



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
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
allow	=	answers that can be accepted
()	=	words which are not essential to gain credit
—	=	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	allow root hairs not just hairs
	a	ii	wilted (1)	1	allow floppy / collapsed / drooped / limp / flaccid / AW ignore reference to cells ignore look dehydrated / brown / dead / dry / shrivelled / withered
	a	iii	light / air movement / humidity (1)	1	allow 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 ignore insects / pests ignore weather
	b		chloroplasts (1)	1	allow chlorophyll allow phonetic spellings
	c	i	trifluralin / chemical spray / kills weeds (1)	1	if answer line is blank allow correct answer indicated in table
	c	ii	2 (1)	1	
	c	iii	eat / consume pests or them (1)	1	allow kills things on the plant / kills pests / kills them ignore microbes ignore get rid of
	d	i	idea of to stop it rotting / stops or reduces or slows down decaying (1)	1	allow idea of stopping or reducing action of bacteria or fungi or speed of going mouldy ignore stop it going off / stop it going bad / to keep it fresh / so it keeps or lasts longer ignore references to oxidation or stops oxygen not kills bacteria
	d	ii	canning or put in tins / cooling / chilling / refrigeration / drying / adding salt / curing / smoking / vinegar / pickling / sugar (1)	1	allow vacuum packing or put in air-tight container / irradiation / adding chemicals allow freeze drying ignore putting it in foil / clingfilm / containers ignore heating or cooking
			Total	9	

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

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

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

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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 allow correct numbers written beside choices in list
	b		salt (1)	1	
	c	i	87.5 (%) (2) but 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 ignore gas loss
	d		get bigger crops / plants grow faster / grow more / increase yield (1)	1	ignore to get better crops / to grow better ignore help them grow / grow stronger allow give them (essential) minerals but ignore more nutrients
			Total	8	

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Question		Expected Answers	Marks	Additional Guidance
5	a	A – batch (1) B – continuous (1)	2	no mark if the two processes are reversed allow phonetic spelling eg continues
	b	any three from 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	ignore transport / storage throughout answer allow running machines allow explanation of a cost eg maintenance (1) eg cost of ensuring safe disposal of waste (1) eg cost of ensuring no pollution of environment but ignore vague references to 'environmental cost' allow enzyme
		Total	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	use SCORIS marking overlay two lines from any 'ingredient' box does not gain the mark for a correct line
	b		(run off from) fertilisers (1)	1	allow sewage / NPK
	c	i	B (1)	1	
	c	ii	A (1)	1	
	c	iii	silver nitrate – (pale) yellow / precipitate and barium chloride – white precipitate	1	both required for the mark
			Total	7	

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

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Question			Expected Answers	Marks	Additional Guidance
8			<p>use ✓'s in this question any three from 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>allow phonetic spellings</p> <p>allow defibrillator charged (2)</p> <p>allow shaved or dry or bare chest or lubricant on chest (1) ignore just pads on skin or chest or body or either side of heart</p> <p>allow (electric) current or electrons runs through body but ignore electricity runs through body ignore shots of electricity / charge</p> <p>ignore restart heart / starts heart beating</p> <p>allow stand back / insulating mat / insulating handles / insulating gloves / insulating shoes</p>
			Total	3	

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

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

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

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

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