

Additional Science B

General Certificate of Secondary Education

Unit **B624/01**: Modules B4, C4, P4 (Foundation Tier)

Mark Scheme for January 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.










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 the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Subject Specific Marking Instructions

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
- = 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)	fungi (1)	1	allow named example of fungi – eg mould / mushrooms / toadstools (1) allow saprophytes (1)
		(ii)	not enough oxygen / decomposers need oxygen / too cold (1)	1	allow no oxygen allow too salty / presence of salt (1) ignore respiration cannot occur unless qualified allow not enough heat / warmth (1) not 'not enough temperature' ignore no bacteria / decomposers there
	(b)	(i)	photosynthesis (1)	1	allow makes food / starch / glucose / carbohydrate allow absorbs light energy not just light or light energy
		(ii)	(the) sun / light / sunlight (1)	1	
		(iii)	leaves (1)	1	allow palisade cell
			Total	5	

Question			Answer	Marks	Guidance
2	(a)		cell wall anywhere before cell membrane (1) ; cell membrane anywhere before cytoplasm (1)	2	
	(b)		allows some substances / molecules through (not others) / ora (1)	1	allow lets water through not sugar / glucose (1) must make reference to both water and sugar / glucose allow lets small molecules through (not large) / ora (1)
			Total	3	

Question			Answer	Marks	Guidance
3	(a)	(i)	fertiliser (1)	1	
		(ii)	roots / root hairs (1)	1	
	(b)	(i)	less growth / yellow (1)	1	ignore withered / dry ignore just discoloured / lose colour allow yellow / brown or brown / yellow or green yellow or yellow / green (1) allow small plant / AW
		(ii)	phosphates / potassium / magnesium (1)	1	allow other trace minerals – eg sodium / iron / manganese / zinc / sulfate not phosphorus not water mark the 1 st answer if more than one response
			Total	4	

Question		Answer	Marks	Guidance
4	(a)	makes its own food / photosynthesises / uses the energy from sunlight to make food (1)	1	allow produces food ignore start / bottom / base of food chain
	(b)	diagram or explanation showing a tapering pyramid with four trophic levels (1)	1	allow triangle with four segments do not measure size of blocks in pyramid – look for largest at bottom tapering to smallest at top look at diagram first, ignore writing unless direct contradiction
	(c)	(stop them) eating / killing / spoiling their crops / plants / sugarcane (1) so that they can produce more / improve quality (1)	2	allow idea that it cannot be used after damage
	(d) (i)	for: as the amount of pesticide has gone up, so has the death rate (1) against: references to drops in death rate when amount is still increasing (1)	2	
	(ii)	add spiders (to plantation) (1) ; they will eat the scarab beetles (1)	2	not add spiders and birds
Total			8	

Question		Answer	Marks	Guidance
5	(a)	burette (1)	1	
	(b)	salt (1) water (1)	2	order unimportant allow H ₂ O
	(c)	10 (1)	1	allow answer ticked or circled or underlined if answer line blank but answer line takes precedence
	(d)	1 (1)	1	allow answer ticked or circled or underlined if answer line blank but answer line takes precedence
	(e)	ammonium sulphate (1)	1	allow (NH ₄) ₂ SO ₄ not ammonia sulfate
Total			6	

Question		Answer	Marks	Guidance
6	(a)	continuous (1)	1	
	(b)	batch (1)	1	
	(c)	any two from energy costs (1) ; starting materials, ingredients or chemicals (1) ; cost of catalyst (1) ; research costs (1) ; cost of testing (1) ; rent or rates or taxes (1) ; legal costs (1) ; cost of paying the workers (1)	2	allow packaging ignore transport or sales costs
Total			4	

Question		Answer	Marks	Guidance
7	(a)	buckminsterfullerene (1)	1	<p>allow bucky ball ignore just fullerene or buckminster allow spelling that is phonetically correct allow C₆₀ answers</p>
	(b)	<p>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)</p>	2	<p>ignore solid ignore does not rust ignore brittle ignore strong or soft or easy to shape</p> <p>ignore it's a lubricant or it's oily or greasy</p> <p>ignore conductor of heat</p>
	(c)	<p>hard (1)</p> <p>high melting point (1)</p>	2	<p>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</p> <p>allow it will not melt / can withstand high temperatures</p> <p>allow (good) thermal conductor as an additional marking point</p>
Total			5	

Question		Answer	Marks	Guidance
8	(a)	natural gas / methane (1)	1	allow oil / crude oil
	(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 nitrogen and hydrogen ignore can be reversed or can be undone ignore references to equilibrium
	(c)	(yield or it) decreases / goes down (1)	1	ignore references to rate
	(d)	(i)	9 (1)	
		(ii)	80 (1)	
Total			5	

Question		Answer	Marks	Guidance
9	(a)	incomplete circuit / bulb not connected (1)	1	allow complete loop needed / wire not attached / gap in circuit owtte (1) ignore unqualified reference to gap
	(b)	(i)	dimmer / less bright (1)	allow decreases / fainter (1)
		(ii)	reduces / smaller / lower / decreases (1)	ignore weaker / goes slower
Total			3	

Question		Answer	Marks	Guidance
10	(a)	radiographer (1)	1	
	(b)	gamma (1)	1	allow any em wave ie ir / uv / visible / microwaves / radio not sound / ultrasound / X-rays (1)
	(c)	(i) longitudinal (1)	1	
		(ii) any one from scan / pregnancy scan / AW (1) ; breaking (kidney) stones (1)	1	allow look for / treat tumours (1) allow cleaning delicate equipment (1) allow to treat muscle injury (1) allow blood flow measurements (1)
Total			4	

Question		Answer	Marks	Guidance
11	(a)	1st answer – insulators (1) ; 2nd / 3rd answers in any order – positive (1) negative (1)	3	allow + and – (1) allow +ve and -ve (1)
	(b)	risk of sparks / explosions / fire / AW (1)	1	
Total			4	

Question			Answer	Marks	Guidance
12	(a)		beta (1) gamma (1)	2	allow symbols for beta and gamma (1) any order
	(b)	(i)	in the core of a nuclear reactor (1)	1	more than one answer ticked scores 0
		(ii)	any two from radiation / alpha / americium – 241 ionises the air (particles) (1) ; ions / ionised air particle move (between charged plates) (1) ; causes current / completes circuit (1) ; smoke (particles) absorb radiation / alpha (1) therefore less ionisation (1) ; reduced current / incomplete circuit sounds alarm (1)	2	allow mention of just oxygen or just nitrogen or just particles (1) allow smoke stops / blocks radiation (1) not smoke (particles) react with radiation ignore slows down ionisation
Total				5	

Question			Answer	Marks	Guidance
13	(a)	(i)	time; days (1)	1	allow quantity OR unit correct if in correct place(1)
		(ii)	activity / radioactivity / radiation; number of decays per second (1)	1	allow quantity OR unit correct if in correct place (1)
	(b)		smooth curve through points (1)	1	
	(c)		repeat readings (1)	1	
Total				4	

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