

Biology B

General Certificate of Secondary Education

Unit **B631/02**: Modules B1, B2, B3 (Higher Tier)

Mark Scheme for January 2011

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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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Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	=	alternative and acceptable answers for the same marking point
(1)	=	separates marking points
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
allow	=	answers that can be accepted
()	=	words which are not essential to gain credit
<u> </u>	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question		Expected Answers	Marks	Additional Guidance
1	(a)	insulin (1)	1	allow adrenalin
	(b)	breasts develop / hips widen / pubic hair / hair under arms (1)	1	ignore periods / menstruation / menstrual cycle allow egg release / egg production / ovulation ignore become fertile allow body hair but ignore just hair ignore references to moods not any solely male characteristic eg voice deepens
	(c)	oestrogen = repair (1) progesterone = maintain thickness (1)	2	allow oestrogen makes it thicker (1) ignore progesterone keeps uterus in good condition
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
2	(a)	(i)	<u>obese</u> (1)	1	
		(ii)	34 (2) but 110 / (1.8 x 1.8) OR 110 / 3.24 (1)	2	correct answer no working = (2) allow 33.95 / 33.950617 (2) allow 33.950 / 33.9 / 33 (1) mark only because incorrect rounding
	(b)	(i)	few(er) cilia / cilia do not work / cilia damaged / AW (1)	1	allow cilia clogged (1) allow more mucus (1) ignore just covered in mucus allow reference to cancer / DNA damage / AW (1) ignore just cell damage ignore covered in tar / dirt / dust ignore hairs
		(ii)	alcohol is a poison / toxin (1)	1	allow liver breaks down the alcohol / alcohol scars liver allow causes cirrhosis allow kills liver cells ignore kills liver
	(c)	(i)	(heat needed for) evaporation (1)	1	not heat evaporates ignore water lost
		(ii)	(lactic acid is) removed / oxidised / broken down / taken to liver (1)	1	ignore degenerates / decay allow changed to carbon dioxide and water
			Total	7	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	A, T, C , G (1)	1	allow any order allow lower case allow correct names
	(b)	(i) 28 (1)	1	not 28 pairs not 14 pairs
		(ii) 58 (1)	1	allow 29 pairs
	(c)	(i) different sequence / order / pattern of <u>bases</u> (1)	1	allow some base(s) are missing / extra base(s) / base(s) substituted allow different base code allow different bases
		(ii) homozygous (no mark) it would need to have two recessive alleles / if it had a dominant allele it would be dark (1)	1	if heterozygous – no mark for whole question
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	<p>idea that viruses carry <u>antigens</u> (1)</p> <p>idea that white blood cells / body releases / makes <u>antibodies</u> (1)</p> <p>idea of body knowing how to make the antibodies (more quickly) if infected again (1)</p>	3	<p>ignore antitoxin</p> <p>allow correct reference to memory cells</p> <p>allow antibodies remain in blood / body</p> <p>ignore just immunity remains (in question)</p>
	(b)	<p>any one from:</p> <p>to check for side effects / check for harmful effects / to see if they are safe / AW (1)</p> <p>find the level of dose needed (1)</p>	1	<p>ignore see if they work / have an effect</p>
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	<u>population</u> (1)	1	allow any indication eg underline
		(ii)	any two from: stop hunting / ban hunting (1) ban egg collecting (1) ban pesticides (1) build them nests (1) feeding stations / feed them (1) educational programmes (1) captive breeding / keep pairs together until they breed (1) creating artificial ecosystems / put in a nature reserve / conservation programme / protect habitat (1)	2	allow legal protection (1) if no mention of banning hunting / egg collection / pesticides ignore just keep in captivity / keep in a zoo (with no reference to breeding)
	(b)		(loss of habitats) removing (natural) sources of food / nest sites (1) OR (artificial ecosystems use) pesticides / poisons / (introduce) things that adversely affect the red kite eg competitors (1)	1	allow less food ignore just habitat loss
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
6	(a)	(i)	16 (2) but 4 quadrats in 1m ² OR average per quadrat = 4 (1)	2	correct answer, no working = (2) allow correct answer in table allow working that clearly shows correct calculation, eg 1 / 0.25 = 4 OR 40 / 10 = 4 (1)
		(ii)	2560 (1)	1	allow ecf ie answer from (i) x 160
	(b)		only sampling 5 places: too little data / sample too small / area too small / AW (1) only sampling top of shore: (samples may be) unrepresentative of the population of limpets / area sampled is too small / bias / AW (1)	2	allow idea that any anomalous results may have a greater effect on final estimate eg the five samples may be unrepresentative ignore just no samples from lower shore ignore just not random allow there may be more / fewer on the lower shore
	(c)		B and D (1)	1	allow ringed answer on question
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
7	(a)	(i)	soft (1) minerals (1)	2	
		(ii)	in tar (pits) / asphalt / amber / ice / peat (1)	1	allow in bog / in swamp allow frozen allow in a place where microbes don't cause decay ignore mud / clay / coal ignore just imprint / impression ignore unqualified reference to just acidic conditions
		(iii)	any two from soft body parts decay / soft parts don't fossilise (1) fossilisation rarely occurs (1) some fossils may not have been found yet (1)	2	allow fossils do not show colouration (1) allow fossils can be damaged (by weathering etc) (1)
	(b)		idea of variation and selective advantage: eg some plants have bigger leaves / fewer indentations and so can absorb more light / photosynthesize more (1) idea of survival of the fittest and inheritance of successful characteristics: eg the plants with larger leaves are more likely to survive and pass on their genes / characteristics (1)	2	both answers must be specific to leaves and not a generic description
			Total	7	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	chlorophyll (1)	1	
	(b)	6H ₂ O C ₆ H ₁₂ O ₆ (1)	1	both needed for mark in correct order must be upper case with subscripts
	(c)	more (sun)light / higher temperature (1)	1	needs to show a comparison allow longer days (in summer) / shorter days in winter (1) allow warmer (in summer) / cooler in winter (1) allow more heat allow more sun
		Total	3	

Question			Expected Answers	Marks	Additional Guidance
9	(a)	(i)	meiosis (1)	1	allow phonetic spelling allow reduction division
		(ii)	no (no mark) eggs contain different combinations of chromosomes / contain one of each chromosome pair (but not the same one) (1)	1	if answer is yes – no marks allow higher level answers eg random assortment / independent segregation / crossing over (1) ignore just 'they are different sexes' ignore just the eggs were different
		(iii)	zygote (1)	1	allow any indication eg underline
	(b)	(i)	13 (1)	1	allow answer in range 12.0-13.5
		(ii)	11 (1)	1	allow answer in range 10.0-12.0
		(iii)	(height) stays the same / growth stops (1)	1	allow no change / nothing allow increases (very) slowly / very little ignore reference to shrinking (at old age)
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
10	(a)	(i)	split / divide embryo / AW (1) implant embryo(s) / clone(s) (into surrogate cows) / AW (1)	2	ignore just cells divide – must be clear it's the embryo splitting must be in correct sequence to get two marks, eg have second answer in first box (1) max
		(ii)	can get more clones or many clones / could only get one or two from biological mother (if surrogates not used) / AW (1)	1	ignore just references to genetically identical allow more chance of success ignore just get more cows allow can keep using the same cow for producing embryos allow avoid risk of 'best' cow dying in labour allow idea that to change a herd by selective breeding would take a long time
		(iii)	fewer alleles / less variation (1)	1	ignore fewer genes allow no variation
	(b)	(i)	DNA unzips / forms single strands (1) new base pairs form / double strands form by semi-conservative replication / AW(1) BUT complementary base pairing / correct example eg AT or CG (2)	3	can mark from diagrams allow DNA splits / breaks in half allow higher level answer: nucleotides pair up allow unambiguous description / diagram of semi-conservative replication
		(ii)	decreases (1)	1	allow any indication eg underline
			Total	8	

Question			Expected Answers	Marks	Additional Guidance
11	(a)	(i)	smaller surface area / less contact with blood (1)	1	ignore damaged alveoli / no alveoli ignore tar in lungs
		(ii)	yes (no mark) net movement is into the blood / random movement of particles (1)	1	if answer is no – no marks ignore just some oxygen enters alveoli (in question)
		(iii)	oxyhaemoglobin (1)	1	
	(b)	(i)	forms plaque / narrows vessels / builds up on walls (1)	1	allow builds up on / in vessels ignore references to veins ignore just blocks / clogs / stops blood flow ignore just blocks / clogs vessels ignore makes vessels smaller
		(ii)	blood is not pumped as efficiently / blood does not travel as quickly / AW (1)	1	allow consequences, eg less oxygen carried around body / breathlessness / fainting allow poor circulation ignore just tired allow heart attack / angina / blood clots / stroke ignore references to blood pressure ignore not enough blood ignore make heart work harder
		(iii)	avoid rejection / AW (1)	1	allow higher level answers correctly referring to antibodies / antigens allow donors are scarce / less risk of infection ignore references to blood groups ignore references to tissue types with no link to rejection allow will accept (as alternative to avoid rejection)
			Total	6	

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