

Additional Science B

General Certificate of Secondary Education

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

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.










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Annotations

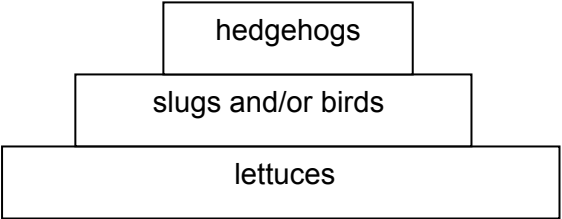
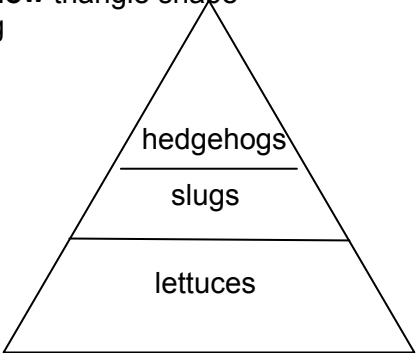
Annotation	Meaning
	Correct response
	Incorrect response
	Benefit of doubt
	Benefit of the doubt not given
	error carried forward
	Omission Mark
	Ignore
	reject
	contradiction

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

/	alternative 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
<u> </u>	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	error carried forward
AW	alternate wording
ora	or reverse argument

Question			Answer	Marks	Guidance
1	(a)	(i)	leaves (1)	1	allow needles (1) allow palisade (layer /cells) (1) allow leaves on the branches (1) but not just branches ignore chloroplasts ignore pines
		(ii)	chloroplasts (1)	1	ignore chlorophyll
		(iii)	<p>water enters through leaf pores</p> <p>carbon dioxide enters through leaf pores ✓</p> <p>water enters through roots ✓</p> <p>carbon dioxide enters through roots</p> <p>water enters through flowers</p> <p>carbon dioxide enters through flowers</p> <p>(2)</p>	2	minus one mark for more than two boxes ticked to a minimum of zero
	(b)	(i)	phloem (1)	1	allow sieve tubes (1) allow phonetically correct spelling not xylem and phloem
		(ii)	alcohol / biogas / peat / straw (1)	1	allow manure / methane (1) ignore coal /oil / wood / bark / bio diesel / animal waste / grass / dead leaves
	(c)	(i)	2002 (1)	1	allow 2001 (1) allow 02 or 01 (1)

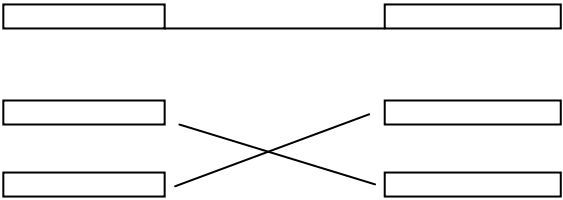
Question		Answer	Marks	Guidance
	(ii)	there has not been a cold November (since 2002) / temperatures seem to be increasing (1) then any one from: so the beetles are not dying (1) due to global warming (1)	2	allow reference to data e.g. has not been colder than -6 (⁰ C) (2) second two marking points are conditional on correct temperature reference e.g. temperatures are decreasing so the beetles survive more (0) ignore references to climate change
	(d)	eats (beetles) / introduces a disease (1)	1	allow idea of acts as a predator (1) allow competes with beetles but does not introduce fungus (1) ignore kills (beetles) unless specifies how ignore saves trees
		Total	10	

Question			Answer	Marks	Guidance
2	(a)	(i)	can make its own food / can photosynthesise (1)	1	allow produces (own) food or named food group (1) not makes minerals ignore nutrients ignore starts the food chain ignore makes own energy but allow correct idea about transfer of light energy to chemical energy (1)
		(ii)	correct shape of pyramid and only three layers (1) lettuces on first level, slugs and/or birds on the next and hedgehogs on the third (1) ie <div style="text-align: center;">  <p>(2)</p> </div>	2	if four layers then (0) marks ignore any gaps allow left or right justified allow triangle shape eg <div style="text-align: center;">  <p>(2)</p> </div>
	(b)		hydroponics (1)	1	allow correct answer underlined, ticked or circled
	(c)	(i)	root (hairs) (1)	1	ignore descriptions of transport within the plants eg enters through roots and travels up xylem
		(ii)	stop (pests) eating crops or infecting the lettuces / fish (1)	1	allow to increase his yields (1) allow because the pests eat or infect the lettuce / fish (1) allow so they don't ruin his crops (1) ignore stop them killing lettuce or fish ignore stop contamination of water / fish / lettuce
Total				6	

Question		Answer	Marks	Guidance
3	(a)	bacteria / fungi (1)	1	allow decomposers (1) allow mould (1)
	(b)	stop microbes / bacteria / fungi/ decomposers / microorganisms getting in (1)	1	ignore prevent microbes growing ignore stops air / oxygen / water getting in / germs
	(c)		2	all correct scores 2 1 or 2 correct scores 1
Total			4	

Question		Answer	Marks	Guidance
4	(a)	<p>any three from: wash at or below (temperature of) 40°C (1) do not bleach (1) tumble dry (low heat) (1) do not iron (1) do not dry clean (1)</p>	3	<p>minus one mark for each incorrect answer to minimum of zero</p> <p>not above 40°C / do not machine wash / hand wash (only) not can bleach not do not tumble dry not can iron not dry clean</p> <p>ignore reference to any other instructions e.g. wash separately</p>
	(b)	<p>saves energy / can wash more fragile clothes / AW (1)</p>	1	<p>allow uses less electricity or less hot water (1) ignore takes less time</p> <p>allow dyes are less likely to run (1) allow does not shrink (clothes) (1) allow does not damage (clothes) (1) allow do not denature enzymes / AW (1)</p> <p>allow less greenhouse gases produced or less carbon dioxide produced (1) ignore less pollution / environmentally friendly / reduces carbon footprint / less carbon emissions ignore any reference to cost alone e.g. more economical</p>
	(c)	<p>to remove food or blood (stains) (1)</p>	1	<p>allow remove grease / oil (stains) (1)</p> <p>ignore mud / dirt / grass</p>
Total			5	

Question		Answer	Marks	Guidance
5	(a)	neutralisation (1)	1	allow correct answer underlined, ticked or circled if answer line is blank
	(b) (i)	1.8 (g) (1)	1	unit not needed
	(ii)	30.3 (g) (1)	1	unit not needed
	(iii)	<u>actual mass</u> x 100 (1) predicted mass but $\frac{4.4}{5.5} \times 100$ scores 2	2	allow $\frac{am}{pm} \times 100$ (1) allow $\frac{4.4}{5.5}$ (1) allow correct reasoning e.g. $5.5 / 100 = 1\%$ so $80\% = 4.4g$ (2)
	(c)	phosphorus (1)	1	allow magnesium (1) allow correct symbol P / Mg (1)
	(d)	idea of bigger or more crops or increase crop yield (1) idea that crops grow faster (1)	2	if there is any reference to killing pests then maximum of one mark for an extra marking point allow adds (essential) elements or minerals / replaces nitrogen used up (1) ignore makes more money / more profit ignore healthier crops ignore better / stronger crops ignore adds nutrients
		Total	8	

Question		Answer	Marks	Guidance
6	(a)	<p>diamond – hard with high melting point graphite – conducts electricity buckminster fullerene – black solid which dissolves in petrol to make a red solution</p> 	2	<p>all correct scores 2 1 or 2 correct scores 1</p>
	(b)	cutting tools / drills (1)	1	<p>allow examples of cutting e.g cutting metals / glass /gem stones (1) but not just cutting things / materials allow (diamond) polishes (1) ignore just 'tools' ignore decoration</p>
	(c)	<p>slippery (1) black / grey / marks the paper (1)</p>	2	<p>allow layers slide easily (1) allow leaves a layer behind on the paper (1) allow rubs off onto the paper / can be rubbed off paper (1) ignore dark allow weak bonds or weak forces between the layers (1) causes graphite to be slippery (1) ignore references to intermolecular bonds or intermolecular forces between layers</p>
Total			5	

Question		Answer	Marks	Guidance
7	(a)	energy production (1)	1	allow 45%(1)
	(b)	43 (%) (1)	1	
		Total	2	

Question		Answer	Marks	Guidance
8	(a)	positive (1).....negative (1)	2	any order allow + / +ve / plus (1) allow - / -ve /negative (1) allow 'opposite' for the second answer
	(b) (i)	attracted or move towards the comb (1)	1	allow dust becomes charged (1) allow clings / sticks to comb (1)
	(ii)	any example of (electrostatic) dusting or brushing (1)	1	allow to pick up dust / wipe dust (1) ignore dust extractors and chimneys not vacuum or Hoover
	(c)	any two from: restarting heart / defibrillators (1) photocopiers/ printers (1) dust removal / extraction / precipitation (1) paint spraying or named example e.g. painting cars (1)	2	exclude any answers that were awarded a mark in b(ii) allow (dust) precipitator (1) ignore TV monitor ignore ref to balloons
		Total	6	

Question		Answer	Marks	Guidance	
9	(a)	4 (ohms/ Ω) (2) but if answer is incorrect 5 \div 1.25 (1)	2		
	(b)	(i)	becomes 10 (V) (1)	1	allow doubles (across the resistor R) (1) ignore increases
		(ii)	(current) reduces / decreases / AW (1)	1	allow any value less than 1.25 (A) but not 0 (A) (1) ignore weakens not slower not voltage reduces
			Total	4	

Question		Answer	Marks	Guidance	
10	(a)	<p>person radiographer mentioned (1)</p> <p>use used to treat cancer / tumours / kill cells /used to sterilise equipment (1)</p> <p>type gamma (waves) or electromagnetic / em / EM (1)</p>	3	<p>mark question as a whole – if there is a clear error then maximum marks cannot be awarded</p> <p>allow radiologist / radiotherapist (1) allow phonetic spelling e.g. radiotographer (1) but not radiothoragist ignore doctors / nurses</p> <p>not break down kidney stones not look at broken bones or to X -ray ignore clean equipment</p> <p>allow beta as alternative to gamma or EM (1) ignore transverse waves not X -ray / ultrasound</p> <p>answers that link the correct radiation to its incorrect use do not award mark for use e.g. beta to sterilise equipment award beta one mark only (because beta is not used for this purpose)</p> <p>but beta to treat cancer (2)</p> <p>answers that link the incorrect radiation to its correct use do not award mark for radiation</p> <p>e.g. ultrasound / X -ray to treat cancer (1)</p>	
	(b)	(i)	decreases / falls / decays / reduces / AW (1)	1	<p>allow becomes less radioactive (1) ignore slows down / weaker</p>
		(ii)	<u>nucleus</u> (1)	1	not helium nucleus

Question		Answer	Marks	Guidance
	(c)	(an) alpha / α particle (1) (a) beta / β particle (1)	2	allow alpha ray (1) allow beta ray (1)
		Total	7	

Question		Answer	Marks	Guidance
11	(a)	<p>It is used to measure blood flow ✓</p> <p>It is used to sterilise hospital equipment</p> <p>It is a longitudinal wave ✓</p> <p>It is used to break up kidney stones ✓</p> <p>It is an electromagnetic wave</p> <p style="text-align: right;">(2)</p>	2	<p>all three correct = [2] 2 correct = [1] 1 correct = [0]</p> <p>minus one mark for more than three boxes ticked to a minimum of zero</p>
	(b)	<p>time between compressions/ time for one wave(length) or period or (time for) one oscillation or cycle (1)</p>	1	<p>due to error, ALLOW: wavelength distance between compressions</p> <p>ignore time / distance between wave crests</p>
		Total	3	

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