



## General Certificate of Secondary Education

# Biology (Modular) 3413/H

## *Specification A*

# 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.



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**GCSE BIOLOGY (MODULAR) 3413/H**  
**MARK SCHEME – HIGHER TIER (TERMINAL PAPER)**  
**SUMMER 2005**

**3413/H Q1**

	answers	extra information	mark
(a)	(too) cold	accept converse	1
	for microbes		1
(b) (i)	<u>more</u> cattle/sheep/rice fields	accept landfill sites	1
(ii)	burning of fossil fuels/deforestation	more cars insufficient	1
(c)	acid rain <b>or</b> effect of acid rain		1
total			5

**3413/H Q2**

	answers	extra information	mark
(a)	$\frac{200}{1000} \times 100 = 20\%$	accept 20% with no working  if incorrect allow 1 mark for:- 200kJ available	2
(b)	any <b>two</b> from <ul style="list-style-type: none"> <li>• used in movement</li> <li>• some lost as heat</li> <li>• some cannot be digested/pass out in faeces/egested</li> <li>• used to repair cells</li> <li>• active transport</li> </ul>	accept lost in respiration/used to maintain body temperature excretion alone (neutral)	2
(c)	any <b>two</b> from <ul style="list-style-type: none"> <li>• controls ripening</li> <li>• prevents over ripening</li> <li>• herbicide</li> <li>• rooting powder</li> <li>• stimulate growth</li> </ul>	accept make plants bigger	2
total			6

**3413/H Q3**

	answers	extra information	mark
(a)	horse A provides nucleus/DNA/genes/genetic information	accept converse e.g. no DNA from B	1
	link DNA/genes/genetic information with presence of nucleus		1
(b)	less (phenotypic) variation	do <b>not</b> accept they all look the same	1
	unable to adapt to different conditions/selective breeding difficult/not possible	accept e.g. less chance that some might be resistant to a new disease accept inbreeding problems more likely	1
total			4

## 3413/H Q4

	answers	extra information	mark
(a)	causes mutation/change in genetic information/DNA		1
(b)	<p><b>Quality of written communication</b></p> <p>one mark for correct linking of ideas</p> <p>any <b>three</b> from</p> <ul style="list-style-type: none"> <li>• non-resistant forms die/only resistant forms survive when exposed to antibiotic</li> <li>• resistant forms breed</li> <li>• breeding more successful as there is little competition for resources</li> <li>• <u>R-gene</u> passed onto offspring</li> </ul>		<p>either survival → breed <b>or</b> breed → gene passed on</p> <p>1</p> <p>3</p>
total			5

## 3413/H Q5

	answers	extra information	mark
(a)	97.5%	if incorrect allow 1 mark for:-  $1800 - 45 = \underline{1755}$  or $\frac{1755}{1800} \times 100$	2
(b) (i)	patients isolated so less risk of catching the disease		1
	anti-toxin used		1
(ii)	fewer people with the disease	do <b>not</b> accept no cases	1
	as (children) now vaccinated		1
	antibiotics used	accept other examples of improved treatment	1
total			7

**3413/H Q6**

	answers	extra information	mark
	any <b>five</b> from <u>Advantages:</u> <ul style="list-style-type: none"> <li>• no restrictions on diet</li> <li>• no need for regular treatment/regular hospital visits</li> <li>• a consequence e.g. can go on holiday</li> <li>• freed from discomfort of dialysis</li> </ul> <u>Disadvantages:</u> <ul style="list-style-type: none"> <li>• risk of rejection</li> <li>• risks of (major) operation</li> <li>• difficulty in finding (suitable) donor</li> <li>• risk of infection when on immunosuppressive drugs</li> </ul>	at least two advantages and two disadvantages  do <b>not</b> accept live a normal life (insufficient)  do <b>not</b> accept cost	5
total			5

**3413/H Q7**

	answers	extra information	mark
(a)	algae/plankton/microscopic organisms		1
(b) (i)	any <b>two</b> from <ul style="list-style-type: none"> <li>• gills/mucus trap starch grains</li> <li>• cilia involved</li> <li>• cilia beat to move the starch grains</li> </ul>	OWTTE accept suitable description of cilia e.g. hairs	2
(ii)	(cilia) beat more slowly  enzymes work more slowly/ respiration is slower/energy released more slowly		1  1
total			5

**3413/H Q8**

	answers	extra information	mark
(a)	increased rate of breathing		1
	increased depth of breathing		1
(b)	<u>more</u> oxygen		1
	needed for respiration/to release energy		1
(c)	24 (breaths/min)	if not correct allow 1 mark for:-  12 breaths in 30 secs  accept equivalent	2
total			6



## 3413/H Q9

	answers	extra information	mark
(a)	(for crops) to make proteins		1
	for growth/increase yield		1
(b)	<ul style="list-style-type: none"> <li>• rapid/more growth of (water) plants</li> <li>• increased competition for light/no light to plants below</li> <li>• death of plants/algae</li> <li>• food for microbes/dead plants decayed by microbes</li> <li>• microbes increase in number</li> <li>• oxygen used (by microbes) in respiration (of microbes)</li> <li>• lack of oxygen kills fish/fish suffocate</li> </ul>	any 6	6
(c)	<p><b>Quality of written communication</b></p> <p>one mark for correct use of terms – circle <b>2</b> words e.g. nitrifying, putrefying, ammonium compounds, ammonia, nitrite, denitrifying</p> <p>any <b>three</b> from</p> <ul style="list-style-type: none"> <li>• protein &gt; ammonia</li> <li>• (protein broken down by) putrefying bacteria/putrefying bacteria (produce ammonia)</li> <li>• ammonia &gt; nitrate</li> <li>• (ammonia used by) nitrifying bacteria/nitrifying bacteria (produce nitrate)</li> </ul>	<p>ammonium (A) compounds accept saprotrophic bacteria</p>	<p>1</p> <p>3</p>
total			12

**3413/H Q10**

	answers	extra information	mark
(a)	1		1
(b) (i)	person 6 = aa and person 7 = AA		1
	gametes correct		1
	offspring all Aa		1
(ii)	0		1
(c)	<u>DNA</u> different		1
	as different order of bases/different code		1
	different order of amino acids in protein	accept amino acids are not correct	1
total			8

**3413/H Q11**

	answers	extra information	mark
(a)	FSH		1
	LH		1
(b)	(oestrogen) inhibits production of FSH		1
	so no more eggs mature/produced	no eggs released - neutral	1
total			4

**3413/H Q12**

	answers	extra information	mark
(a)	any <b>two</b> from <ul style="list-style-type: none"> <li>immediate increase in <b>X</b>/delayed increase in <b>Y</b></li> <li>Conc. increased more in <b>X</b></li> <li><b>X</b> remains high/<b>Y</b> falls after 20 days (approx.)</li> </ul>		2
(b)	<b>X</b> previously exposed to same antigen <u>memory cells</u> present in <b>X</b> produce (clone of) <b>B</b> - cells	accept previously vaccinated	1 1 1
total			5

**3413/H Q13**

	answers	extra information	mark
(a)	carbohydrase	accept amylase	1
(b)	so ethanol is produced	accept alcohol	1
(c)	correct choice of scales	1 cm = 1% ethanol 2cm = 5h	1
	all points correctly plotted	tolerance less than ½ square reject dot to dot	1
	curve of best fit drawn		1
(d)	fuel	alcohol insufficient accept other valid alternatives e.g. industrial cleaner reject beer/wine	1
(e)	to increase the concentration/purify	accept remove unwanted substances	1
total			7

**3413/H Q14**

	answers	extra information	mark
(a)	feeds mainly on plants/grass	accept cow is a herbivore	1
	cell walls made of cellulose		1
(b)	bacteria digest cellulose	accept bacteria produce cellulase	1
	cellulose → sugar		1
	dead bacteria source of other nutrients /cell contents more accessible		1
(c)	food supply	do <b>not</b> accept kept warm (neutral)	1
(d)	idea of cellulose being digested before site of absorption	accept does not need to eat its own faeces	1
total			7

**3413/H Q15**

	answers	extra information	mark
(a)	pituitary gland		1
(b)	ADH controls water content of blood/urine		1
	less ADH > less water reabsorbed (from urine/into blood/body)		1
	more/dilute urine produced		1
total			4