



## General Certificate of Secondary Education

# Biology (Modular) 3413/H

## *Specification A*

# 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.



**GCSE BIOLOGY (MODULAR) 3413/H**  
**MARK SCHEME – HIGHER TIER (TERMINAL PAPER)**  
**SUMMER 2006**

**3413/H Q1**

	answers	extra information	mark
(a)	any <b>two</b> from <ul style="list-style-type: none"> <li>• area investigated</li> <li>• length of time spent collecting/same number collecting</li> <li>• same part of beach studied</li> <li>• same day/same week/month</li> <li>• same conditions/weather</li> </ul>		2
(b) (i)	any <b>two</b> from <ul style="list-style-type: none"> <li>• fewer crabs/no crabs</li> <li>• more mussels</li> <li>• more barnacles</li> </ul>	'more seaweed' is insufficient	2
(ii)	any <b>one</b> from <ul style="list-style-type: none"> <li>• only one pair of beaches studied</li> <li>• wind conditions may change</li> </ul>	accept other valid answers	1
total			5

**3413/H Q2**

	answers	extra information	mark
(a)	reduces water loss	do <b>not</b> accept 'there is no water loss'	1
(b)	reduces heat loss <u>at night</u> /accept keeps them warm at night	accept reduces water loss if not given in (a)	1
	reduces heat gain <u>in day</u> /keeps them cool in day	accept keeps camel insulated if neither marking point given ignore reference to protection from u/v	1
(c)	(light brown fur) for camouflage/blend in	accept more heat reflected	1
	(wide feet) prevent sinking		1
total			5

**3413/H Q3**

	answers	extra information	mark
(a)	buried/or suitable description	do <b>not</b> accept buried with rock	1
	slow decay/no decay		1
	replaced by minerals/other materials	accept petrified/turned to rock/stone	1
	<b>Quality of written communication</b> 1 mark for correct sequencing		1
(b)	any <b>three</b> from <ul style="list-style-type: none"> <li>• change in environment/climate/habitat/ weather/surroundings</li> <li>• new predators/different predator</li> <li>• new competitor/ different competitor</li> <li>• new disease/different disease</li> <li>• no prey to eat/prey becomes extinct/no food to eat</li> </ul>		3
total			7

**3413/H Q4**

	answers	extra information	mark
(a)	choose parents with named feature from diagram (eg large fruit/more fruit)		1
	breed together/idea of sexual reproduction		1
	choose 'best' offspring and breed		1
(b)	to obtain (genetically) identical copies/clones/same genes passed on/quicker		1
total			4

**3413/H Q5**

	answers	extra information	mark
(a)	urea	accept other valid answers	1
(b)	dialysis fluid used/or described	do <b>not</b> accept diffusion by osmosis	1
	separated from blood by membrane		1
	diffusion (from blood to fluid)		1
(c)	any <b>two</b> from <ul style="list-style-type: none"> <li>• no (compatible) kidney available/long waiting list</li> <li>• not strong enough for operation/risks of major surgery/operation</li> <li>• may be short term kidney failure</li> </ul>	do <b>not</b> accept costs	2
total			6

**3413/H Q6**

	answers	extra information	mark
(a) (i)	bubbles/froth/foam		1
(ii)	boiling kills cells /yeast		1
	only living yeast cells carry out fermentation	accept so therefore there is no fermentation ( <b>if the yeast cells are dead</b> )	1
(iii)	sugars used (by yeast)		1
	CO <sub>2</sub> produced/ethanol/alcohol		1
(b) (i)	(contains) <b>bacteria</b>		1
(ii)	cheese/yoghurt	accept other valid answers	1
total			7

**3413/H Q7**

	answers	extra information	mark
(a)	suitable linear scale	minimum of 5 small squares for 1pH	1
	all points correctly plotted	minimum of 5 small squares for 10 minutes	1
	line of best fit which does not start before 4	½ small square tolerance	1
(b)	pH7/correct for the graph		1
(c)	(to produce) small molecules/broken down	accept converse points	1
	soluble		1
	so can be absorbed (in small intestine)/so it can enter the blood		1
total			7

**3413/H Q8**

	answers	extra information	mark
(a)	1.7 (arbitrary units)	accept 63%	1
(b)	increased temperature/(added) heat from the stove/hotter		1
	more carbon dioxide/CO <sub>2</sub> made by the stove		1
(c)	temp/CO <sub>2</sub> no longer limiting/light intensity limiting/not enough light available (in March)		1
total			4



**3413/H Q9**

	answers	extra information	mark
(a)	respiration	accept suitable reference to burning	1
	by microbes	accept any suitable organism	1
	releases CO <sub>2</sub>		1
	CO <sub>2</sub> used in photosynthesis		1
(b) (i)	burn less fossil fuel/wood	use renewable sources/eg	1
	stop cutting down trees/plant trees		1
(ii)	methane	accept water	1
(c)	heat energy radiated by earth		1
	absorbed by methane/CO <sub>2</sub>	accept CO <sub>2</sub> layer traps heat	1
	re-radiated back to earth		1
total			10

**3413/H Q10**

	answers	extra information	mark
(a)	parents Bb		1
	one allele in gamete		1
	child bb		1
(b)	any <b>two</b> from		2
	<ul style="list-style-type: none"> <li>• uv light absorbed/penetrates skin</li> <li>• causes mutations</li> <li>• mutation-skin cancer link</li> </ul>		
total			5

**3413/H Q11**

	answers	extra information	mark
(a)	membrane		1
(b)	recessive allele has different order of bases		1
	codes for different amino acid sequence		1
	therefore no protein/different protein made		1
(c)	any <b>three</b> from <ul style="list-style-type: none"> <li>• obtain DNA from human cell</li> <li>• cut with enzymes</li> <li>• transfer to bacterial cell</li> <li>• DNA reproduces with bacterial cell</li> </ul>	accept gene/allele/genetic information as alternatives to DNA	3
total			7

**3413/H Q12**

	answers	extra information	mark
(a)	correct antigens ie B antigen and AB antigens	ignore case	1
	correct antibodies ie antibody A and none		1
(b)	plasma		1
(c)	no antigens		1
	so no agglutination/(red) blood cells wont stick together/clump		1
total			5

**3413/H Q13**

	answers	extra information	mark
(a)	ethanol is toxic/kills yeast		1
	at this concentration		1
(b)	<p>any <b>four</b> but maximum of 3 pros/cons</p> <p>Pros</p> <ul style="list-style-type: none"> <li>• less toxic gas produced</li> <li>• less acid rain</li> <li>• conserves fossil fuels/ethanol is a renewable energy source</li> <li>• less nett production of CO<sub>2</sub>/ idea of C – neutral</li> </ul> <p>Cons</p> <ul style="list-style-type: none"> <li>• -pesticide can pollute water courses</li> <li>• bioaccumulation</li> <li>• fertiliser can pollute water courses</li> <li>• eutrophication</li> <li>• land not available for food production</li> <li>• energy used in distillation</li> <li>• loss of habitats/rainforest</li> </ul> <p><b>Quality of written communication</b> 1 mark for correct use of 2 scientific terms eg eutrophication, global warming, bioaccumulation, renewable, acid rain, carbon dioxide, fossil fuel</p>		4
total			7

**3413/H Q14**

	answers	extra information	mark
(a)	brain	accept hypothalamus	1
(b)	2.5 minutes/2mins 30sec	accept 2.55	1
(c)	arterioles to skin dilate	do <b>not</b> accept capillaries dilate	1
	inc blood flow to skin		1
	sweating		1
	heat lost by radiation		1
	evaporation of water – heat loss		1
total			7

**3413/H Q15**

	answers	extra information	mark
(a)	contraction		1
	reduced pressure in oesophagus (so liquid sucked up)		1
(b)	many branching tubes/many holes/openings		1
	saliva spread over large area/food collected from a large area		1
total			4