RECOGNISING ACHIEVEMENT

GCSE

Additional Science B

General Certificate of Secondary Education

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

Mark Scheme for January 2012

Oxford Cambridge and RSA Examinations

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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.

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Annotations

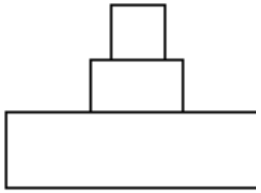
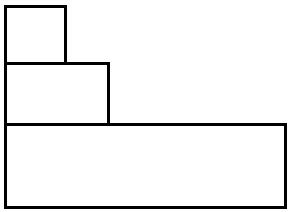
Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt **not** given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Subject-specific Marking Instructions

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

Question			Answer	Marks	Guidance
1	(a)	(i)	2 (times) / twice / double (1)	1	**allow** 30 000 more **ignore** 30 more
		(ii)	above (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank
	(b)		moisture / water (1) reducing / decreasing / lowering (1)	2	**allow** juices / liquid **allow** slowing (down) **ignore** stopping
	(c)		insecticides kill fungi that cause decay ☐ fungicides kill fungi that cause decay ✓ herbicides kill fungi that cause decay ☐ pesticides are used in intensive farming ✓ pesticides are used in organic farming ☐	2	each incorrect tick loses 1 mark down to zero
			Total	**6**	

Question			Answer	Marks	Guidance
2	(a)	(i)	chloroplast (1)	1	**not** chlorophyll
		(ii)	allow gas exchange (1)	1	**allow** let CO_2 **into** leaves / lets O_2 **out of** leaves **allow** let gases in and out of leaves **allow** lets gases/ carbon dioxide /oxygen through (the stomata) **ignore** diffuse **not** references to breathing **ignore** reference to water
	(b)	(i)	(water) evaporates / diffusion (1)	1	**allow** as water vapour / as a gas **ignore** steam
		(ii)	as light intensity increases, rate of transpiration increases (1)	1	**allow** positive correlation / as one rises so does the other **allow** reference to lag
		(iii)	**any two from:** for (good root) growth / ora (1) for respiration / photosynthesis (1) to prevent discoloured leaves (1)	2	 **allow** higher level responses eg to make DNA / RNA / ATP / cell membrane / proteins / enzymes **ignore** to make amino acids **ignore** to repair **allow** to give it colour
		(iv)	nitrogen (1)	1	**allow** N / N_2 (1)
			Total	**7**	

Question			Answer	Marks	Guidance
3	(a)		battery (1)	1	**allow** intensive / factory **ignore** caged
	(b)		humans (area 60) chickens (area 120) wheat (wheat 360)  correct labelled pyramid i.e. chickens in middle and humans on top (1) correct bar sizes to give accurate scale diagram (1) allow ± ½ square tolerance on width and height of bars	2	**second mark is dependent on first marking point** **allow** scale drawing non-pyramid e.g.  If all bars are same height (10 small squares) then bar for chickens is 12 squares wide and bar for humans is 6 squares wide. If bars not all same height then bar for chickens must occupy area of 120 small squares and humans 60 small squares
	(c)		micro-organisms / bacteria / saprophytes (1)	1	**allow** microbes / detritivores / sludge worms / decomposers **ignore** flies / bugs / fungi
	(d)		biological control (1) idea that *(Hypoaspis aculeifer)* is a predator and feeds on the pest or red poultry mite (1) idea that it is a useful method in enclosed spaces like barns / glasshouses (1)	3	**Use ticks in this question** **allow** predator kills pest **but** it kills them is insufficient **allow** where the predator can be prevented from moving away **allow** indoors
			Total	**7**	

Question			Answer	Marks	Guidance
4	(a)	(i)	4 / four (1)	1	**ignore** N, H, P and O
		(ii)	20 (1)	1	
	(b)	(i)	ammonium hydroxide / ammonia (1)	1	**allow** NH_3 / NH_4OH **ignore** ammonium on its own
		(ii)	neutralisation (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line blank
			Total	**4**	

Question			Answer	Marks	Guidance
5			**any two from:** labour costs / salaries / wages / staff / workers / aw (1) energy costs / electricity / gas (1) raw materials / starting materials (1) time taken for development (1) marketing (1) cost of equipment / plant (1) taxes / rates / rent (1) licensing / legal costs (1) Safety / H & S (1) pollution control (1)	2	**allow** heating / lighting **allow** (cost of) chemicals / ingredients **ignore** advertising **ignore** references to the environment / transport / storage **ignore** packaging
			Total	**2**	

Question			Answer	Marks	Guidance
6	(a)		continuous (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line blank
	(b)	(i)	air / atmosphere (1)	1	**not** oxygen
		(ii)	nitrogen + hydrogen → ammonia (1)	1	**allow** = **or** ⇌ sign instead of → but **not** 'and' or '&' for + **allow** mix of names and correct formula **allow** $N_2 + H_2 \rightarrow NH_3$ **ignore** balancing if symbols used **not** '+ catalyst' in equation, but **allow** catalyst above arrow
		(iii)	reaction can proceed in both directions / 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 **ignore** references to equilibrium
		(iv)	17 (1)	1	
	(c)		decreases / goes down / gets lower (1)	1	
			Total	**6**	

Question			Answer	Marks	Guidance
7	(a)	(i)	kills microbes / kills bacteria (1)	1	**ignore** kills germs / bugs **allow** gets rid of microbes or bacteria **allow** to sterilise it **ignore** so the water is safe to drink **ignore** to clean the water
		(ii)	**any one from:** lead (compounds)(1) pesticide / insecticide (residues) (1) aluminium (1)	1	 **allow** any named heavy metal **ignore** other kinds of fertiliser eg phosphate fertiliser
	(b)	(i)	white (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line blank
		(ii)	 33.3 (2) **BUT** $\% \text{ yield} = \frac{\text{actual mass}}{\text{predicted mass}} \times 100$ or 0.24 / 0.72 x 100 (1)	2	mark answer line first **allow** full marks for correct answer with no working out **allow** 33 (2) **allow** $\frac{\text{am}}{\text{pm}}$ x 100 (1)
			Total	**5**	

Question			Answer	Marks	Guidance
8	(a)		carbon (1)	1	
	(b)	(i)	hard / high melting point (1)	1	
		(ii)	**any one from:** in pencil (leads) (1) lubricant (1) in golf clubs (1) in cricket bats (1)	1	 **allow** used for writing **allow** in sports equipment **allow** (graphite) filters **ignore** in (electrical) wires
			Total	**3**	

Question			Answer	Marks	Guidance
9	(a)		**B** (1)	1	**allow** correct answer ticked, circled or underlined in list if answer line is blank
	(b)		(re)starting the heart / defibrillators / dust extraction / precipitator (eg in chimneys) / spray painting / photocopiers (1)	1	**allow** (laser) printers / electrostatic dusters / crop spraying **allow** painting cars, but not just painting **ignore** dusters / balloons / Van-der-Graaff generator
	(c)		idea that sweat shirt is made of an **insulator** (1) idea that (clothes) become charged by rubbing each other or rubbing against the skin (1) idea that shock occurs when charge or electrons moves (to Earth) (1)	3	**Use ticks in this question** **allow** synthetic material or named example of synthetic material eg nylon (1) **allow** earthed (1)
			Total	**5**	

Question			Answer	Marks	Guidance
10	(a)		so that the toaster cannot become live (1)	1	**allow** so he cannot get an electric shock from it / so he doesn't get electrocuted **ignore** so that the toaster doesn't conduct electricity **ignore** just safety **ignore** so that the case doesn't get hot
	(b)		50 (ohms) (2) **but if answer incorrect** $\frac{230}{4.6}$ (1)	2	
			Total	**3**	

Question			Answer	Marks	Guidance
11	(a)		compression (1) frequency (1)	2	
	(b)		to break down kidney stones ✓ to check peoples hearing to look inside the body by scanning ✓ to measure the speed of blood flow in the body ✓ to measure the temperature of the body	2	**all** 3 correct = (2) **any** 1 or 2 correct = (1) more than 3 boxes ticked reduce marks down to (0) for each incorrect tick
			Total	**4**	

Question			Answers	Marks	Guidance
12	(a)		nucleus (1)	1	**ignore** middle
	(b)	(i)	**any two from:** idea that alpha cannot **penetrate** the skin or soft tissue / is absorbed by the skin or soft tissue (1) idea that gamma can **penetrate** the skin or soft tissue / is not absorbed by the skin or tissue (1) alpha is not detected outside the body / gamma is detected outside the body (1)	2	**allow** data correctly used to **explain** penetration of skin eg alpha only has a range of 0.0005 cm in skin so could not get to the detector (1) **allow** eg gamma radiation has a range of 100 cm in skin so will easily reach the detector (1) **allow** no alpha radiation to be detected (1)
	(b)	(ii)	treating cancer or tumours / sterilising medical equipment (1)	1	**allow** leak detecting **allow** to help recover from cancer **not** cleaning
	(c)		radiographer (1)	1	**allow** radiologist **allow** phonetic spelling
			Total	**5**	

Question			Answer	Marks	Guidance
13	(a)		put (materials) into a nuclear reactor / radioactive core (1)	1	**allow** higher level answers eg when they absorb a neutron (1) **not just** in a nuclear power station
	(b)		**any one from:** looking for blockages or leakages in pipes (1) looking for (route of) underground pipes (1) track waste (1)	1	**ignore** thickness testing **ignore** in the human body
	(c)		background (radiation) (1)	1	**allow** higher level answers eg radon gas / cosmic rays (1) **ignore** natural or environmental (radiation)
			Total	**3**	

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