



General Certificate of Secondary Education

Biology 3411/F

Specification B

Mark Scheme

2006 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
	<u>In correct sequence:</u> heart ovary eye stomach pancreas		1 1 1 1 1
total			5

3411/F Q2

question	answers	extra information	mark
(a)(i)	A		1
(ii)	C		1
(iii)	D		1
(b)	(muscle) contracts / shortens	do not accept tightens / smaller / thicker allow tenses	1
(c)	any two from: <ul style="list-style-type: none"> • automatic / non-conscious • reaction / response (to a stimulus) • rapid 	accept 'no thinking' or not involving brain / involves non-thinking part of brain do not accept instinctively / subconsciously do not accept just 'action'	2
total			6

3411/F Q3

question	answers	extra information	mark
	<u>In correct sequence:</u> asexual identical clones gametes sexual different		1 1 1 1 1 1
total			6

3411/F Q4

question	answers	extra information	mark
(a)(i)	to cool down / to lose heat / to maintain (body) temperature		1
(ii)	more / a lot of <u>water</u> is lost in <u>sweat</u>	do not accept 'most water'	1
(b)	volume of <u>water</u> is lower / less <u>water</u> / not enough <u>water</u> (in urine)		1
(c)	breathing / defecation / faeces	do not accept respiration / tears / colloquial names for faeces	1
total			4

3411/F Q5

question	answers	extra information	mark
(a)(i)	gene / DNA / genetic material <u>for coat protein</u>		1
(ii)	coat protein / protein coat		1
(b)(i)	white blood cells		1
(ii)	antibodies		1
(iii)	more rapidly		1
total			5

3411/F Q6

question	answers	extra information	mark
(a)	warm / 20°C / room temperature	do not accept temperature / heat / suitable temperature / hot	1
	moist / water / damp / wet	ignore 'when made up' ignore 'when left open in kitchen' ignore oxygen	1
(b)(i)	oxygen		1
(ii)	respiration		1
(iii)	more slowly		1
total			5

3411/F Q7

question	answers	extra information	mark
	<u>In correct sequence:</u>		
	diffusion		1
	high		1
	low		1
	membrane		1
	osmosis		1
	wilts		1
total			6

3411/F Q8

question	answers	extra information	mark
(a)(i)	10		1
(ii)	31 to 32		1
(b)(i)	extra chromosome / 3 copies	do not accept extra chromosomes do not accept more chromosomes do not accept gene	1
	of (chromosome) 21		1
(ii)	male – XY / has X and Y	accept male and Y present accept reverse argument – male, because female would be XX	1
(c)	DNA		1
total			5

3411/F Q9

question	answers	extra information	mark
(a)	pollen falls / lands (on mud / water / lake)	or pollen falls (implied mud)	1
	becomes buried in more <u>mud</u> (with time)		1
(b)(i)	birch		1
(ii)	8 200		1
(c)(i)	dry / drier	accept less / little rain ignore less water ignore references to Sun and temperature ignore rain unqualified	1
(ii)	wet / damp / moist / humid / more rain / raining / rainy	ignore more water ignore references to Sun and temperature ignore rain unqualified	1
total			6

3411/F Q10

question	answers	extra information	mark
(a)(i)	2	ignore working or lack of working $\frac{200}{100}$ for 1 mark	2
(ii)	athlete runs faster in 100 metres	do not accept speed unqualified do not accept different speeds do not accept distance	1
(b)(i)	oxygen debt		1
(ii)	lactic acid		1
total			5

3411/F Q11

question	answers	extra information	mark
(a)	flight feathers – provide a large surface area	accept only one line from each adaptation	1
	honey-combed feathers – reduce mass but retain strength		1
	streamlined body shapes – reduce air resistance		1
(b)	large surface area	accept feathers spread out	1
	push down on the air		1
total			5

3411/F Q12

question	answers	extra information	mark
(a)	dialysis		1
	membranes		1
	urea		1
(b)	Treatment 1 stops white cell production		1
	Treatment 2 prevent rejection	accept enable acceptance	1
total			5

3411/F Q13

question	answers	extra information	mark
(a)	cytoplasm (on left)		1
	cell wall (top right)		1
	cell membrane (lower right)		1
(b)(i)	5°C fermentation / respiration / reactions slow / stop enzymes inactive / slow / stop	accept 'kinetic energy low'	1
(ii)	50°C fermentation / respiration / reactions stop		1
	yeast killed / enzymes denatured / destroyed		1
(c)(i)	line graph drawn		1
	accurate plots	accept +/- half square	1
	smooth curve or ruled dot-to-dot	ignore extrapolation of line	1
(ii)	carbon dioxide (produced)		1
(iii)	less increase (at 5g) than 4g		1
(iv)	osmosis/water loss/ethanol/toxin produced		1
(v)	bubbles of gas / air spaces		1
	expand		1
(d)	beer / wine / alcohol		1
total			15

3411/F Q14

question	answers	extra information	mark
(a)(i)	C		1
(ii)	lack of nucleus / others have a nucleus or chromosome / DNA / genetic material free in cytoplasm	accept plurals do not accept just 'has a strand of DNA'	1
(b)(i)	breathe in <u>air</u> / droplets exhaled by other people / breathe same air or higher concentration of bacteria in the <u>air</u> or more likely to be coughed on	mark for mechanism do not penalise reference to virus / TB / germ ignore answers involving proximity unqualified	1
(ii)	(bacteria / it) enter body / lungs by breathing / via air		1
(iii)	via the blood	accept via rbc or other components of blood accept lymph	1
(c)	any two from: • skin • scabs / clot • mucus / cilia • stomach acid / gut protease	accept tears do not accept ear wax / saliva / sebum apply list principle ignore nasal hair	2
total			7

3411/F Q15

question	answers	extra information	mark
(a)	34	ignore working or lack of working $\frac{10\ 200}{300}$ for 1 mark	2
(b)(i)	mouth / <u>small intestine</u> / duodenum / ileum		1
(ii)	<u>amylase</u>	accept phonetic spelling accept <u>carbohydrase</u>	1
(iii)	sugar / maltose / glucose / disaccharide / monosaccharide / dextrin		1
(iv)	<u>small intestine</u> / duodenum / ileum		1
total			6

3411/F Q16

question	answers	extra information	mark
	<p>Quality of written communication:</p> <p>any four from:</p> <ul style="list-style-type: none"> • tar present • (chemicals from smoke / tar) enter the blood • mutation • (lung) cancer / reference to carcinogen • bronchitis / emphysema • less surface area / less oxygen enters blood • circulatory disease / blood clots / blocked arteries / heart attack / stroke • carbon monoxide • less oxygen carried by blood / CO combines with Hb • damage cilia / alveoli • microbes or correct named e.g. remain in lungs 	<p>For <u>correct use of</u> scientific terms:</p> <p>at least two from: e.g. cancer, mutation, bronchitis, emphysema, arteries, atheroma, carbon monoxide, carcinogen, trachea, bronchus, bronchiole, cilia, alveoli, haemoglobin, mucus, red blood cell, white blood cell, ulcer, angina, nicotine, addiction, etc.</p> <p>annotate as Q ✓ or Q ✗</p> <p>do not accept just tar enters blood</p> <p>accept x from tar gets in the blood</p> <p>nb award less oxygen mark once only</p> <p>do not accept blocked by tar</p> <p>nb award less oxygen mark once only accept no oxygen</p>	<p>1</p> <p>4</p>
total			5

3411/F Q17

question	answers	extra information	mark
(a)(i)	oxygen / O ₂	do not accept O only	1
(ii)	photosynthesis	accept phonetic spellings	1
(b)	<u>Graph:</u> points	ACCURACY \pm ½-square minus 1 mark per error	2
	line	single line best fit <u>curve</u> , not straight line or ruled point-to-point must attempt to start at origin	1
(c)	any two from: • carbon dioxide (concentration) • temperature / too cold • water / moisture / rain / humidity	accept 'heat' do not accept temperature too high do not accept lack of chlorophyll	2
total			7

3411/F Q18

question	answers	extra information	mark
(a)	animal which / it kills/ hunts / catches (other animals) it / animal which eats other animals / it is a carnivore	ignore references to prey animal kills <u>and</u> eats its prey = 2 marks an animal that preys on another animal = 0 marks	1 1
(b)	lemming population decreases before / when no owls present	accept converse	1
(c)	any three from: <ul style="list-style-type: none"> • lack of food • due to competition / due to over-eating by lemmings / due to high lemming population • disease • severe weather drought / flood / or too hot / too / very cold • other predators 	nb competition for food = 2 marks accept humans as predators	3
total			6

3411/F Q19

question	answers	extra information	mark										
	<p>Quality of written communication:</p> <p>any four from:</p> <table border="0"> <thead> <tr> <th>Substance</th> <th>Effect</th> </tr> </thead> <tbody> <tr> <td>carbon dioxide</td> <td> <ul style="list-style-type: none"> • greenhouse effect / global warming / mechanism described • sea-level rise / melting ice-caps / flooding / rainfall change </td> </tr> <tr> <td>sulphur dioxide nitrogen oxides</td> <td> <ul style="list-style-type: none"> • acid rain / lowering soil pH / water acidification • damages leaves / trees kills plants / animals / breathing difficulties / bronchitis / eye irritation / deaths of people / damaging statues / buildings </td> </tr> <tr> <td>carbon monoxide</td> <td> <ul style="list-style-type: none"> • combines with Hb / less O₂ carried in blood </td> </tr> <tr> <td>soot / (smoke) particles</td> <td> <ul style="list-style-type: none"> • reducing light / photosynthesis </td> </tr> </tbody> </table>	Substance	Effect	carbon dioxide	<ul style="list-style-type: none"> • greenhouse effect / global warming / mechanism described • sea-level rise / melting ice-caps / flooding / rainfall change 	sulphur dioxide nitrogen oxides	<ul style="list-style-type: none"> • acid rain / lowering soil pH / water acidification • damages leaves / trees kills plants / animals / breathing difficulties / bronchitis / eye irritation / deaths of people / damaging statues / buildings 	carbon monoxide	<ul style="list-style-type: none"> • combines with Hb / less O₂ carried in blood 	soot / (smoke) particles	<ul style="list-style-type: none"> • reducing light / photosynthesis 	<p>Ideas given in a sensible order: at least one correct named substance linked to its correct effect annotate Q ✓ or Q ✗</p> <p>max 2 for named substances extra wrong substances cancel</p> <p>do not accept just climate change</p> <p>accept reduced mineral availability to plants</p> <p>do not accept toxic unqualified</p> <p>ignore ash</p> <p>correct substance and wrong effect = 1 mark only</p>	<p>1</p> <p>4</p>
Substance	Effect												
carbon dioxide	<ul style="list-style-type: none"> • greenhouse effect / global warming / mechanism described • sea-level rise / melting ice-caps / flooding / rainfall change 												
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carbon monoxide	<ul style="list-style-type: none"> • combines with Hb / less O₂ carried in blood 												
soot / (smoke) particles	<ul style="list-style-type: none"> • reducing light / photosynthesis 												
total		5											

3411/F Q20

question	answers	extra information	mark
(a)	any three from: moving left • X contracts • Y relaxes moving right • Y contracts • X relaxes	max 2 if both directions of movement not given / implied or direction wrong If no other marks are awarded allow antagonism or a description of antagonism for 1 mark	3
(b)	any three from: muscles (contract to) move the tail (tail fin) provides large surface area pushes (backwards) against water	accept shorten / tense for contract accept other suitable description of force pushes water backwards = 2 marks	3
total		6	

3411/F Q21

question	answers	extra information	mark
(a)(i)	2550		1
(ii)	1943		1
(b)	bacterium / bacteria		1
(c)	painkiller	accept named types e.g. aspirin paracetamol etc / anti-inflammatory	1
(d)	<p>Quality of written communication:</p> <p>any three from:</p> <p>(active)</p> <ul style="list-style-type: none"> • given before getting disease • dead / inactive / attenuated pathogen injected or prior exposure • (stimulating) antibody production • long lasting <p>(passive)</p> <ul style="list-style-type: none"> • given after exposure • antibody injected • rapid response 	<p>one mark is available for the use of correct scientific terminology (at least two terms required) e.g. pathogen, antibody, bacteria, virus, antigen, protein, WBC / named WBC, memory cells, inject</p> <p>annotate Q✓ or Q*</p> <p>Max 2 if no reference to active / passive or wrong</p> <p>Max 2 if only reference to active or passive</p> <p>accept converse for passive for this mark</p>	<p>1</p> <p>3</p>
total			8

3411/F Q22

question	answers	extra information	mark
(a)	provide oxygen (for respiration) or to make it aerobic	in either order	1
	circulate/mix (contents of fermenter)		1
(b)(i)	60°C		1
(ii)	respiration (of microorganisms) or metabolism (of microorganisms / bacteria)		1
(iii)	any one from:		1
	<ul style="list-style-type: none"> • water-cooled jacket • cooled / cold air in 	accept descriptions accept heat exchanger	
(c)	<u>Penicillium</u>	check spelling at end of word carefully accept pencilleum	1
total			6