OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B

General Certificate of Secondary Education

Unit **B632/02**: Modules B4, B5, B6 (Higher Tier)

Mark Scheme for June 2012

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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

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
__	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

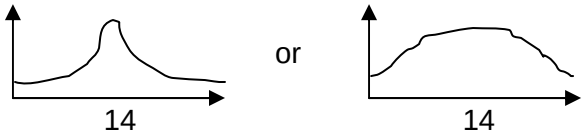
Question			Answer	Marks	Guidance
1	(a)		(so / because palisade cells can) absorb **more** light / photosynthesize **more** (1)	1	**allow** (palisade cells) get / collect / hit by / capture **more** light **ignore** get more sun **but** get more sunlight = 1 needs comparison, so **ignore** e.g. (palisade 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)		any value more than 0 and less than 4.5 (1) increases humidity **or** decreases wind speed / air movement (1) decreases diffusion gradient / concentration gradient of water / AW **or** increases concentration of water outside the leaf (1) (rate of) evaporation decreases **or** (rate of) diffusion decreases (1)	4	 **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 **ignore** references to amounts of water **allow** correct higher level reference to lower water potential outside leaf **ignore** references to transpiration rate (in question) **ignore** evaporation stops / diffusion stops mark all points independently except in case below **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)

Question			Answer	Marks	Guidance
	(b)		**any two from:** movement of food substances / sugar (and water) (1) through phloem (1) movement is up and down plant / AW (1) does not involve stomata **or** does not involve evaporation / loss of water **or** not affected by wind speed / humidity (1)	2	assume unqualified answers refer to translocation **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 **not** phloem and xylem **ignore** just 'not affected by external factors' **ignore** not affected by temperature **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) **allow** additional mark for higher level answer referring to role of ATP / respiration / active transport (1) **ignore** just 'involves / needs energy'
			Total	**6**	

Question			Answer	Marks	Guidance
3	(a)	(i)	5 (%) (2) if answer incorrect 90 ÷1800 x 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)		☐ ✓ water diffuses out of the leaves though stomata (1) ☐ ☐ ✓ 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

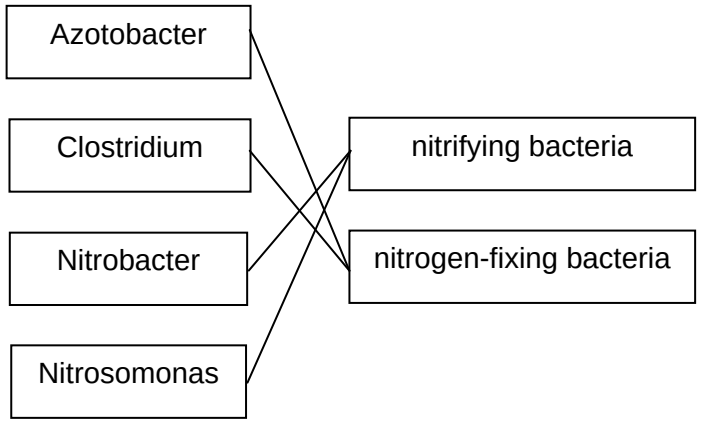
Question			Answer	Marks	Guidance
		(ii)	the baby will not be genetically/biologically hers (1) idea that may be worried about the genes/health of the egg (1)	2	**ignore** just 'it's not her baby' **ignore** it's not from her ovaries / not her egg **allow** idea that child may want contact with its biological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

Question			Answer	Marks	Guidance
6	(a)		contains (synovial) fluid (1)	1	**allow** liquid **allow** it's a moveable joint / can move **ignore** just examples of types of joint e.g. 'it's a ball and socket' = 0 **ignore** it can only move like a hinge **allow** it can move, for example a hinge joint **allow** it moves in all directions (because it is a ball and socket joint)
	(b)		15 (%) (1)	1	
	(c)	(i)	suggest surgery AND the point 72,15 indicated on the graph (1)	1	**allow 1 for correct ECF** **need to see line(s) / cross / clear indication on graph to award mark**
		(ii)	**more likely** to advise reducing risk / **less likely** to suggest surgery (1)	1	**ignore** just 'advise reducing risk' **ignore** less likely to need surgery (as get older) **allow** less likely to get surgery (as get older)
		(iii)	idea that (older people are) (more) likely to suffer adverse effects of an operation (1)	1	**e.g. allow** older patients may not survive operation **allow** idea that chances of operation being successful are lower with age **ignore** economic reasons **ignore** older people more likely to have more brittle bones
			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)		Azotobacter & Clostridium = N-fixing Nitrobacter & Nitrosomonas = nitrifying  all lines correct (2) two / three lines correct (1)	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^{o}C and above 40^{o}C
		(ii)	Liz (no mark) (the best temperature) could be (just) below or (just) above 30 (^{o}C) **or** (the best temperature) could be anywhere above 25 and below 35 (^{o}C) / anywhere between 25 and 35 (^{o}C) (1)	1	If state Paul then score 0 **allow** (the best temperature) is close to / about 30(^{o}C) (but not exactly) **allow** any numbers > 25 and < 35(^{o}C) **allow** any range > 25 and < 35(^{o}C), e.g. 30-34 **but** the answer "any number from 25 to 35 (^{o}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**	

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