align-items: center; justify-content: center;"> <p>solvent</p> <p>binding medium</p> <p>pigment</p> </div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 150px; display: flex; flex-direction: column; align-items: center; justify-content: center;"> <p>helps to stick...</p> <p>colours the paint</p> <p>thins the paint</p> </div> </div>	2	all correct (2) one or two correct (1)
	(b)	<p>idea of decoration (1)</p> <p>idea of protection (1)</p>	1	<b>allow</b> to look nice / colour the wall (1)
		<b>Total</b>	3	

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Question			Expected answers	Marks	Additional Guidance
8	(a)	(i)	copper (1)	1	<b>allow</b> Cu (1)
		(ii)	idea of more mass change in salt water / ora (1)	1	<b>allow</b> mass goes down more in salt water (1) <b>allow</b> more of the iron corroded in salt water than distilled water (1) <b>allow</b> mass of metal decreases faster (1) <b>allow</b> comparison of two final masses (1) but <b>ignore</b> just quoting final mass in salt water e.g. 'because it's gone down to 0.5g' scores 0
	(b)		<b>any two from</b> (metals) can be used again (1)  saves natural resources (1)  reduces disposal problems (1)	2	  <b>allow</b> metals wont be wasted / no shortage of metal / metals wont be in short supply (1) <b>allow</b> less quarrying required (1)  e.g. less 'dumps' needed (1) <b>allow</b> idea that if not recycled, scrap cars take up a lot of space (1) <b>ignore</b> vague references to environment or pollution <b>ignore</b> it saves money <b>allow</b> uses less energy (1)
			<b>Total</b>	4	

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Question		Expected answers	Marks	Additional Guidance
9	(a)	plates move or plates collide (1)	1	<b>allow</b> San Francisco is on a plate boundary / plates grind together / plates rub together / plates meet (1) <b>ignore</b> direction of movement
	(b)	magma (1) lava (1)	2	answers must be in correct order
		<b>Total</b>	3	

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Question		Expected answers	Marks	Additional Guidance
10	(a)	light (1)  direct (1)  surface / area / surface area (1)	3	<b>allow</b> sunlight but <b>not</b> sun (1) <b>ignore</b> solar  <b>allow</b> dc / DC (1)  <b>allow</b> exposed surface (1)
	(b)	(i) move magnet / move coil (1)	1	<b>allow</b> move magnet and coil (1) <b>allow</b> create (relative) movement or speed between magnet and coil (1) <b>allow</b> put magnet in the coil / put magnet near the ammeter (1) <b>ignore</b> wrap wire around the magnet if answer line is blank <b>allow</b> correct movement eg arrow on diagram
		(ii) alternating (current) (1)	1	<b>allow</b> AC or ac (1) <b>but not</b> just 'A' or 'a' <b>ignore</b> alternate current <b>ignore</b> changing <b>but</b> <b>allow</b> constantly changing direction (1)
		<b>Total</b>	5	

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Question		Expected answers	Marks	Additional Guidance
11		18 (watts) (2) <b>but</b> if answer is incorrect $12 \times 1.5$ (1)	2	
		<b>Total</b>	2	

Question		Expected answers	Marks	Additional Guidance
12		<p>any two from:</p> <p>planets collided (1)</p> <p>idea of (iron) cores merge (1)</p> <p>idea that debris ejected from collision OR debris orbits the Earth OR debris forms the Moon (1)</p>	2	<p><b>USE TICKS ON THIS QUESTION</b></p> <p><b>allow</b> (large) asteroid collided with the Earth (1)</p> <p><b>ignore</b> Moon collides with Earth</p> <p><b>allow</b> the idea of joining to form the Earth's core (1)</p> <p><b>ignore</b> idea of a <b>single</b> chunk knocked off or out of Earth</p>
		<b>Total</b>	<b>2</b>	

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Question		Expected answers	Marks	Additional Guidance
13	(a)	<p><b>any two from:</b> protective or safety clothing (1)</p> <p>remote handling / keep at a distance / use tongs or tweezers (to handle) (1)</p> <p>idea of short exposure time (1)</p> <p>idea of <b>lead</b> shielded storage (1)</p> <p>idea of monitoring badges / photographic film (1)</p>	2	<p><b>allow</b> one example such as goggles or gloves or <b>lead</b> apron or PPE (1) but <b>ignore</b> lab coat</p> <p><b>allow</b> don't handle the materials with bare hands (1)</p> <p><b>ignore</b> wear suitable or right equipment or clothing</p> <p><b>allow</b> stand well back (1)</p> <p><b>allow</b> keep out of direct line source is facing (1)</p> <p><b>allow</b> keep (materials or named material) in a lead or lead lined box</p> <p><b>ignore</b> materials other than lead</p>
	(b)	<p><b>any two from:</b> <b>low level</b> waste put in land fill sites (1)</p> <p>store underground / bury (underground) (1)</p> <p>encase OR seal in glass / vitrify (1)</p> <p>idea of reprocessing (1)</p> <p>need to store for a <b>very</b> long time (1)</p>	2	<p><b>allow</b> in mines (1)</p> <p><b>ignore</b> bury under the sea(bed)</p> <p><b>allow</b> seal in concrete / bitumen (1)</p> <p><b>ignore</b> unqualified put in glass / concrete / steel BUT</p> <p><b>allow</b> seal in glass / concrete / bitumen then put in steel container (2)</p> <p><b>allow</b> turn into plutonium / uranium / nuclear fuel (1)</p> <p><b>allow</b> 100s or 1000s of years but not just long time (1)</p> <p><b>ignore</b> references to security unless related to / needed for a very long time</p> <p><b>ignore</b> send into space</p> <p><b>ignore</b> reference to nuclear bombs / terrorism</p>
		<b>Total</b>	4	

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Question		Expected answers	Marks	Additional Guidance												
14	(a)	<p>down 1 GALAXY 3 SUN across 3 STAR 4 MOON</p>	3	<p>4 correct = (3) 2 or 3 correct = (2) 1 correct = (1)</p> <p>if boxes are empty <b>allow</b> correct answers written next to clues</p>												
	(b)	<table border="1"> <tr><td>T</td><td>F</td></tr> <tr><td></td><td>✓</td></tr> <tr><td>✓</td><td></td></tr> <tr><td>(✓)</td><td></td></tr> <tr><td>✓</td><td></td></tr> <tr><td></td><td>(✓)</td></tr> </table>	T	F		✓	✓		(✓)		✓			(✓)	2	<p>3 correct = (2) 2 or 1 correct = (1) <b>allow</b> crosses instead of ticks</p>
T	F															
	✓															
✓																
(✓)																
✓																
	(✓)															
	(c)	explosion expanding gas	2	<p>3 correct = (2) 2 or 1 correct = (1)</p>												
		<b>Total</b>	7													

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