

GCSE

Biology B

Unit **B732/02**: Modules B4, B5, B6 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2014

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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.

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Annotations used in scoris

Annotation	Meaning
	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

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
<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

MARK SCHEME

Question	Answer	Marks	Guidance
1 a i	lacewings increase, aphids decrease or lacewings decrease, aphids increase or aphids decrease followed by lacewings decrease (1) idea that lacewings eat/ kill aphids (1)	2	allow more lacewings, fewer aphids ignore aphids dying out (but allow lacewings increase, aphids die) allow fewer aphids followed by fewer lacewings ignore actual data allow lacewings are predators of aphids OR aphids are prey/food of lacewings
ii	(growing buckwheat / graph B) increases the number of lacewings (overall) (1) (growing buckwheat / graph B) decreases the number of aphids (overall) (1) but no evidence about crop yield (1)	3	ignore buckwheat attracts lacewings (in question) allow reverse arguments for no buckwheat allow no evidence about crop damage allow for additional marking point if fewer aphids then (can assume) more crop yield / less crop damage (1)
b	idea that anomalous results have less impact / anomalous results can be identified or discounted (1)	1	ignore more evidence / improves accuracy (in question) ignore simply improves reliability allow idea that small sample may not be representative / ORA
	Total	6	

Question	Answer	Marks	Guidance
2	<p>[Level 3] Describes the results AND gives a detailed explanation of the experiment. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Describes the results AND gives a limited explanation of the experiment. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Describes the results of the experiment OR gives a limited explanation of the experiment. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A*</p> <p>Detailed explanation could include:</p> <ul style="list-style-type: none"> • air movement increases / maintains concentration gradient • air movement increases / maintains diffusion gradient • air movement lowers concentration of water outside plant <p>ignore references to osmosis</p> <p>Limited explanation could include:</p> <ul style="list-style-type: none"> • (increased) air movement / fan causes loss of water • (water is lost by) evaporation / diffusion of water <p>ignore references to osmosis</p> <p>Description:</p> <ul style="list-style-type: none"> • loss of mass/water/readings go down in B / shoot • no change in A (allow small decrease) <p>To get full credit for description there needs to be a comparison between A and B. Description of only A or B limits mark to 1/3/5</p> <p>if no other marks, allow air movement increases transpiration for L1, 1 mark</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
Total		6	

Question	Answer	Marks	Guidance
3 a i	(lack of oxygen causes) fewer/no (aerobic) bacteria / fungi (1) (therefore) no/slow/less decay (1)	2	allow fewer/no decomposers / microorganisms ignore germs/viruses ignore fewer/no detritivores allow no/slow/less breakdown of dead material allow for additional marking point: less/no/slower respiration (by bacteria/fungi/decomposers) (1) allow reverse arguments
ii	(release) energy (1) to take in minerals/nutrients (1) by active transport / movement against a concentration gradient (1)	3	ignore absorb minerals from the air
b	higher concentration of salt (in roots) than sea water / ORA (1) (so can absorb water by) osmosis (1)	2	allow have lower concentration of water than sea water allow correct references to water potential references to concentration must be qualified
c i	different concentrations of salt (1)	1	allow idea of different water availability allow different levels of nutrients/minerals allow different niches / different abiotic factors / examples of different factors e.g. pH / light / temperature allow different environmental factors allow different conditions
ii	idea that only mangroves are adapted to / can survive / can grow in this environment (1)	1	allow mangroves outcompete other plants allow other plants not adapted / cannot survive / cannot grow (in mangrove forest)
	Total	9	

Question	Answer	Marks	Guidance
4 a	from carbon dioxide (from the air / through leaves) (1)	1	allow from glucose allow correct formula ignore from food ignore photosynthesis / respiration / breathing
b	from water (from the soil / through roots) (1)	1	allow from glucose allow correct formula ignore from food ignore photosynthesis / respiration / breathing
c	from carbon dioxide (from the air / through leaves) (1)	1	not from water allow from glucose allow correct formula ignore from food ignore photosynthesis / respiration / breathing
d	from nitrates (from the soil / through roots) (1)	1	allow correct formula
	Total	4	

Question	Answer	Marks	Guidance
5 a i	pituitary (1)	1	allow phonetic spelling
ii	<u>negative feedback</u> (1)	1	ignore homeostasis
b i	young women (1) women with low FSH levels (1)	2	If quote ages to treat then allow only treat women in a certain age range (must be a range between ages 20 to 44) allow only treat women under a stated age in the range 20 - 44 If quote levels to treat then allow only treat women in a certain range (must be a range between level 4 to 12) allow only treat women under a stated level in the range 4 - 12
ii	build up hopes in women who are unlikely to get pregnant / women have to go through hormone treatment with little hope of success / very expensive and money could be spent on treatments that may be more successful (1)	1	allow idea that some women cannot carry baby to full term allow idea that IVF can not treat all forms/causes of infertility allow idea that clinic may not treat women with health disorders / unhealthy lifestyles (smoking / drugs / alcohol) allow clinic may not treat women if she/her partner already has children ignore references to age / FSH level ignore unqualified references to expense
	Total	5	

Question	Answer	Marks	Guidance
6 a i	A = ureter (1) B = cortex (1)	2	allow phonetic spelling not urethra
ii	to filter (the blood) (1)	1	allow molecules / substances are forced out (of blood) allow ultrafiltration ignore just remove waste
b	percentage working decreases over time / ORA (1) less points / A grade will have a greater chance of still working / lasting longer / ORA (1)	2	ignore just negative correlation allow correct comparison e.g. A and B last longer than C and D allow converse answers ignore actual data on its own
c	7% (difference) (2) BUT Manjit grade B/79% and Georgina grade C/72% (1)	2	allow answers written by table
	Total	7	

Question	Answer	Marks	Guidance
7	<p>[Level 3] Answer describes the range of movement at the hip AND describes the consequence(s) of damaged cartilage / synovial fluid Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Answer describes the range of movement at the hip AND gives simple description of the damage Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Answer describes the range of movement at the hip OR gives simple description of the damage. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at D to A</p> <p>Indicative scientific points may include:</p> <p>Consequences:</p> <ul style="list-style-type: none"> • less synovial fluid means less lubrication / more friction • less/damaged cartilage means more friction/less shock absorption <p>Simple description of damage:</p> <ul style="list-style-type: none"> • less (synovial) fluid • less cartilage / cartilage is wearing away • bones rubbing together / bone pushed into socket <p>Range of movement:</p> <ul style="list-style-type: none"> • allows movement in three planes / almost 360° / all directions <p>if just 'hip joint is a ball and socket joint' limits mark to L1, 1 mark or L2, 3 marks</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
	Total	6	

Question	Answer	Marks	Guidance
8 a i	1 (cm) (1)	1	
ii	1727 (2) but $3.14 \times 1 \times 550$ (1)	2	<p>allow answer in range 1727-1728 (2)</p> <p>allow $\pi \times 1 \times 550$ (1)</p> <p>allow ECF from (i)</p> <p>allow correct rounding</p>
iii	<p>any two from:</p> <p>real lining has: villi (1) folds / creases (1) microvilli (1)</p>	2	<p>allow finger-like projections</p> <p>ignore bumps / not smooth / stretched</p> <p>ignore cilia</p>
b	<p>any two ideas from:</p> <p>breast-feeding rats develop more villi/folds/microvilli (in small intestine) (1)</p> <p>breast-feeding rats absorb more food / faster (1)</p> <p>breast-feeding rats need more food to produce milk (1)</p>	2	<p>allow reverse arguments</p> <p>note <i>absorb more food to make milk = 2</i></p> <p>allow nutrients as alternative to food</p>
	Total	7	

Question	Answer	Marks	Guidance
<p>9 a</p>	<p><i>Lactobacillus</i> bacteria</p> <p>bacteria that rot organic material releasing methane</p> <p>bacteria that produce toxins</p> <p><i>Penicillium</i> <i>fungus</i></p> <p>used in biogas production</p> <p>used in yoghurt making</p> <p>used in production of antibiotics</p> <p>cause diseases such as cholera or food poisoning</p>	<p>2</p>	<p>three or four correct = 2 marks two correct = 1 mark</p>
<p>b</p>	<p>similarity: make their own food / are producers (1)</p> <p>difference: bacteria obtain energy from chemical reactions / bacteria do not use light / do not photosynthesise(1)</p>	<p>2</p>	<p>allow autotrophic / chemosynthetic / make sugar ignore they both take in gases / both take in CO₂ / both need energy ignore they both get food</p> <p>allow reverse arguments referring to plants assume unqualified answers refer to bacteria</p>
<p>Total</p>		<p>4</p>	

Question	Answer	Marks	Guidance
10 a	humus (1)	1	ignore detritus / compost
b i	particles of different density (1) BUT particles of greater density sink faster/further (2)	2	allow mass/weight as alternatives to density allow sand particles are heavier / clay lighter = 1 allow sand particles are heavier so sinks faster/further / ORA =2 ignore references to particle size
ii	answer in range 34-36 (%) (2) BUT in working, measurement in range 17 to 18 (mm) (1)	2	allow 1.7 – 1.8 but must say cm ignore 17 or 18 % (on answer line)
iii	loam (1)	1	If answer is sandy, then allow ecf if % in (ii) is >55
	Total	6	

Question	Answer	Marks	Guidance
11 a	kill (other) microorganisms / stops microorganisms entering (1) prevent production of other products / spoilage (1)	2	ignore stop microbes reproducing allow prevent contamination allow kill bacteria/fungi allow so there are no microorganisms/bacteria/fungi ignore simply stop microorganisms/bacteria/fungi ignore kill germs/bugs/viruses allow might change the products / reduce alcohol production allow idea that microorganisms might be harmful allow (other microorganisms) compete for resources
b	<p>[Level 3] Two comparisons and two explanations Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Two comparisons and one explanation Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] One comparison OR one explanation Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at D to A*</p> <p>Indicative scientific points may include</p> <p>comparisons:</p> <ul style="list-style-type: none"> • alcohol production is/starts/finishes quicker/earlier with added sugar • both produce 14% alcohol / the same final percentage/level of alcohol <p>explanations:</p> <ul style="list-style-type: none"> • added sugar means fermentation / anaerobic respiration happens more quickly OR sugar is a limiting factor • 14% alcohol / high percentage/level of alcohol kills yeast <p>Note: One comparison and two explanations = L3,5 marks One comparison and one explanation = L2,3 marks</p> <p>ignore just 'alcohol made from sugar'</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
Total		8	

Question	Answer	Marks	Guidance
12 a	protein coat / protein outer layer / AW (1) (containing) genetic material (1)	2	protein cell wall = 0, but protein wall =1 allow DNA or RNA allow genes ignore chromosomes
b i	any two from idea that only estimates / not completely accurate as some sufferers might not go and see a doctor / not everyone is tested (for salmonella) (1) (flu estimate less reliable as) flu-like symptoms may not be flu (1) (salmonella more likely to be accurate as) positive tests for salmonella (bacteria) (1)	2	
ii	idea that flu more common in winter / salmonella more common in summer / ORA (1) (flu more common in winter) because more likely to be indoors/on buses or trains so flu more likely to be passed on / ORA (1) (salmonella more common in summer) because of BBQs / food may not be kept cold enough / ORA (1)	3	ignore simply food not cooked properly / stored at incorrect temperature (in question)
Total		7	

Question	Answer	Marks	Guidance
13 a i	fungi (1) 7 (%) (1)	2	allow any correct rounding of 7.0376432 no ECF
ii	some species have been given more than one name / counted more than once (1)	1	allow some have gone extinct (since being discovered) allow new species have evolved/mutated/appeared (faster than expected)
b	any two from these ideas birds are easier to spot / beetles are more difficult to spot (1) more people watch/are interested in birds than beetles (1) birds migrate / move around more (1) beetle species are similar and only recently have people realised they are different species (1) there are more niches for beetles (1) beetles are older than birds and have had time to evolve into more species (1) identification/collection techniques (for beetles) have improved (1)	2	ignore descriptions of differences between the graphs with no explanation e.g. there are fewer bird species than beetle species allow birds are bigger than beetles allow people have been recording birds for longer / idea that birds already known in 1750 allow beetles may live in places with few people

Question	Answer	Marks	Guidance
c i	<p>any two from these ideas (no) (no marks)</p> <p>a correlation does not prove causation (1)</p> <p>need more evidence (to prove) / could be other factors (causing extinction) (1)</p> <p>there is not a (complete) match between the two graphs (1)</p> <p>it could just be that we are better at recording extinctions now compared with 200 years ago (1)</p>	2	<p>yes = 0 marks</p> <p>allow there have always been extinctions so any match could be a coincidence</p> <p>allow human population is increasing exponentially but extinction is not /</p> <p>allow not much increase in extinctions in first 100 years although there is an increase in human population</p> <p>allow additional mark point the graph may be from a biased source (1)</p>
ii	<p>idea that this will help support the website's aim / stop extinctions (1)</p> <p>idea of making the two lines look as similar as possible / look like there is a correlation (1)</p>	2	<p>ignore simply 'biased'</p> <p>ignore simply there is a correlation</p> <p>allow additional marking point to fit them both on the same graph / easier to compare / if used same scale or axis then difficult to plot both lines (accurately) / idea that the (range of) numbers are very different (1)</p>
iii	<p>(increasing human population leads to extinction because of) habitat destruction / pollution / climate change / hunting (1)</p>	1	
	Total	10	

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