



GCSE

## Additional Science B

General Certificate of Secondary Education

Unit **B624/01**: Modules B4, C4, P4

## Mark Scheme for June 2011

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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

/	=	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
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

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Question			Expected Answers	Marks	Additional Guidance
1	a	i	roots (1)	1	<b>allow</b> root hairs <b>not</b> just hairs
	a	ii	wilted (1)	1	<b>allow</b> floppy / collapsed / drooped / limp / flaccid / AW <b>ignore</b> reference to cells <b>ignore</b> look dehydrated / brown / dead / dry / shrivelled / withered
	a	iii	light / air movement / humidity (1)	1	<b>allow</b> sunlight / brightness / how sunny it is / wind / number of leaves / number of stomata / water availability / how close plants are / other plants around them / SA of leaves / under cover <b>ignore</b> insects / pests <b>ignore</b> weather
	b		chloroplasts (1)	1	<b>allow</b> chlorophyll <b>allow</b> phonetic spellings
	c	i	trifluralin / chemical spray / kills weeds (1)	1	if answer line is blank <b>allow</b> correct answer indicated in table
	c	ii	2 (1)	1	
	c	iii	eat / consume pests or them (1)	1	<b>allow</b> kills things on the plant / kills pests / kills them <b>ignore</b> microbes <b>ignore</b> get rid of
	d	i	idea of to stop it rotting / stops or reduces or slows down decaying (1)	1	<b>allow</b> idea of stopping or reducing action of bacteria or fungi or speed of going mouldy <b>ignore</b> stop it going off / stop it going bad / to keep it fresh / so it keeps or lasts longer <b>ignore</b> references to oxidation or stops oxygen <b>not</b> kills bacteria
	d	ii	canning or put in tins / cooling / chilling / refrigeration / drying / adding salt / curing / smoking / vinegar / pickling / sugar (1)	1	<b>allow</b> vacuum packing or put in air-tight container / irradiation / adding chemicals <b>allow</b> freeze drying <b>ignore</b> putting it in foil / clingfilm / containers <b>ignore</b> heating or cooking
			<b>Total</b>	<b>9</b>	

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Question			Expected Answers	Marks	Additional Guidance
2	a	i	tick in last box (1)	1	if boxes are blank <b>allow</b> last statement indicated
	a	ii	hydroponics (1)	1	<b>allow</b> hydroponics <b>allow</b> phonetic spellings
	a	iii	<b>any two from:</b> no microorganisms (1)  too or very cold / AW (1)  no oxygen / O <sub>2</sub> / O (1)  lack of moisture or water / low humidity (1)	2	<b>allow</b> no bacteria or microbes or decomposers or fungi <b>ignore</b> organisms <b>ignore</b> not enough bacteria or microbes or decomposers or fungi  <b>allow</b> its cold / no heat or not enough heat  <b>allow</b> idea of needing oxygen to rot <b>ignore</b> not enough oxygen or O <sub>2</sub> or O <b>ignore</b> air
	a	iv	nitrates / phosphates / potassium / magnesium (1)	1	<b>not</b> nitrogen / phosphorus <b>allow</b> sulphates <b>allow</b> correct chemical symbol

Question		Expected Answers	Marks	Additional Guidance
b		<p>use ✓'s in this question</p> <p><b>advantages:</b></p> <p><b>up to two from</b></p> <p>idea of largest yield when grown in water (compared to other <b>plants</b>) (1)</p> <p>idea of (largest) increased yield compared to growing in <b>soil</b> (1)</p> <p>uses data to support idea of higher yield (1)</p> <p><b>disadvantages:</b></p> <p><b>up to two from</b></p> <p>low(est) percentage of the plant that can be eaten (1)</p> <p>leads to problem of disposing of remains as will not rot (1)</p>	3	<p><b>allow</b> cucumbers have the highest yield / grow the most (of all the plants) (1)</p> <p>e.g. you get more when grown in water than in soil / grows better in water than soil (1)</p> <p>e.g. 65.7(%) in water and (only) 5.4(%) in soil (1)  e.g. you get 60.3(%) more yield in water (2)  e.g. 65.7(%) is the highest (in the table) (1)  <b>if no other advantage marks scored allow higher yield (1)</b></p> <p><b>allow</b> only 20(%) can be eaten  <b>allow</b> a lot of cucumber(s) can't be eaten / a big percentage can't be eaten / ora (1)</p> <p><b>allow in disadvantages:</b> beans contain more protein / cucumbers more difficult to digest / cucumbers have less dry mass</p>
		<b>Total</b>	8	

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Question			Expected Answers	Marks	Additional Guidance
3	a		biogas and wood (1)	1	<b>both needed</b> if answer line is blank <b>allow</b> correct answers shown in list
	b	i	lets some molecules through but not others (1)	1	<b>allow</b> lets small molecules through <b>allow</b> lets water through but not other substances <b>allow only</b> lets water through <b>allow</b> idea of <b>only</b> some things or substances can go through <b>allow</b> idea of things or substances can go through but not others <b>ignore</b> stops salt getting through <b>ignore</b> lets water through <b>but</b> stops salt getting through lets water through scores (1) <b>not</b> lets salt getting through but not water <b>ignore</b> reference to holes <b>ignore</b> references to direction
	b	ii	tick in first box (1)	1	more than one box ticked no mark
			<b>Total</b>	<b>3</b>	

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Question			Expected Answers	Marks	Additional Guidance
4	a	i	burette (1)	1	allow phonetic spelling
	a	ii	11 – alkali 7 – neutral 1 – acid	2	all three correct scores 2, 1 or 2 correct scores 1 if table has no numbers an table <b>allow</b> correct numbers written beside choices in list
	b		salt (1)	1	
	c	i	87.5 (%) (2)  <b>but</b> if answer incorrect then  $\frac{4.2}{4.8} \times 100$  OR  $\frac{\text{actual mass}}{\text{predicted mass}} \times 100 \quad / \quad \frac{\text{am}}{\text{pm}} \times 100 \quad (1)$	2	allow 88 (2)
	c	ii	loss in evaporation / loss in transferring liquids / loss in heating (1)	1	allow idea of material left in equipment <b>ignore</b> gas loss
	d		get bigger crops / plants grow faster / grow more / increase yield (1)	1	<b>ignore</b> to get better crops / to grow better <b>ignore</b> help them grow / grow stronger allow give them (essential) minerals but <b>ignore</b> more nutrients
			<b>Total</b>	<b>8</b>	

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Question		Expected Answers	Marks	Additional Guidance
5	a	A – batch (1) B – continuous (1)	2	<b>no mark if the two processes are reversed</b> <b>allow</b> phonetic spelling eg continues
	b	<b>any three from</b> energy / gas / electricity / water costs (1)  labour costs / workers to pay / workers time / paying named worker eg salary of scientists (1)  equipment / machinery / plant or building costs (1)  cost of catalyst (1)  research costs or cost of testing (1)  rent / rates / taxes (1)  legal costs / idea of cost of litigation (1)  packaging or examples eg bottles / containers / plastic (wrap) (1)	3	<b>ignore</b> transport / storage throughout answer <b>allow</b> running machines  <b>allow</b> explanation of a cost eg maintenance (1) eg cost of ensuring safe disposal of waste (1) eg cost of ensuring no pollution of environment <b>but ignore</b> vague references to 'environmental cost'  <b>allow</b> enzyme
		<b>Total</b>	5	

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Question		Expected Answers	Marks	Additional Guidance
6	a	detergent – cleans the grease off dishes (1)  rinse agent – helps water drain off dishes (1)  water – thins out the detergent (1)	3	<b>use SCORIS marking overlay</b> two lines from any 'ingredient' box does not gain the mark for a correct line
	b	(run off from) fertilisers (1)	1	<b>allow</b> sewage / NPK
	c i	B (1)	1	
	c ii	A (1)	1	
	c iii	silver nitrate – (pale) yellow / precipitate <b>and</b> barium chloride – white precipitate	1	<b>both</b> required for the mark
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
7	a	B (1)	1	if answer line is blank <b>allow</b> correct answer ticked circled or underlined or correct choice indicated in the question <b>allow</b> Hazel
	b	attracted / move to(wards) comb (1)	1	<b>allow</b> move <b>allow</b> stick to the comb  <b>not</b> repulsion of pieces of paper from each other <b>not</b> move away from the comb
	c	electron (1)	1	
		<b>Total</b>	3	

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Question		Expected Answers	Marks	Additional Guidance
8		<p><b>use ✓'s in this question</b>  <b>any three from</b>          defibrillator / defib. / AW</p> <p>paddles charged or at high voltage (1)</p> <p>good electrical contact with chest (1)</p> <p>charge passed through patient / (patient given) shock / shock to heart / patient or heart given charge (1)</p> <p>heart contracts (1)</p> <p>idea of not shocking (other) staff (1)</p>	3	<p><b>allow</b> phonetic spellings</p> <p><b>allow</b> defibrillator charged (2)</p> <p><b>allow</b> shaved or dry or bare chest or lubricant on chest (1)  <b>ignore</b> just pads on skin or chest or body or either side of heart</p> <p><b>allow</b> (electric) current or electrons runs through body  <b>but ignore</b> electricity runs through body  <b>ignore</b> shots of electricity / charge</p> <p><b>ignore</b> restart heart / starts heart beating</p> <p><b>allow</b> stand back / insulating mat / insulating handles / insulating gloves / insulating shoes</p>
		<b>Total</b>	3	

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Question		Expected Answers	Marks	Additional Guidance
9	a	Idea of changing or using the (variable) resistance (1)	1	<b>allow</b> change power supply <b>allow</b> adjust variable <b>allow</b> adjust or change voltage or p.d. / add a power supply or battery <b>allow</b> remove a resistor <b>but not</b> turn resistor off
	b	3.75 (2) <b>but</b> if answer is incorrect $\frac{15}{4} = (1)$	2	<b>allow</b> 3.8 (2)
<b>Total</b>			<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
10		body scans (1)  idea of <b>locating</b> or <b>breaking</b> (down) or <b>removing</b> kidney stones or gall stones (1)  measuring or checking blood flow (1)	2	<b>allow</b> checking unborn baby / foetus or baby in womb or pregnancy scans <b>allow</b> check or hear the baby's heart (beat) / brain scan (on baby) <b>ignore</b> just checking the baby or looking at the baby or when you are pregnant or testing for pregnancy <b>ignore</b> measuring heart rate as <b>extra</b> marking points: <b>allow</b> muscle / ligament / dental / eye / cataract treatment <b>allow</b> example of cleaning eg dental treatment eg (medical) instruments / equipment <b>allow</b> treatment or diagnosis of cancer or HIFU <b>not</b> CT / CAT scan or X-rays <b>not</b> see through or into bodies
<b>Total</b>			<b>2</b>	

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Question		Expected Answers	Marks	Additional Guidance
11	a	treating cancer / sterilising equipment (1)	1	<b>allow</b> tracer / PET scan / diagnosing cancer / gamma camera / security scanning <b>allow</b> radiotherapy <b>ignore</b> cleaning equipment
	b	<u>nucleus</u> (1)	1	<b>allow</b> phonetic spelling <b>ignore</b> middle / centre / core
	c i	smoke detectors (1)	1	<b>allow</b> smoke alarms <b>allow</b> treatment (some types) of cancer / TAT <b>ignore</b> fire alarm
	ii	put into a nuclear <b>reactor</b> (1)	1	<b>allow</b> bombarding with or absorbing neutrons <b>ignore</b> nuclear power plant
		<b>Total</b>	4	

Question		Expected Answers	Marks	Additional Guidance
12	a	uranium (1)  steam (1)  electricity (1)	3	<b>allow</b> plutonium  <b>ignore</b> water vapour  <b>allow</b> electric
	b i	C (1)	1	if answer line is blank <b>allow</b> correct answer ticked circled or underlined
	b ii	D / 19000 (1)	1	if answer line is blank <b>allow</b> correct answer in both lists above answer line ticked circled or underlined
		<b>Total</b>	5	

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