



General Certificate of Secondary Education

Biology 3411/F

Specification B

Mark Scheme

2005 examination – June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Biology (Specification B) Foundation Tier 3411/F

3411/F Q1

question	answers	extra information	mark
(a) G	<p>Stimulus Part of the body</p>	<p>1 mark for each correct line</p> <p>if 2 lines to one box, CANCEL mark</p>	max 3
(b) A	<p><u>in correct sequence:</u></p> <p>sensory brain</p>		1 1
total			5

3411/F Q2

question	answers	extra information	mark
A	<p><u>in correct sequence:</u></p> <p>breathing diffusion respiration</p>		1 1 1
total			3

3411/F Q3

question	answers	extra information	mark
(a)(i) A	carbon dioxide	accept other positive indications	1
(ii) A	methane	accept other positive indications	1
(b) A	increase	accept other positive indications	1
(c) E	any three from: building farming / removing hedgerows / fire quarrying / mining industry drainage of marshland dam construction / flooding land dumping waste	accept houses / airports / roads / factories do not accept pesticides, fertilisers etc accept release of toxic chemicals / named eg accept acid rain / global warming only if linked to production by human activity do not accept just ‘pollution’ do not accept fly tipping, litter	3
total			6

3411/F Q4

question	answers	extra information	mark
(a)(i) A	clones	accept other positive indications	1
(ii) E	same genes / alleles / DNA grown in same (environmental) conditions or correct eg – same amount of water / same temperature / same amount of light	accept same genetics / genetic information do not accept same chromosomes	1 1
(b) G	any two from: <u>water</u> uptake ion / salts / minerals / nutrient uptake stability / support / anchorage	do not accept 'food' / vitamins	2
total			5

3411/F Q5

question	answers	extra information	mark
(a)(i) A	(predator) lion		1
	(prey) antelope		1
(ii) A	light	accept other positive indications	1
(iii) A	<u>in sequence (top to bottom):</u> lion antelope grass		1
(b)(i) G	bacteria / fungi / saprotrophs	accept moulds / decomposers / microorganisms / microbes / saprophytes / saprobionts	1
(ii) A	aerobic	accept other positive indications	1
	moist		1
	warm		1
(iii) A	carbon dioxide		1
	mineral salts		1
total			10

3411/F Q6

question	answers	extra information	mark
(a) G	one from each parent / one from egg and one from sperm	do not accept egg and sperm join / fertilisation unqualified	1
(b)(i) G	nn	accept a ring around printed nn	1
(ii) A	Nn Nn		1
total			3

3411/F Q7

question	answers	extra information	mark
(a) G	decrease in number of deaths (after vaccination started)		1
(b) A	<u>in correct sequence:</u> bacteria white blood cells antibodies		1 1 1
total			4

3411/F Q8

question	answers	extra information	mark
(a)(i) E	8		1
(ii) E	125	accept 124 accept correct answer from candidate's (a)(i) unless zero	1
(b) E	any three from: 'over the limit' slows reactions / takes longer to stop car / increased reaction time mars judgement / cannot estimate distances / slower thinking over-confident / do not notice other road users / less aware of surroundings problems with vision / blurred vision / dizzy lack concentration / sleepiness / drowsy upsets balance	ignore: affects nervous system unqualified	3
(c) G	<u>in correct sequence:</u> (blood) plasma diffusion lungs		1 1 1
(d) G	damage to brain / kills brain cells / damage to liver / cirrhosis / addiction / 'become an alcoholic' / obesity / overweight / 'beer belly' / stomach ulcers	accept liver cancer / liver failure ignore kidney damage do not accept transient effects, eg drunkenness do not accept lung damage / heart disease	1
total			9

3411/F Q9

question	answers	extra information	mark													
<p>E</p>	<p>Quality of written communication</p>	<p>for ideas given in a sensible order; comparison made for geranium and cactus for each feature (ie not just list for geranium followed by list for cactus) + <u>linking</u> of feature & explanation</p>	<p>1</p>													
	<p>any four features + explanations from:</p> <p>cactus has:</p> <table border="0"> <thead> <tr> <th>Feature</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>thicker cuticle</td> <td>waterproof / keeps water in</td> </tr> <tr> <td>smaller surface area</td> <td>less water loss / less heat absorbed</td> </tr> <tr> <td>fewer stomata</td> <td>less water loss</td> </tr> <tr> <td>stomata open at night / closed in day</td> <td>(closed when warmest) – so less water loss</td> </tr> <tr> <td>more widespread roots</td> <td>quickly absorbs water (after rain) / access to bigger area for absorbing water / absorb more water</td> </tr> <tr> <td>more water <u>storage tissue</u></td> <td>little water available in environment / can survive drought / avoids dehydration</td> </tr> </tbody> </table>	Feature	Explanation	thicker cuticle	waterproof / keeps water in	smaller surface area	less water loss / less heat absorbed	fewer stomata	less water loss	stomata open at night / closed in day	(closed when warmest) – so less water loss	more widespread roots	quickly absorbs water (after rain) / access to bigger area for absorbing water / absorb more water	more water <u>storage tissue</u>	little water available in environment / can survive drought / avoids dehydration	<p>accept converse points for geranium plant</p>
Feature	Explanation															
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<p>total</p>		<p>5</p>														

3411/F Q10

question	answers	extra information	mark
(a) G	respire		1
	oxygen / glucose	} each once only	1
	glucose / oxygen		1
	blood		1
	carbon dioxide / heat	} each once only	1
	heat / carbon dioxide		1
(b)(i) E	immediate protection needed		1
	would be too slow to produce body's own antibodies		1
(ii) E	painkiller / antibiotic	accept named examples eg aspirin	1
total			9

3411/F Q11

question	answers	extra information	mark
(a) G	correctly labelled incisor	1 st / 2 nd tooth – can bracket 1 st and 2 nd or between 1 st and 2 nd	1
	canine	3 rd tooth	1
	premolar	4 th / 5 th tooth – can bracket 4 th and 5 th or between 4 th and 5 th	1
	molar	6 th / 7 th / 8 th tooth – can bracket 6 th , 7 th and 8 th or between 6 th , 7 th and 8 th	1
(b)(i) E	chewing / crushing / grinding (food)		1
(ii) E	large / block shaped / large surface area / flat top / several cusps or cusps fit into depressions on opposite teeth		1
(c)(i) G	carnivore or mainly / (only) meat	ignore bones do not allow meat and another food unless mainly meat	1
(ii) E	Incisor: small / spade shaped / chisel shaped		1
	to pull meat apart or strip meat from bone	ignore bite / cut	1
	Canine: sharp / pointed / curved / long	ignore large / strong	1
	grip / kill / pierce prey or tear / rip meat		1
total			11

3411/F Q12

question	answers	extra information	mark
(a) G	microscopic organisms / plants / animals / pieces / plankton / microorganisms / microbes / bacteria	do not accept microscopic food	1
(b) G	siphon		1
	gills		1
	cilia		1
total			4

3411/F Q13

question	answers	extra information	mark
(a) G	A = nucleus	accept phonetic spelling only	1
	B = (cell) membrane	accept plasma membrane	1
(b) G	any one from: photosynthesis <u>makes</u> sugar / starch / carbohydrate / organic material traps or absorbs light	accept ' <u>makes</u> food' do not accept makes chlorophyll ignore stores starch / food / light / chlorophyll	1
(c) G	any two from: Plant cell • (has) vacuole or has cell sap • (has) wall/ cellulose • (stores) starch or doesn't store glycogen Animal cell • no vacuole or small / temporary vacuole or no cell sap • no wall / cellulose or <u>only</u> membrane • doesn't store / have starch or stores glycogen	ignore reference to shape must be clear indication in all four boxes ignore reference to chlorophyll	2
total			5

3411/F Q14

question	answers	extra information	mark
(a)(i) G	liver		1
(ii) G	<u>on diagram:</u> 'X' on liver	must be unambiguous (eg not overlapping gall bladder) intersection of X in liver	1
(b) G	stomach <u>small</u> intestine	accept duodenum or ileum extra wrong answers cancel the mark, eg small intestine (colon) = no marks	1 1
(c) G	amylase not produced by stomach acid / low / wrong pH in stomach or enzyme would be denatured in stomach or amylase only works in neutral / alkaline conditions	accept no starch digesting enzymes in the stomach accept correct enzyme not in stomach accept <u>only</u> proteases in stomach do not accept protease does not digest starch incorrect extra information cancels mark do not accept amylase does not work in the stomach	1 1
(d) E	any three from: • non-digestible / insoluble matter in faeces or fibre / roughage in faeces • <u>water</u> absorption / <u>water</u> removed (into blood) • by <u>large</u> intestine / colon / rectum • by osmosis / diffusion	ignore 'solid' accept cannot be broken down cancel mark if list of materials	3
total			9

3411/F Q15

question	answers	extra information	mark
(a) G	burning fossil fuels / coal / gas / oil	accept driving <u>vehicles</u> / eg cars accept coal-fired power station accept car emissions ignore combustion unqualified do not accept power station unqualified do not accept <u>using</u> fossil fuels	1
(b)(i) E	(SO ₂) makes it acidic / makes acid rain / lowers pH		1
(ii) E	any one from: (SO ₂) kills leaves reduces number of leaves reduces leaf area or smaller leaves causes fewer leaves to grow	ignore correct extras, eg withered, yellow etc	1
(c) E	any two from: (fewer leaves / less leaf S.A) so less photosynthesis less food / less sugar / less starch supplied (to roots / to stems) (SO ₂) lowers pH of soil / makes soil acidic ions (/minerals / salts / nutrients) less available (to plants)	accept don't get enough nutrients	2
total			5

3411/F Q16

question	answers	extra information	mark
(a)(i) E	remains of an organism in rock / amber / coal / ice / tar or remains of an organism which lived long ago	accept bones, shells or impression for 'remains'	1
(ii) E	<ul style="list-style-type: none"> fossils show changes <u>over</u> time 	do not accept just 'evolved' not just a past event	1 1
(b) E	<p>Quality of written communication</p> <p>any two from:</p> <p>mutation occurs in bacteria or change in DNA / gene occurs</p> <p>(when antibiotic used) only resistant bacteria survive or non-resistant bacteria are killed or reference to 'natural selection'</p> <p>resistant bacteria pass on the gene / allele</p>	<p>for correct use of at least two scientific terms eg mutation, resistant (not just 'antibiotic-resistant', not 'immune') / selection / natural selection / survival / reproduction / gene / allele / DNA</p> <p>cancel if mutation 'caused by' antibiotic</p> <p>allow pass on the mutation do not accept just 'pass on resistance'</p>	1 2
total			6

3411/F Q17

question	answers	extra information	mark
(a) E	shoot A grew or got longer / taller / larger	accept B didn't grow	1
	(in A) auxin moves / spreads down / through the stem or moves away from tip		1
	auxin <u>stimulates (/ causes)</u> growth / elongation	allow grew <u>because of</u> hormone	1
	in B no auxin / little auxin / or auxin supply removed		1
(b)(i) G	towards shade / away from light	ignore 'to the left' accept 'towards R'	1
(ii) A	R		1
(c) E	any two from: <u>rooting</u> of cuttings or as a <u>rooting</u> powder (control of) fruit / seed ripening weedkiller accept: seedless fruit formation inhibition of (lateral) bud growth for tissue culture	accept either delays or promotes ignore wrong qualification accept 'to save having to trim hedges'	2
total			8

3411/F Q18

question	answers	extra information	mark
(a) E	345 to 350	ignore working or lack of working use of 355 to 360 and 10 for 1 mark	2
(b) E	any two from: <u>more</u> sweating (at 37.6°C) <u>more</u> water loss or dehydration <u>occurs</u> blood becomes (more) concentrated / (more) salty or need to replace water stimulation of the hypothalamus	'more' at least once in the first 2 points do not accept prevents dehydration only	2
(c) E	any three from: evaporation of <u>water</u> cools skin or uses heat from skin cools blood / heat from blood (passing through skin)	do not accept just water loss unqualified related to sweating cooling the blood ignore vasodilation	3
total			7

3411/F Q19

question	answers	extra information	mark
(a)(i) G	bacteria respire / reproduce / grow (more) quickly	accept bacteria more active accept bacteria not killed accept enzymes not denatured or enzymes work best ignore bacteria work best accept otherwise bacteria will be killed	1
(ii) A	25°C		1
(b)(i) G	respiration is anaerobic or fermentation occurs	accept so that lactic acid is made accept respiration not aerobic	1
(ii) E	any two from: use lactose / (milk) sugar produce <u>lactic acid</u> / lactate denatures / coagulates / damages / alters protein	do not accept use glucose or other named sugars ignore clots	2
(c)(i) G	curds solid and whey liquid / runny	require both or a comparative statement ie curds more solid, whey more liquid / runny accept curds are white and whey is more yellow do not accept whey thinner	1
(ii) G	by filtering	accept decant(ing) / siev(ing) / drain(ing) / centrifug(ing)	1
(iii) G	addition of bacteria / mould (slow) ripening / maturing	eg <u>penicillium</u> ignore addition of salt, wrapping in cloth	1 1
total			9

3411/F Q20

question	answers	extra information	mark
(a) E	accurate plots smooth curve or ruled dot-to-dot	accept max $\frac{1}{2}$ square error	1 1
(b) E	used by <u>mould</u> or taken in by the <u>mould</u>	do not accept 'made into amoxycillin'	1
(c) E	as nutrient decreases amoxycillin increases any one from: <ul style="list-style-type: none"> • nutrient falls faster than amoxycillin rises at start • nutrient falls slower than amoxycillin rises in middle • nutrient falls faster than amoxycillin rises at end 	allow converse	1 1
(d) E	kill bacteria	do not accept viruses or vague references to other pathogens do not accept 'fight bacteria'	1
total			6

3411/F Q21

question	answers	extra information	mark
(a) G	measles mumps rubella / German measles	any order	1
(b) E	<p>Quality of written communication:</p> <p>any four from:</p> <p>a valid reference to pain</p> <p>should</p> <p>protect against diseases</p> <p>measles / mumps / rubella are dangerous diseases / can cause lasting harm / death</p> <p>cannot be treated by antibiotics</p> <p>problem of epidemics</p> <p>should not</p> <p>may suffer autism / damage to mental / social development</p> <p>may suffer large intestine disorders</p> <p>separate vaccines available that cause no / less problems</p>	<p>for giving at least two statements linked to vaccination</p> <p>NB max 3 marks for only one side of argument</p> <p>do not accept economic argument</p> <p>eg pain of vaccination / disease</p>	<p>1</p> <p>4</p>
total			6