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
	benefit of the doubt
	benefit of the doubt **not** given
	error carried forward
	information omitted
	ignore
	reject
	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 ✓ Binocular ✓ Monocular Narrower field of view Wider field of view	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	due to contraction of heart (muscle) (1) so that blood reaches all parts of the body (1)	2	**allow** pushed / pumped / squeezed by heart (muscle) **allow** needs lots of force to get through the capillaries **allow** so it gets around the body **allow** arteries have thick wall / narrow lumen (1) **ignore** blood travels through small vessels / narrow vessels
b	**[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) **[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) **[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) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C.** **Indicative scientific points at level 2 and 3 may include:** • 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 **Indicative scientific points at level 1 include:** • total output for Amir = 2800 (ml) • total output for average = 2500 (ml) 1 calculation correct only then can't get full marks for a level If totals not calculated at all then limited to level 1

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 ☐ grasshopper and rat ☐ rat and dragonfly larva ✓ rat and mosquito larva ☐ rat and snake ☐	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	**any two from:** eyes on side of head for wide field of view (1) living in groups to reduce chance of being caught (1) camouflage so can not be seen / AW (1) small so easier to hide / AW (1) large ears to hear predators (1)	2	**ignore** unqualified features **ignore** good eyesight to see predators **allow** camouflage to blend into surroundings **ignore** small so can not been seen **allow** good hearing to hear predators **allow** runs fast to avoid predators (1)
b i	when lemmings number is high then the breeding of snowy owls/ number of nests is high / ORA (1)	1	**allow** lemming numbers fall after snowy owls nest / breed **ignore** the number of lemmings and snowy owl nests are similar to each other **ignore** numbers of snowy owls – must refer to nests/breeding
b ii	reasonably strong because (no mark): the peaks of the lemmings always coincides with presence of snowy owls nest / ORA (1) but many snowy owls nests / breeding in 2004 and 2007 when there are only small peaks in lemming numbers (1)	2	**allow** idea that data for nests is missing for many years (1)
c	bacteria / fungi / decomposers (1)	1	**allow** saprophytes **ignore** microbes **ignore** detritivores
	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	**[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) **[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) **[Level 1]** Qualitative description only. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E.** **Indicative scientific quantitative points may include:** • 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 **Indicative qualitative comparisons may include:** • 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 **Indicative qualitative descriptions may include:** • oil kills whales • both populations fall after the oil spill Accept other correct quantitative points including referring to dates Quantitative only = max level 1 Can only go beyond level 1 if refer to both A and B **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**

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	**any two from:** idea of it's cruel / unethical / immoral (1) whales are an intelligent mammal (1) lack of freedom / large animal confined in small area / shorter lifespan in captivity(1) not enough genetic variation in captivity / idea of disease wiping them out (1) less likely to survive in the ocean if released (1) will affect the food chains in the wild (1)	2	 **allow** shouldn't make money from trapping wild animals **allow** whales become distressed **allow** they should be allowed to live in the oceans
	Total	9	

Question	Answer	Marks	Guidance
8 a	select / choose plants that produce bigger fruit (than the others) (1) breed these together (1) repeat selection and breeding over many generations (1)	3	no marks if answer in context of genetic engineering / cloning / cuttings **ignore** 'breed' unless it's clearly the selected plants that are being bred together **ignore** just 'repeat the process' max 2 for a generic description of selective breeding
b	(new plants) will be clones / genetically identical (1) so will (all) have large fruit (1)	2	**allow** new plants will be the same **ignore** new plants will be similar **allow** have the same characteristics (as parent) **allow** idea will get plants / fruit quicker (1)
	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	**[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) **[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) **[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) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E** **Indicative scientific points may include:** • 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 May gain marks from equation **allow higher level points** • more anaerobic respiration • need to remove lactic acid • oxygen debt • avoid muscle fatigue to avoid muscle fatigue = L1 to avoid muscle fatigue by removing lactic acid = L2 to avoid muscle fatigue by providing **more** oxygen = L2 **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

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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