



General Certificate of Secondary Education

Science: Single Award (Modular) 3469F

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 papers.

Science: Single Award (Modular)

Summer 2006

3469F

3469F Q1

question	answers	extra information	mark
(a)(i)	rock/stone/amber/resin/any named rock or rock type e.g. sedimentary/metamorphic	allow peat/coal/clay reject tree sap allow soil/mud/sand/ice	1
(ii)	decayed/bacterial action	allow rotted/decomposed disintegrated/degraded are neutral	1
(b)(i)	eohippus		1
(ii)	any two from: <ul style="list-style-type: none"> • pliohippus bones longer/bigger/wider/thicker • comparison of hoof shapes • pliohippus has fewer bones/toes 	stronger bones is neutral must make a comparison it = mesohippus reject feet/ideas of bones fused together ignore actual number of bones if comparison is correct	2
total			5

3469F Q2

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • P nucleus • Q chromosome • R gene 		1 1 1
(b)	<ul style="list-style-type: none"> • ovary • womb • fertility • contraceptive 		1 1 1 1
total			7

3469F Q3

Question	answers	extra information	mark
(a)(i)	He	allow helium	1
(ii)	Br	allow bromine/Br ₂ /bromide	1
(iii)	Li	allow lithium	1
(iv)	F	allow fluorine/F ₂ /fluoride	1
(b)	<ul style="list-style-type: none"> • low • poor/bad/weak/not 		1 1
(c)	<ul style="list-style-type: none"> • number • period • group 		1 1 1
total			9

3469F Q4

question	answers	extra information	mark
	<ul style="list-style-type: none"> • weed killer • barbeque fuel • oven cleaner • bleach 	four correct gains 3 marks three or two correct gains 2 marks one correct gains 1 mark	
total			3

3469F Q5

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • line to right of normal • direction changed to right 		1 1
(b)	<ul style="list-style-type: none"> • speed • refraction 		1 1
(c)	heating/thermal imaging/heat seeking/remote control/communication amplified	e.g. mobile phone to PC reject mobile phone on its own.	1
total			5

3469F Q6

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • gamma • ultraviolet • infra red • radio 	all four correct for 3 marks three or two correct for 2 marks one correct for 1 mark	3
(b)	<p><i>Quality or written communication 1 mark for correct use of any three of radiation, ultraviolet, infra red, cell, mutation, chromosome, gene, cancer, DNA</i></p> <p>any three from:</p> <ul style="list-style-type: none"> • damage/harm/burn to skin • cancer • cells • infra red • ultraviolet • mutation • chromosomes damaged • genes damaged • dehydration 	<p>allow sunburn 'skin cancer' equivalent to first 2 bullet points</p> <p>allow reference to DNA</p> <p>allow heatstroke or sunstroke</p>	1 3
total			7

3469F Q7

question	answers	extra information	mark
(a)	Y diode Z lamp/bulb		1 1
(b)	ammeter	do not allow ampmeter	1
(c)	current would not flow/zero	accept bulb out/no reading on ammeter	1
total			4

3469F Q8

question	answers	extra information	mark
(a)	all three plots correct	allow 1 mark for 1 or 2 correct plots	2
	all labels present (in correct relative proportions)		1
(b)	<ul style="list-style-type: none"> • skin • lungs • liver • kidney • bladder 		1 1 1 1 1
total			8

3469F Q9

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

3469F Q10

question	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • XY or YX • Y • XY or YX 		<p>1</p> <p>1</p> <p>1</p>
(b)	<p><i>Quality of written communication</i> <i>1 mark for the correct use of any three of:</i> <i>gene (not recessive gene), allele, dominant, recessive, carrier, homozygous, heterozygous</i></p> <p>any three from:</p> <ul style="list-style-type: none"> • caused by recessive allele • need two (recessive) alleles to get condition/homozygous recessive • one (allele) from mother and one from father • parents both carriers/heterozygous/both have the gene or allele <p>Marks available from diagram:</p> <p> </p> <p>identified as cystic fibrosis</p> <p>or</p> <p> </p> <p>identified as cystic fibrosis</p>	<p>allow recessive gene/allow faulty gene or faulty allele allow (recessive) gene</p> <p>3</p>	<p>1</p> <p>3</p>
total			7

3469F Q11

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

3469F Q12

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

3469F Q13

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

3469F Q14

question	answers	extra information	mark
(a)	mainly empty space	do not 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 three from: <ul style="list-style-type: none"> a nucleus nucleus containing protons nucleus containing neutrons electrons outside the nucleus 	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

3469F Q15

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"> • (B) 82 • (C) 84 	ignore letter but give one mark for each correct calculation	1 1
(c)	<ul style="list-style-type: none"> • digested • absorbed/diffuse/taken into/ passes into • into blood 	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

3469F Q16

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