

Additional Science B

General Certificate of Secondary Education **B624/01**

Unit 2: Modules B4, C4, P4

Mark Scheme for June 2010

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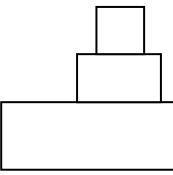
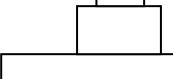
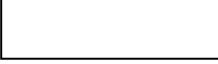
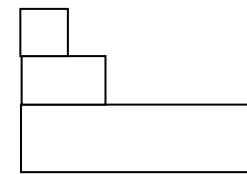
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Question		Expected Answers	Marks	Additional Guidance
1	(a)	bread (1) (news)paper (1)	2	
	(b)	recycling (1)	1	
	(c) (i)	root /root hair(cells) (1)	1	
	(ii)	water is taken into the plant by the stem water moves up the stem to the leaves water is taken into the plant by the leaves water evaporates from the leaves water evaporates from the roots	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2 if more than two boxes are ticked deduct one mark for every extra box down to a minimum of zero
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	kill or destroy / AW pests / insects / bugs (that damage crops) (1)	1	allow the idea that pesticides can kill a wide variety eg fungi / insects allow get rid of pests ignore keeps pests / insects / bugs away (from crops) ignore stops pests / insects / bugs eating crops ignore helps crops grow faster ignore animals and organisms
	(b) (i)	15000 (kg per hectare)	1	
	(ii)	they eat caterpillars (1)	1	allow they eat pests or insects allow they kill the caterpillars or pests or insects (1) allow biological control ignore animals not kills or eat greenfly
	(c)	idea that herons' food is killed or reduced / pesticide kills or reduces things in food chain / AW (1) idea that pesticide passes along food chain / AW (1) BUT (bio) accumulation / (concentration) increases along food chain / highest (concentration) in herons (2)	2	ignore (mechanism of transfer) run-off / leaching / spray drift from land into river ignore references to eutrophication e.g. pesticide kills the stickleback ignore simply 'kills / poisons herons' allow (pesticide) builds up along food chain (2) allow higher level answers: pesticide is persistent / is not broken down / is stored in body tissues / can not be excreted (1) pesticide reduces egg shell thickness (1)
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	through leaf pores / stomata / leaves (1)	1	allow though holes in leaf surfaces (1)
	(b) (i)	<u>0.04 (%)</u> (1)	1	if answer line is blank allow 0.04 (%) ticked circled or underlined
	(ii)	produces the biggest mass (of tomatoes) (1) idea of higher levels of carbon dioxide do not increase mass of tomatoes (1) BUT 0.1% is right for optimum or maximum growth (2) using smallest amount of CO ₂ for max. amount of tomatoes (2) lowest amount of CO ₂ for highest mass of tomatoes (2)	2	allow correct description eg goes up then stays constant (1) allow most amount (of tomatoes) made or biggest yield (1) allow saves wasting carbon dioxide that isn't used / beyond 0.1% wastes CO ₂ (1) allow extra CO ₂ increases global warming (1) ignore reference to cost
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	wood / alcohol / biogas / biodiesel / methane / charcoal / manure / straw / vegetable oil (1)	1	ignore paper ignore biofuel allow logs
	(b)	blue tits (area 30 squares)  caterpillars (area 50 squares)  cabbages (area 450 squares)  correct labelled pyramid i.e. caterpillars in middle and blue tits on top (1) correct bar sizes to give accurate scale diagram (1) allow +/- 1/2 square tolerance on width and height of bars	2	second mark is dependent on first marking point allow scale drawing non-pyramid e.g.  labelling of cabbages not required If all bars are all same height (10 small squares) then bar for caterpillars is 5 squares wide and bar for blue tits is 3 squares wide. If bars not all same height then bar for caterpillars must occupy area of 50 small squares and blue tits 30 squares.
	(c) (i)	respiration / heat (loss or transfer) / movement (1)	1	allow processes of heat transfer e.g. radiation, conduction, convection allow evaporation allow milk production ignore sweating or breathing
	(ii)	1100 (kJ) (1)	1	
		Total	5	

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Question	Expected Answers		Marks	Additional Guidance
5 (a)		to grow large(r) crops / to grow crops fast(er) / increase yield / AW (1)	1	allow to make more profit (1) allow to grow big(ger) cabbages or crops allow give crops / AW essential elements or minerals (to grow) allow help vegetables or crops grow stronger or grow better ignore grow on its own
(b)		phosphorus / P (1)	1	
(c) (i)		3 / three (1)	1	allow potassium nitrogen and oxygen but not merely symbols
	(ii)	101 (1)	1	
(d) (i)		nitric (acid) (1)	1	allow correct formula i.e. HNO_3
	(ii)	neutralisation (1)	1	If answer line blank allow correct answer circled, underlined or ticked in list.
	Total		6	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	air (1)	1	not oxygen but ignore nitrogen ignore atmosphere
	(b)	(reaction) goes both ways (1)	1	allow can go or work the other way allow can be changed back or can happen backwards allow can get elements or hydrogen or nitrogen back allow ammonia can go to hydrogen and nitrogen ignore can be reversed or can be undone ignore references to equilibrium
	(c)	any two from: (starting) materials (1) wages (1) equipment or plant (costs) (1) (cost of catalyst) or iron(1) rent / rates / water (rates) (1)	2	ignore references to transport or storage or R & D allow (cost of) nitrogen / N / N ₂ / N ₂ and / or hydrogen / H / H ₂ / H ₂ or products allow the workers / workforce / pay allow safety equipment or safety of workers
	(d)	(yield or it) decreases / goes down / AW (1)	1	ignore references to rate
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
7		river (1) coolant (1) microbes (1) fertilisers (1)	4	allow last two answers in any order
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	Buckminster fullerene (1)	1	allow bucky ball ignore just fullerene or Buckminster allow spelling that is phonetically correct
	(b)	any two from black / grey (1) lustrous / shiny (1) high melting point (1) opaque (1) slippery (1) (good) conductor of electricity or good conductor (1)	2	ignore solid ignore does not rust ignore brittle ignore strong or soft or easy to shape ignore its a lubricant or its oily or greasy ignore conductor of heat
	(c)	hard (1) high melting point (1)	2	allow hard wearing allow it can't be scratched ignore hard to break or good at cutting hard things ignore strong or sharp or dense ignore durable allow it will not melt allow (good) thermal conductor as an additional marking point
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	decays (1) decreases (1) background (1) nucleus (1)	4	more than one answer for a single response scores (0) for that response allow decays for second response answers must be in the correct order for each mark
	(b)	alpha (1)	1	more than one answer scores (0) if answer line is blank allow correct answer ticked circled or underlined in the list
	(c)	sterilising (equipment) (1)	1	allow higher level answers such as tracer / diagnosis allow examples of use eg gamma knife or gamma camera allow tests for cancer allow scans or PET scans but not pregnancy scans ignore reference to MRI or CAT not merely 'cleaning' equipment
	(d)	uranium (1)	1	allow plutonium allow correct chemical symbols eg U or Pu
	(e)	chain (reaction) (1)	1	allow fission not fusion
		Total	8	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	4 (2) but if answer incorrect then $12 \div 3$ scores (1)	2	ignore incorrect units
	(b)	doubles / 6 (amps) / AW (1)	1	allow increases / AW not 5 or 96 (amps) ignore stronger
Total			3	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	(re)starting heart / defibrillator / AED or automated external defibrillator (1)	1	allow correct description of use allow shock the heart ignore shock the patient allow bring (patient) back to life with a shock ignore references to (electric) current ignore put chest paddles on the patient
	(b)	removes dust / precipitator (1)	1	allow removes or cleans smoke / reduces emissions / removes dirt ignore removes gases allow smoke / dust / 'it' sticks or is attracted (to precipitator) but ignore sticks or is attracted to the brick or the chimney not reduces carbon dioxide or takes in / catches the smoke ignore references to global warming
Total			2	

Question	Expected Answers	Marks	Additional Guidance
12 (a)	high frequency scores (2) but any correct mention of frequency or pitch or Hz (1)	2	e.g. pitch or frequency or Hz above threshold of human hearing (2) (pitch or frequency or Hz) above 20 000 Hz / 20 kHz (2) high pitched or high Hertz / Hz (2) if candidate refers to an incorrect numerical value (in Hz) ignore it and credit other marking points ultrasound or "it" is 20 000 on its own scores (0) allow low frequency or pitch scores (1) allow above the threshold of human hearing (1) if no other mark scored allow too high to hear (1) ignore too quiet ignore outside the range of human hearing
(b)	scanning body / breakdown or removal of (kidney) stones / measure blood flow (1)	1	allow checking unborn baby or baby in the womb allow pregnancy scan ignore just check the baby or pregnancy test allow check or hear baby's heart (beat) / brain scan (on baby) ignore measuring heart rate allow muscle / ligament / dental / eye / cataract / treatment (1) allow example of cleaning eg dental treatment eg (medical) instruments / equipment allow treatment or diagnosis of cancer ignore looking at the baby not see through bodies
	Total	3	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	friction / rubbing / scraping (of shoes on carpet) (1)	1	allow higher level answers eg gains or loses electrons or charged particles but ignore positive electrons or positive charge allow carpet or shoe is an insulator ignore gets static off the carpet
	(b)	positive and negative (1)	1	both required either order allow + and – allow +ve and –ve
	(c)	idea of being earthed (1)	1	allow charge escapes allow electron / charge / negative charge flows or idea of current flow (from body) but not positive charge flow ignore electricity ignore because he is (electrostatically) charged
	(d)	dust (on insulators) / clothes clinging (1)	1	allow sparks or explosion risk or fire risk allow examples of the above e.g. when refuelling or e.g. flour mill allow lightning (damage) / AW allow damage to electronic components or electrical appliances allow interference with communications e.g. interferes with TV signals e.g. crackling on TV screen allow burn or kill (people) ignore causes pain / it hurts or references to hair standing on end
		Total	4	

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