

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.

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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

Annotation	Meaning
/	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	alternative wording
ora	or reverse argument

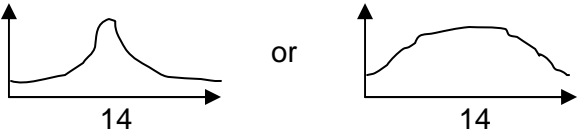
Question		Answer	Marks	Guidance
1	(a)	(so / because palisade cells can) absorb more light / photosynthesize more (1)	1	allow (palisade cells) get / collect / hit by / capture more light ignore get more sun but get more sunlight = 1 needs comparison, so ignore e.g. (palisade cells absorb) lots of light assume unqualified answers refer to palisade cells allow reverse argument if clearly applies to spongy / mesophyll cells allow (palisade cells) make more glucose ignore just '(palisade cells are) closer to the surface' ignore palisade cells are bigger
	(b)	yellow (leaves) (1)	1	allow pale green / yellowy green / yellowy orange / yellowy brown ignore 'pale' / discoloured ignore less growth (in question) / smaller ignore brown / orange
	(c)	it's part of / to make DNA (1) it's part of / to make (cell) membranes (1)	2	allow it's part of / to make chromosomes / genes / RNA ignore for respiration / for growth / make more cells / photosynthesis allow additional marking point: it's part of / to make ATP (1)
	(d)	(to absorb / move to a) higher concentration in cells / roots / plants (than soil) or (to absorb / move from a) lower concentration in the soil (than cells / roots / plants) (1)	1	needs comparison, so ignore e.g. absorb from a low concentration in the soil allow to move against/up a concentration / diffusion gradient allow because it would diffuse in the opposite direction ignore references to lower amounts in soil / ora / AW
		Total	5	

Question		Answer	Marks	Guidance
2	(a)	<p>any value more than 0 and less than 4.5 (1)</p> <p>increases humidity or</p> <p>decreases wind speed / air movement (1)</p> <p>decreases diffusion gradient / concentration gradient of water / AW or</p> <p>increases concentration of water outside the leaf (1)</p> <p>(rate of) evaporation decreases or</p> <p>(rate of) diffusion decreases (1)</p>	4	<p>allow becomes humid but ignore it is humid allow higher water concentration in air but ignore more water in air allow no wind / air movement</p> <p>ignore references to amounts of water allow correct higher level reference to lower water potential outside leaf</p> <p>ignore references to transpiration rate (in question) ignore evaporation stops / diffusion stops</p> <p>mark all points independently except in case below</p> <p>If no other marks awarded then can allow values higher than 4.5 (1) ONLY if explanation is correct: i.e. temperature increases (1) (so) (rate of) evaporation increases (1) increases diffusion gradient / concentration gradient of water or increases concentration of water inside the leaf or (rate of) diffusion increases (1)</p>

Question	Answer	Marks	Guidance
(b)	<p>any two from:</p> <p>movement of food substances / sugar (and water) (1)</p> <p>through phloem (1)</p> <p>movement is up and down plant / AW (1)</p> <p>does not involve stomata or does not involve evaporation / loss of water or not affected by wind speed / humidity (1)</p>	2	<p>assume unqualified answers refer to translocation</p> <p>allow any named sugar not movement of minerals (negates first marking point) ignore nutrients (unclear if food or minerals) ignore other named foods e.g. starch ignore references to just water moving</p> <p>not phloem and xylem</p> <p>ignore just 'not affected by external factors' ignore not affected by temperature</p> <p>allow reverse argument if it clearly refers to transpiration: transpiration moves minerals (1) transpiration moves through xylem (1) transpiration is only up the plant (1) transpiration involves stomata / evaporation / water loss (1)</p> <p>allow additional mark for higher level answer referring to role of ATP / respiration / active transport (1) ignore just 'involves / needs energy'</p>
	Total	6	

Question			Answer	Marks	Guidance
3	(a)	(i)	5 (%) (2) if answer incorrect $90 \div 1800 \times 100$ (1)	2	allow 0.05 (1) only if percentage sign is crossed out
		(ii)	(idea of energy being lost through) faeces / egestion / excretion / urine / respiration / movement / maintaining body temperature / not all parts eaten / not all organisms eaten (1)	1	allow clear examples of movement e.g. hunting ignore just 'waste' allow heat allow keeping warm ignore conduction / convection / radiation not growth (negates any mark)
	(b)		idea that there would not be enough energy left (for another level) (1)	1	ignore just 'large percentage loss / small percentage transfer between levels' allow small amount of energy left at end of food chain ignore nothing eats snakes / snakes are too dangerous to be eaten ignore no energy left
	(c)		idea that snakes eat lots of shrews / shrews eat lots of insects or idea that insecticide is persistent / is not excreted / not removed from body / is not broken down (1)	1	ignore just 'accumulates in higher trophic levels' ignore just the idea that the insecticide moves along the food chain ignore snakes eat lots of insects
			Total	5	

Question		Answer	Marks	Guidance
4	(a)	<input type="checkbox"/> <input checked="" type="checkbox"/> water diffuses out of the leaves though stomata (1) <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> water and cell walls are needed for support (1)	2	if more than 2 ticks then deduct 1 mark for each incorrect answer (to minimum 0)
	(b)	ladybirds may move away / greenfly reproduce as fast/faster than they are eaten / more greenfly arrive (1)	1	allow ladybirds may get eaten allow ladybirds do not live very long / reproduce slowly allow greenfly reproduce (very) quickly but ignore just 'greenfly reproduce' allow she didn't use enough ladybirds ignore the ladybirds did not eat (many) greenfly allow ladybirds may eat something else (instead) ignore ladybirds eat tomatoes ignore just 'might take longer than three weeks' / 'it's a slow process'
	(c)	(vinegar / acid / low pH) kills / slows down or stops growth / slows down or stops reproduction of decomposers / bacteria / fungi / mould / microbes (that cause decay) (1)	1	ignore just 'stops decay' ignore just stops / gets rid of bacteria etc allow high level answer: stops bacterial enzymes working / denature bacterial enzymes ignore denatures bacteria
Total			4	

Question			Answer	Marks	Guidance
5	(a)	(i)	maintains the lining of the uterus / stops the lining of the uterus breaking down (1)	1	allow maintains lining / maintains uterus / maintains wall allow stops lining / uterus wall breaking down allow thickens the lining / uterus / wall allow prepares the lining / uterus for implantation (of a fertilised egg) allow inhibits FSH / LH (production) ignore affects / controls lining / uterus / wall
		(ii)	line which peaks at (about) 14 days (1) 	1	allow dotted line
	(b)	(i)	Joanna (1)	1	more than one name = 0

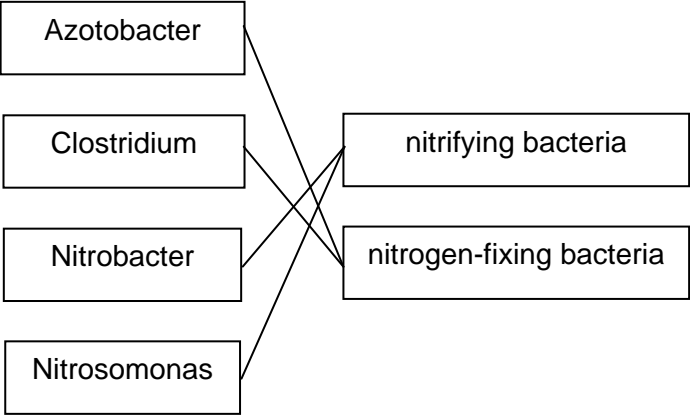
Question	Answer	Marks	Guidance
	<p>(ii) the baby will not be genetically/biologically hers (1)</p> <p>idea that may be worried about the genes/health of the egg (1)</p>	2	<p>ignore just 'it's not her baby'</p> <p>ignore it's not from her ovaries / not her egg</p> <p>allow idea that child may want contact with its biological mother / biological mother may want contact with child</p> <p>allow (worried) she may not bond with the child</p> <p>allow baby does not contain (any of) her genes</p> <p>but ignore baby is genetically different from her (because all babies are)</p> <p>allow don't know if the child might have a (genetic) disorder / health problem</p> <p>allow additional marking point: may be seen as unnatural / unethical / against religion / playing God (1) but ignore simply 'it is wrong'</p> <p>ignore won't have the mother's characteristics</p> <p>ignore don't know what features the child will have</p> <p>ignore possibility of failure to implant</p> <p>ignore rejection / infection</p> <p>ignore reference to financial cost</p> <p>ignore references to 'designer babies' / choosing characteristics</p>
	Total	5	

Question		Answer	Marks	Guidance
6	(a)	contains (synovial) fluid (1)	1	<p>allow liquid</p> <p>allow it's a moveable joint / can move</p> <p>ignore just examples of types of joint e.g. 'it's a ball and socket' = 0</p> <p>ignore it can only move like a hinge</p> <p>allow it can move, for example a hinge joint</p> <p>allow it moves in all directions (because it is a ball and socket joint)</p>
	(b)	15 (%) (1)	1	
	(c)	(i) suggest surgery AND the point 72,15 indicated on the graph (1)	1	<p>allow 1 for correct ECF</p> <p>need to see line(s) / cross / clear indication on graph to award mark</p>
		(ii) more likely to advise reducing risk / less likely to suggest surgery (1)	1	<p>ignore just 'advise reducing risk'</p> <p>ignore less likely to need surgery (as get older)</p> <p>allow less likely to get surgery (as get older)</p>
		(iii) idea that (older people are) (more) likely to suffer adverse effects of an operation (1)	1	<p>e.g. allow older patients may not survive operation</p> <p>allow idea that chances of operation being successful are lower with age</p> <p>ignore economic reasons</p> <p>ignore older people more likely to have more brittle bones</p>
		Total	5	

Question		Answer	Marks	Guidance
7	(a)	pulmonary artery (1)	1	
	(b)	(i) idea that blood goes through heart once on each complete circuit of body (1)	1	assume unqualified answers refer to single circulatory system allow reverse argument if clearly applies to double circulatory system allow doesn't have circuit to lungs and circuit to body allow 'heart to body to heart' ignore just 'single circuit' ignore references to oxygenated / deoxygenated blood
		(ii) (only) one atrium / ventricle (v two) / two chambers (v four) / one artery leaving (v two) (1)	1	assume unqualified answers refer to fish heart allow reverse argument if applies to human heart, e.g. human heart has two atria etc allow it doesn't have two atria / two ventricles / four chambers / two arteries allow it has no right ventricle / left ventricle / left atrium / right atrium (i.e. implies just one) ignore references to veins ignore references to thickness of ventricle wall
		Total	3	

Question		Answer	Marks	Guidance
8	(a)	liver, produces urea (1) kidney, removes urea (from the blood) / excretes urea (1)	2	allow liver, produces it ignore liver, increases it allow kidney, removes it / excretes it allow kidney, filters / sieves urea / it ignore kidney, decreases it ignore references to just urine ignore kidney, changes / adjusts / controls amount or level of urea in blood (in question) allow additional marking point: skin, urea in sweat (1)
	(b)	(i) kidney (1)	1	
		(ii) more water (re) absorbed by the kidney / into blood (1) less urine produced / more concentrated urine / less water in urine (1) blood becomes more dilute / too dilute (1)	3	allow higher level answer: increases permeability of (kidney) tubules ignore just more water in body / cells allow additional marking point for specific effect such as increased blood pressure / cranial pressure (1)
	(c)	cystic fibrosis (1)	1	allow asthma / antitrypsin deficiency / Niemann-Pick disease / ciliary dyskinesia
		Total	7	

Question			Answer	Marks	Guidance
9	(a)	(i)	movement / AW (1)	1	allow to swim
		(ii)	nucleus / mitochondria (1)	1	allow chromosome(s) ignore vacuole allow higher level answer: e.g. ER / Golgi bodies
	(b)	(i)	in water (1)	1	
		(ii)	incubation period / (time needed for) bacteria to multiply / reproduce / increase / grow (1) (time needed for) production of toxins (1)	2	allow reverse argument: (at start) too few bacteria allow reverse argument: (at start) too little toxin allow additional marking point for idea of there being a critical level (1) e.g. bacteria need to increase above a critical level = 2 e.g. toxins need to increase above a critical level = 2
		(iii)	idea that not many natural disasters / earthquakes / (major) floods or idea that damage to sewage or water pipes quickly repaired (1)	1	allow clean water / good sanitation / good water supply / good sewage system / water treated (with chlorine) / water quality monitored / do not drink from wells or rivers ignore just 'high standard of living' ignore good medical treatment / AW

Question	Answer	Marks	Guidance
(c)	<p>Azotobacter & Clostridium = N-fixing Nitrobacter & Nitrosomonas = nitrifying</p>  <p>all lines correct (2) two / three lines correct (1)</p>	2	if more than 4 lines, deduct 1 mark for each incorrect line, to a minimum mark of 0
	Total	8	

Question			Answer	Marks	Guidance
10	(a)	(i)	all three points correctly plotted (30,38) (35,35) (40,6) (1) one smooth curve going through all 5 points (1)	2	allow +/- 0.5 small squares for both points and line not straight lines point to point not multiple lines ignore line before 20°C and above 40°C
		(ii)	Liz (no mark) (the best temperature) could be (just) below or (just) above 30 (°C) or (the best temperature) could be anywhere above 25 and below 35 (°C) / anywhere between 25 and 35 (°C) (1)	1	If state Paul then score 0 allow (the best temperature) is close to / about 30(°C) (but not exactly) allow any numbers > 25 and < 35(°C) allow any range > 25 and < 35(°C), e.g. 30-34 but the answer “any number from 25 to 35 (°C)” = 0 allow Liz (no mark) not enough data (near optimum) allow Liz (no mark) only did experiment once so cannot be sure allow Liz (no mark) do not know margin of error
		(iii)	idea of (compromise between the need for a high rate of fermentation and) the costs incurred by maintaining a high temperature (1)	1	allow less energy/heat needed ignore just ‘cheaper’ / ‘more cost effective’ allow heat produced (during fermentation) allow so can control alcohol concentration / content allow so process completes in a known time (to prevent secondary fermentation in bottles) ignore just ‘control the rate of reaction’ allow to get less alcohol
	(b)	(i)	distillation (1)	1	
		(ii)	(high concentrations of alcohol) kill the yeast / fungi / microbes (1)	1	allow denature (yeast) enzymes ignore denature yeast ignore references to bacteria
			Total	6	

Question			Answer	Marks	Guidance
11	(a)	(i)	(roots) do not get enough oxygen for respiration or (roots) need oxygen for respiration (1)	1	allow (roots) do not get any oxygen for respiration ignore do not get enough air for respiration ignore just 'no / not enough oxygen (for roots)' allow not enough / no active transport allow take up fewer minerals / can not take up minerals allow (useful) aerobic microbes can't survive, e.g. decomposers allow denitrifying bacteria can survive/ are anaerobic allow nitrates converted to nitrogen (gas) ignore minerals get washed away ignore reduces concentration of minerals in soil ignore references to osmosis
		(ii)	any three from: loss of water (from plants) (1) by osmosis (1) (because) lower water concentration in soil than in plants / ora (1) loss of turgor (1)	3	allow dehydration of plants but ignore idea simply that 'plants can not get enough water' ignore diffusion allow higher level answer: soil has lower water potential / ora allow (plant/cells) wilts / droops / becomes flaccid / becomes plasmolysed
	(b)	(i)	idea that can grow crops in some places where previously could not / can grow crops in a greater variety of places (1)	1	allow examples: near salt marshes / by sea ignore can grow crops in salty soil (in question) allow can irrigate with sea water allow can grow crops in more places ignore idea that can grow crops anywhere
		(ii)	restriction (enzyme) (1)	1	allow endonuclease ignore restrictive / restricting / restricted
			Total	6	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

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