



# General Certificate of Secondary Education

## Science: Single Award (Modular) 3469H *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.

**Science: Single Award (Modular)**

**Summer 2006**

**3469H**

**3469H Q1**

Question	answers	extra information	mark
(a)	any <b>two</b> from:  layer of fat stiff, tightly packed feathers coat feathers with oil		2
(b)	any <b>two</b> from:  paddle like feet streamlined body wings shaped like flippers heavy, solid bones		2
total			4



### 3469H Q3

question	answers	extra information	mark
(a)	gas <b>or</b> gaseous	vapour neutral	1
(b)	–150 to –155	<b>must</b> have minus sign for mark	1
(c)	any <b>two</b> from: <ul style="list-style-type: none"> <li>as atomic number/mass number/atomic mass/proton number increases, boiling point increases</li> <li>boiling point increases from helium to radon/boiling point increases down the group</li> <li>not directly related/proportional/rises quickly at first then more slowly</li> </ul>		2
(d)	<ul style="list-style-type: none"> <li>2 electrons on inner ring</li> <li>8 electrons on outer ring</li> </ul>	do <b>not</b> award if extra rings drawn	1
			1
total			6

### 3469H Q4

question	answers	extra information	mark
(a)	LHS sugar/glucose	allow named sugars	1
	RHS carbon dioxide + alcohol/ethanol		1
(b)	protease	allow named proteases	1
total			3

**3469H Q5**

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> <li>0.59 <b>or</b> 0.588 <b>or</b> 59% <b>or</b> 58.8% <b>or</b> 200 / 340 <b>or</b> 10 / 17</li> </ul> gains 2 marks	evidence of: 200 / 30 + 28 + 10 + 28 + 44 + 200 gains 1 mark  do <b>not</b> allow '60' without correct working shown  allow error carried forward in denominator	2
(b)	<ul style="list-style-type: none"> <li>alpha <b>and</b> beta <b>and</b> gamma</li> </ul>	all three in any order accept correct greek symbols references to rays/particles are neutral	1
(c)	<ul style="list-style-type: none"> <li>gamma/beta</li> <li>can penetrate (cells or skin)</li> </ul>	marking points are independent	1 1
total			5

**3469H Q6**

question	answers	extra information	mark
(a)	mainly empty space	do <b>not</b> accept space between atoms	1
(b)	(repelled/reflected) by positive charge	allow repelled/reflected by nucleus/proton allow gold atoms/particles have positive charge reject gold/leaf positively charged	1
(c)	any <b>three</b> from: <ul style="list-style-type: none"> <li>a nucleus</li> <li>nucleus containing protons</li> <li>nucleus containing neutrons</li> <li>electrons outside the nucleus</li> </ul>	allow marks on labelled diagram  reference to charges neutral  allow electrons in orbits/shells  if no marks gained allow one mark for proton, neutron and electron	3
total			5

**3469H Q7**

question	answers	extra information	mark
(a)	8 gains 2 marks	else evidence of $20 \times 40 / 100$ gains 1 mark	2
(b)	(C) <ul style="list-style-type: none"> <li>(B) 82</li> <li>(C) 84</li> </ul>	ignore letter but give one mark for each correct calculation	1 1
(c)	<ul style="list-style-type: none"> <li>digested</li> <li>absorbed/diffuse/taken into/passes into</li> <li>into blood</li> </ul>	allow broken down/decomposed dissolved is neutral reject disintegrated  allow correct digestive enzyme + substrate for 1 mark each to max 2  i.e. protease + protein carbohydrase/amylase + carbohydrate/starch lipase + fat/lipid  incorrect references to enzymes are neutral	1  1  1
total			7

**3469H Q8**

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> <li>(crude oil) heated</li> <li>(vapour) condensed</li> <li>at different temperatures</li> </ul>	allow evaporation allow cooled allow boiling points	1 1 1
(b)	20 50		1 1
total			5

**3469H Q9**

question	answers	extra information	mark
	any <b>four</b> from: <ul style="list-style-type: none"> <li>burning trees increases CO<sub>2</sub></li> <li>microbial activity increase CO<sub>2</sub></li> <li>(trees) photosynthesise using CO<sub>2</sub></li> <li>less CO<sub>2</sub> removed from atmosphere</li> <li>less CO<sub>2</sub> locked up in wood/trees</li> <li>CO<sub>2</sub> is greenhouse gas</li> <li>absorbs energy radiated by Earth</li> <li>some of this energy re-radiated</li> </ul>	oxygen neutral ozone neutral	4
total			4

**3469H Q10**

question	answers	extra information	mark
(a)(i) (ii) (iii)	<ul style="list-style-type: none"> <li>Z</li> <li>X</li> <li>Y</li> </ul>	all three for 2 marks; two or one for 1 mark	2
(b)	<ul style="list-style-type: none"> <li>FSH/hormone Z given</li> <li>causes eggs to mature/develop</li> </ul>	allow causes eggs released egg production/more eggs neutral	1 1
(c)(i)	<ul style="list-style-type: none"> <li>pill stops egg maturing/release</li> <li>by inhibiting FSH/hormone Z production</li> </ul>		1 1
(ii)	any <b>two</b> from: <ul style="list-style-type: none"> <li>fertilised egg</li> <li>embryo rights/right to life</li> <li>encourages promiscuity/irresponsibility</li> </ul>	accept reference to embryo/fetus allow like abortion/like murder  morally wrong (unqualified) neutral religious belief (unqualified) neutral	2
total			8

**3469H Q11**

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> <li>outer electrons/shells nearer to nucleus</li> <li>electrons gained more easily</li> </ul>		1
			1
(b)(i)	<ul style="list-style-type: none"> <li>outer electron shell full</li> <li>no tendency to gain/lose electrons</li> </ul>		1
			1
(ii)	(yes) <ul style="list-style-type: none"> <li>radon has more electron shells than xenon</li> <li>so more likely to lose/gain electron</li> </ul>		1
			1
total			6

**3469H Q12**

question	answers	extra information	mark
(a)	any <b>three</b> from: <ul style="list-style-type: none"> <li>increase concentration</li> <li>increase pressure</li> <li>smaller pieces of reactant/increase surface area</li> <li>catalyst</li> <li>smaller space/volume for gaseous reactions</li> </ul>	allow stirring	3
		allow enzyme	
(b)	any <b>two</b> from: <ul style="list-style-type: none"> <li>particle speed increased</li> <li>collide more frequently/energetically</li> <li>particles more likely to have energy greater than activation energy</li> </ul>	allow more successful collisions for 2 marks	2
(c)	minimum energy needed for particles to react/to start the reaction		1
total			6



**3469H Q13**

question	answers	extra information	mark
	<i>Quality of written communication</i> <i>1 mark for correct use of <b>three</b> of the following scientific terms</i> <i>ray, normal, reflection, critical angle, reflection</i>		1
	any <b>three</b> from:  angle between ray and normal greater than critical angle ray reflected total internal reflection	allow material has refractive index higher than critical angle for 2 marks	3
total			4

**3469H Q14**

question	answers	extra information	mark
(a)(i)	<ul style="list-style-type: none"> <li>(combination of) gravity</li> <li>(high) speed</li> </ul>	allow momentum	1 1
(ii)	orbit time one day/move around Earth at same rate as Earth spins/orbit time same as the Earth's		1
(iii)	any <b>two</b> from: <ul style="list-style-type: none"> <li>Earth spins beneath them</li> <li>can scan whole Earth in one day/several times each day</li> <li>at close range/more detail</li> </ul>		2
(b)(i)	greater distance, greater velocity		1
(ii)	started in one place expanding	allow evidence for the big bang	1 1
total			8

### 3469H Q15

question	answers	extra information	mark
(a)(i)	<ul style="list-style-type: none"> <li>filtered</li> <li><b>all</b> reabsorbed</li> </ul>	allow idea of leaving blood/plasma	1 1
(ii)	<ul style="list-style-type: none"> <li>filtered</li> <li>some reabsorbed</li> </ul>	allow idea of leaving blood/plasma	1 1
(iii)	not filtered	allow stays in blood/plasma	1
(b)	(urea) not reabsorbed  <b>or</b>  reabsorption of water (leads to more concentrated solution)		1
(c)	any <b>two</b> from <ul style="list-style-type: none"> <li>more water reabsorbed</li> <li>less urine produced</li> <li>urine more concentrated</li> </ul>		2
total			8

### 3469H Q16

question	answers	extra information	mark
(a)	10		1
(b)	300		1
(c)	infra red		1
(d)	warms environment/becomes spread out	allow released into the surroundings not just wasted	1
total			4