

GCSE

Biology B

Unit **B731/01**: Modules B1, B2, B3 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

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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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11 Annotations used in scoris

Annotation	Meaning
	correct response
	incorrect response
BOD	benefit of the doubt
NBOD	benefit of the doubt not given
ECF	error carried forward
	information omitted
I	ignore
R	reject
CON	contradiction

12 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	Better judgement of distance <input checked="" type="checkbox"/> Binocular <input checked="" type="checkbox"/> Monocular <input type="checkbox"/> Narrower field of view <input type="checkbox"/> Wider field of view <input type="checkbox"/>	2	each incorrect tick above 2 loses 1 mark down to zero ignore tick in box for narrow field of view
b	fast (1) automatic (1)	2	allow quick/rapid allow unlearned allow you do it without thinking / unconsciously ignore 'it just happens' allow the response is always the same (1)
c i	sweating (1)	1	allow evaporation / conduction / convection / radiation
c ii	cools them down / removes heat / so they do not overheat / saliva acts like sweat (1)	1	allow higher level responses referring to saliva evaporates
	Total	6	

Question	Answer	Marks	Guidance
2 a i	ciliated epithelial cells (1)	1	allow correct answer ringed, ticked or underlined on list
a ii	damages the cilia (1) unable to remove/clear mucus (1)	2	allow damage to hairs allow cilia are paralysed/can't move/can't work ignore affects cilia ignore cilia are destroyed/burned/killed allow damages / stimulates goblet cells allow unable to remove pathogens/bacteria/dirt/dust allow produce more/build-up mucus ignore causes smokers' cough ignore causes (lung) cancer
b	any two from: mucus not wafted out / removed (to be swallowed) (1) mucus builds up (1) holds microbes in respiratory system / microbes not killed (by stomach acid) / microbes not removed (1)	2	ignore cancer ignore smokers cough allow microbes can increase in number allow pathogens/bacteria/viruses/germs as alternatives to microbes ignore dust/dirt not removed ignore more microbes can enter lungs allow cilia can't clean mucus/ microbes out of lungs (1) allow cilia can't clean mucus with trapped microbes out of lungs (2)
c i	the later men stop the greater the risk (of lung cancer) / the earlier men stop the lower the risk (2) but stopping smoking reduces the risk of lung cancer (1)	2	allow the longer time the men smoke the greater the risk = 2 allow a positive correlation = 2

Question	Answer	Marks	Guidance
c ii	8 (%) (1)	1	
c iii	no (no mark) the reduction in risk between 40 and 60 years is less than 10% / is 8% (1) the only 10% reduction in risk is over a time period of at least 30 years (1)	2	need to state yes or no and link it to their explanation allow ecf from (c)(ii) allow yes (no mark) idea that 8 is close to 10 (1) allow idea that 10 is only an average (1)
	Total	10	

Question	Answer	Marks	Guidance
3 a	<p>due to contraction of heart (muscle) (1)</p> <p>so that blood reaches all parts of the body (1)</p>	2	<p>allow pushed / pumped / squeezed by heart (muscle)</p> <p>allow needs lots of force to get through the capillaries</p> <p>allow so it gets around the body</p> <p>allow arteries have thick wall / narrow lumen (1)</p> <p>ignore blood travels through small vessels / narrow vessels</p>
b	<p>[Level 3] Simple calculation done to show the total input and output of water and uses data to show that they don't balance and makes a conclusion about water control mechanisms including the kidney. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Simple calculation done to show the total input and output of water and uses data to show that they don't balance and recognises control mechanisms for water levels in body are not working properly. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Simple calculation done to show the total input and output of water or uses data to show that they don't balance. 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 C.</p> <p>Indicative scientific points at level 2 and 3 may include:</p> <ul style="list-style-type: none"> • inputs and outputs don't balance / output greater than input • Amir's urine volume is 300ml more than average / Amir's output is 300 (ml) greater than his input • recognises control mechanisms for water levels in body are not working properly • The kidneys that are not working properly <p>Indicative scientific points at level 1 include:</p> <ul style="list-style-type: none"> • total output for Amir = 2800 (ml) • total output for average = 2500 (ml) <p>1 calculation correct only then can't get full marks for a level If totals not calculated at all then limited to level 1</p>

Question	Answer	Marks	Guidance
c	through the blood(stream) (1)	1	allow in blood vessels / in plasma allow in arteries/veins/capillaries ignore in blood cells ignore by the heart
	Total	9	

Question	Answer	Marks	Guidance
4 a i	algae / phytoplankton (1)	1	ignore examples not in table
a ii	grasshopper and mosquito larva <input data-bbox="801 331 882 395" type="checkbox"/> grasshopper and rat <input data-bbox="801 427 882 491" type="checkbox"/> rat and dragonfly larva <input checked="" data-bbox="801 523 882 587" type="checkbox"/> rat and mosquito larva <input data-bbox="801 619 882 683" type="checkbox"/> rat and snake <input data-bbox="801 715 882 778" type="checkbox"/>	1	incorrect tick loses mark
b	producer (1)	1	allow correct answer ringed, ticked or underlined on list
	Total	3	

Question	Answer	Marks	Guidance
5 a	<p>any two from:</p> <p>eyes on side of head for wide field of view (1)</p> <p>living in groups to reduce chance of being caught (1)</p> <p>camouflage so can not be seen / AW (1)</p> <p>small so easier to hide / AW (1)</p> <p>large ears to hear predators (1)</p>	2	<p>ignore unqualified features</p> <p>ignore good eyesight to see predators</p> <p>allow camouflage to blend into surroundings</p> <p>ignore small so can not been seen</p> <p>allow good hearing to hear predators</p> <p>allow runs fast to avoid predators (1)</p>
b i	when lemmings number is high then the breeding of snowy owls/ number of nests is high / ORA (1)	1	<p>allow lemming numbers fall after snowy owls nest / breed</p> <p>ignore the number of lemmings and snowy owl nests are similar to each other</p> <p>ignore numbers of snowy owls – must refer to nests/breeding</p>
b ii	<p>reasonably strong because (no mark):</p> <p>the peaks of the lemmings always coincides with presence of snowy owls nest / ORA (1)</p> <p>but many snowy owls nests / breeding in 2004 and 2007 when there are only small peaks in lemming numbers (1)</p>	2	<p>allow idea that data for nests is missing for many years (1)</p>
c	bacteria / fungi / decomposers (1)	1	<p>allow saprophytes</p> <p>ignore microbes</p> <p>ignore detritivores</p>
	Total	6	

Question	Answer	Marks	Guidance
6 a	fly A (1) because it has many features that are similar / dark bottom of abdomen / light top of thorax (1)	2	no marks for fly B or fly C but fly B because it has similar features / hairs / mostly same colour (1) or fly C because it has similar features / hairs / size / colour of abdomen (1) fly A because it is the same = 1
b	Drosophila (1)	1	allow drosophila and phonetic spelling
c i	any two from: idea it went against other scientific theories / Lamarck (1) insufficient evidence / DNA not discovered (1) went against religious beliefs (1)	2	allow lack of proof allow made people fearful of their ancestry (1)
c ii	idea that there is more evidence now / shown by fossil record / DNA mapping made clear the closeness of different organisms / selective breeding provides direct evidence of being able to change organisms (1) because it has been tested by (a wide range of) scientists (1)	2	allow now we have more proof allow mechanism (genes) for evolution wasn't realised / known allow scientists can't disprove it / other theories have been proved wrong
	Total	7	

Question	Answer	Marks	Guidance
7 a i	<p>[Level 3] Qualitative comparison between pods A and B and at least one quantitative idea. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Qualitative comparison between pods A and B. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Qualitative description only. 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 E.</p> <p>Indicative scientific quantitative points may include:</p> <ul style="list-style-type: none"> • pod A falls from 29 to 23 after the spillage • pod A falls from 36 to 23 overall • pod B falls from 22 to 13 (1990) / 12 (1991) / 11 (1992) • pod A falls by 6 after the spillage • pod B falls by 9 / 10 / 11 • pod A starts to increase in 1991 <p>Indicative qualitative comparisons may include:</p> <ul style="list-style-type: none"> • pod A begins to fall before pod B • pod A falls more than pod B overall • pod A falls less than pod B after the spillage • pod B falls more rapidly • pod A starts to increase but B does not <p>Indicative qualitative descriptions may include:</p> <ul style="list-style-type: none"> • oil kills whales • both populations fall after the oil spill <p>Accept other correct quantitative points including referring to dates</p> <p>Quantitative only = max level 1</p> <p>Can only go beyond level 1 if refer to both A and B</p> <p>Use the L1, L2, L3 annotations in Scoris. Do not use ticks.</p>

Question	Answer	Marks	Guidance
a ii	pod B because it's been most affected by the pollution / has lower numbers / numbers are not rising (1)	1	allow higher level responses referring to numbers falling to a critical level
b	<p>any two from:</p> <p>idea of it's cruel / unethical / immoral (1)</p> <p>whales are an intelligent mammal (1)</p> <p>lack of freedom / large animal confined in small area / shorter lifespan in captivity(1)</p> <p>not enough genetic variation in captivity / idea of disease wiping them out (1)</p> <p>less likely to survive in the ocean if released (1)</p> <p>will affect the food chains in the wild (1)</p>	2	<p>allow shouldn't make money from trapping wild animals</p> <p>allow whales become distressed</p> <p>allow they should be allowed to live in the oceans</p>
	Total	9	

Question	Answer	Marks	Guidance
8 a	<p>select / choose plants that produce bigger fruit (than the others) (1)</p> <p>breed these together (1)</p> <p>repeat selection and breeding over many generations (1)</p>	3	<p>no marks if answer in context of genetic engineering / cloning / cuttings</p> <p>ignore 'breed' unless it's clearly the selected plants that are being bred together</p> <p>ignore just 'repeat the process'</p> <p>max 2 for a generic description of selective breeding</p>
b	<p>(new plants) will be clones / genetically identical (1)</p> <p>so will (all) have large fruit (1)</p>	2	<p>allow new plants will be the same</p> <p>ignore new plants will be similar</p> <p>allow have the same characteristics (as parent)</p> <p>allow idea will get plants / fruit quicker (1)</p>
	Total	5	

Question	Answer	Marks	Guidance
9 a	undifferentiated cells / unspecialised cells (1) idea that can develop/change into different types of cells (1)	2	ignore can change into anything
b	made from skin cells (1) normal stem cells come from embryos (1)	2	allow made from differentiated cells allow stem cells come from bone marrow / umbilical cord
c i	40 (1)	1	
ii	20 (1)	1	
d	max one from: (yes – no mark) if works with mice it should work with humans (1) idea that otherwise infertile couples might not be able to have babies (1) max one from: (no – no mark) just because worked in mice does not mean it will work in humans (1) (was only done in 2012, so) do not know if there will be side-effects / harmful effects that haven't appeared yet (1) idea that unethical / immoral / against religion (1)	2	allow there may be potential risks ignore mutations ignore interfering with nature
	Total	8	

Question	Answer	Marks	Guidance
10 a	digestive system / kidney (1)	1	
b i	11500 (ml per min) or x12.5 (1)	1	
b ii	<p>[Level 3] Explanation that muscles are respiring more AND need more of at least one reactant or need to remove more of at least one product of respiration. AND State that energy from respiration needed for muscle contraction. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Explanation that muscles are respiring more OR need more of at least one reactant or need to remove more of at least one product of respiration. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Partial explanation that muscles are respiring OR description of at least one reactant or product of respiration being transported to or from the muscles. 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 E</p> <p>Indicative scientific points may include:</p> <ul style="list-style-type: none"> • muscles need more oxygen • muscles need more glucose • need to remove more carbon dioxide • need to remove more water • need to remove more heat • more (aerobic) respiration • muscles transfer (need) more energy • muscle contraction • more respiration = faster respiration <p>May gain marks from equation</p> <p>allow higher level points</p> <ul style="list-style-type: none"> • more anaerobic respiration • need to remove lactic acid • oxygen debt • avoid muscle fatigue <p>to avoid muscle fatigue = L1 to avoid muscle fatigue by removing lactic acid = L2 to avoid muscle fatigue by providing more oxygen = L2</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>

Question	Answer	Marks	Guidance
c i	17 500 (ml per minute) (1)	1	
ii	heart (1) because pumps harder / faster (1)	2	allow beats harder / faster allow pumps more blood allow increases pressure of blood that it is pumping
d	increase (1)	1	
	Total	12	

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