



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Science: Single Award Modular

3469

Higher

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3469/H Q1

	answers	extra information	mark
(a)	pituitary (gland) ovaries	allow corpus luteum	1 1
(b)	idea of stimulating release of eggs preventing release of eggs	allow FSH increases fertility accept contraception / contraceptive pill / morning after pill allow oestrogen decreases fertility accept progesterone affects uterus lining do not credit simply 'a hormone to increase fertility or a hormone to decrease fertility' do not credit 'pill' unqualified or injections do not accept just FSH or oestrogen or IVF with no effect stated	1 1
total			4

3469/H Q2

	answers	extra information	mark
(a)	asexual	mitosis is neutral	1
(b)	(body cell) nucleus is from body cell	no mark for just body cell – mark the explanation allow converse nucleus from egg cell is removed	1
	nucleus contains (genetic) information / instructions / chromosomes / genes / DNA / allele	do not credit 'contains characteristics'	1
(c)	splitting apart (cells from clonal) embryo	do not credit 'repeat process'	1
total			4

3469/H Q3

	answers	extra information	mark
(a)	burning fossil fuels / named fossil fuel (releases carbon dioxide) releases carbon dioxide	do not allow – cars / factories / power stations (neutral)	1
	idea of due to deforestation less carbon dioxide is removed / less photosynthesis / less carbon stored in wood		1
	idea of due to deforestation carbon dioxide increases when trees are burned / decay / microbial respiration		1
(b)	any two from swollen stem stores water (for dry periods) reduced leaves / spines lose less water / less transpiration / less evaporation idea of long roots absorb water from deeper / more spread out in soil		2
total			5

3469/H Q4

	answers	extra information	mark
(a)(i)	Y or 2,8,8 or Argon or Ar	All correct gains 3 marks	3
(ii)	W or 2,5	3 correct gains 2 marks	
(iii)	X or 2,7 or fluorine or F	2 or 1 correct gains 1 mark	
(iv)	Z or 2,8,8,1 or potassium or K	N.B. number of ticks on script must equal number of marks	
(b)	1 and 2 (both needed)	do not credit if any other group listed 'transition metals' neutral allow alkali metals and alkali earth metals	1
total			4

3469/H Q5

	answers	extra information	mark
(a)	11	accept 10.5 – 11.5	1
(b)	ideas of increases / raises frequently / often energetically / violently	either order either order do not allow harder	1 1 1
(c)	yeast killed	accept enzymes denatured / destroyed	1
total			5

3469/H Q6

	answers	extra information	mark
(a)	oval / ellipse Sun		1 1
(b)	X Tempel-Tuttle Y Encke Z Nenjmin	all three for 2 marks, any two or one for 1 mark	2
(c)	use of spaceships / probes /satellites use of radio telescopes	ideas of communication needed do not credit telescope ignore searches for conditions for life	1 1
total			6

3469/H Q7

	answers	extra information	mark
	beta	allow alpha and beta	1
	any one from		1
	alpha absorbed by paper		
	or beta absorbed by aluminium or metal	accept beta / it's not absorbed by paper	
	or gamma would affect all of film	the responses are linked, the candidate cannot obtain the second mark point unless the first is correct	
total			2

3469/H Q8

	answers	extra information	mark
	(ultrasonic) waves / vibrations / oscillations in <u>fluid</u>	must mention fluid / liquid / water	1
	idea of shake or vibrate dirt / particles off watch	allow cavitation / implosion of small bubbles do not credit dust falls off or breaks up	1
total			2

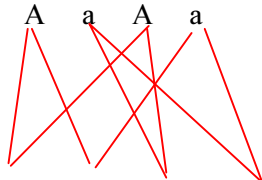
3469/H Q9

	answers	extra information	mark
(a)	any three from (concentration of) oxygen increases by 60 units (concentration of) carbon dioxide decreases by 6 (units)	accept by more than double accept oxygen more than doubles for 2 marks accept by a small amount note: usually first 2 marks will be for changes in oxygen and CO ₂ , third mark will be for a suitable quantitative comment	3
(b)	plasma red blood cell / haemoglobin / oxyhaemoglobin	blood cells is insufficient	1 1
total			5

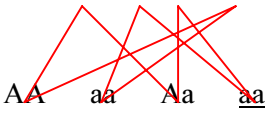
3469/H Q10

	answers	extra information	mark
(a)	needle at 0 needle to left of 0		1 1
(b)	any two from increase speed / pedal faster increase strength of magnet increase number of turns on coil / number of coils increase area of coil		2
total			4

3469/H Q11

	answers	extra information	mark									
(a)	gametes A or a A or a		1									
	F ₁ genotypes correctly derived		1									
	albino identified		1									
	OR											
	 <p>AA Aa Aa <u>aa</u></p>	gametes – 1										
	OR											
	<table border="1"> <tr> <td></td> <td>A</td> <td>a</td> </tr> <tr> <td>A</td> <td>AA</td> <td>Aa</td> </tr> <tr> <td>a</td> <td>Aa</td> <td><u>aa</u></td> </tr> </table>		A	a	A	AA	Aa	a	Aa	<u>aa</u>	F1 genotypes corresponding to 'lines' – 1 lines must be correct	
	A	a										
A	AA	Aa										
a	Aa	<u>aa</u>										
		Albino (aa) identified – 1 (lower case)										
		gametes – 1 boxes all correct – 1 albino (aa) identified – 1										

3469/H Q11 (continued)

(b)	$\frac{1}{2}$ / half / 50% evens / 1 in 2	do not credit 1 to 2 <i>or</i> 50/50	1								
	gametes A or a a or a or one parent heterozygous, one parent homozygous recessive		1								
	F ₁ genotypes correctly derived		1								
	OR										
	(R) (S) A a a a 	gametes correctly identified – 1 F ₁ genotypes correctly derived – 1									
	OR (R) <table border="1"> <tr> <td></td> <td>A</td> <td>a</td> </tr> <tr> <td>(S) a</td> <td>Aa</td> <td>aa</td> </tr> <tr> <td>a</td> <td>Aa</td> <td>aa</td> </tr> </table>		A	a	(S) a	Aa	aa	a	Aa	aa	gametes correctly derived – 1 F ₁ genotypes correctly derived – 1
	A	a									
(S) a	Aa	aa									
a	Aa	aa									
total			6								

3469/H Q12

	answers	extra information	mark
	idea of variation Darwin's theory based on range of variation in organisms	accept some (birds) have long legs and some have short legs do not credit inherited characteristics mention of genes etc – neutral	1
	idea of acquisition Lamarck's based on characteristics or long legs acquired during lifetime	e.g. legs stretch during lifetime do not credit grow	1
	idea of survival of fittest Darwin's theory based on survival of organisms with beneficial variation	accept reference to survival of the fittest accept ones with longer legs will survive	1
	idea of inheritance Lamarck's based on inheritance of acquired characteristics	accept reverse point that Darwin recognised that acquired characteristics are not inherited do not credit reference to other animals e.g. giraffes	1
total			4

3469/H Q13

	answers	extra information	mark
(a)	inert solid / named / alginate or resin beads e.g plastic netting		1
(b)	correct choice of scale correct plotting of curves 1 + 1 reasonable curves	filling axes – accept x starts at 30, y starts at 10 (all plots correct $\pm \frac{1}{2}$ square) do not allow incorrect extrapolation	1 2 1
(c)(i)	any three from <ul style="list-style-type: none"> • at first / up to 40° the rate is the same • above 50° the rate was always higher with immobilised isomerase / the rate in solution decreases more rapidly • the higher the temperature, (above 50°) the bigger the difference in rates • quantitative statement e.g. rate 5 times greater at 80° 		3
(ii)	enzyme functions for longer period / allows continuous process / not mixed with the product / not so much damage to the enzyme / denaturation	accept more profit / more efficient if qualified	1
total			9

3469/H Q14

	answers	extra information	mark
(a)	same number of outer electrons / have 2 outer electrons	do not accept inner electrons or 2Xs	1
(b)	calcium (idea) outer electrons / shell further from nucleus more easily lost / attraction from nucleus less	do not credit lower down group do not credit larger / more shells accept screening of inner electrons	1 1
total			3

3469/H Q15

	answers	extra information	mark
(a)	radium	accept Ra	1
(b)	different numbers of protons	accept one has 91 protons, one has 92 or Pa has 91 protons, U has 92 do not credit they have different atomic numbers reject different numbers of protons and neutrons	1
(c)	alpha		1
(d)	neutron <u>changes</u> into proton	accept electron lost / beta radiation accept singular or plural answers	1
total			4

3469/H Q16

	answers	extra information	mark
(a)	<p>Quality of written communication <i>The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme</i></p> <p>(sound produced by) voice is analogue / microphone detects analogue signal</p> <p>(idea) transmission requires digital signal</p> <p>speaker (produces sound which) is analogue / ear (we can only translate or understand or analogue (signal)</p>	<p>looking for differences between analogue and digital signals</p>	<p>1</p> <p>1</p> <p>1</p>
(b)	<p>any two from</p> <p>reference to analogue (with analogue) different frequencies may weaken to different extents</p> <p>each time signal is amplified these differences / noise are also amplified</p> <p>reference to digital even weak pulses still recognised as 'on'</p> <p>noise (even when amplified) recognised as 'off'</p>	<p>do not credit analogue signals weaken or quality of signal is reduced or easily distorted</p> <p>parts (a) and (b) should be marked separately</p>	2
total			5

3469/H Q17

	answers	extra information	mark
(a)(i)	any two from (matter from) exploded star / supernova matter so dense / gravity so strong that electromagnetic radiation / light cannot escape from it		2
(ii)	X-rays emitted when gases or matter released from nearby stars spiral into it		1 1
(b)	fusion (of nuclei) of lighter elements / hydrogen / helium		1 1
total			6

3469/H Q18

	answers	extra information	mark
(a)	<u>evaporation</u> of sweat cools body	do not credit sweating cools body if no reference to evaporation allow cools body if attempt at description of evaporation (e.g sweat dries) for 1 mark	1 1
(b)(i)	idea <u>blood</u> (passing through gut) cooled (by ice) (this) cooled <u>blood</u> cools brain	do not credit ice cools brain	1 1
(ii)	impulses from brain / thermoregulatory centre to skin vessels supplying skin surface capillaries constrict / sweat glands less active or hairs become erect therefore less heat lost by skin	do not accept messages / signals accept hypothalamus accept electrical signals do not credit capillaries constrict / move down accept reduced supply of blood to skin surface shivering (unqualified) is neutral	1 1 1
total			7

3469/H Q19

	answers	extra information	mark
(a)	loft insulation		1
	energy saved in 10 years £600		1
	net saving (600 – 110) £490		1
	OR		
	hot water jacket		1
	energy saved in 10 years £140		1
	This is the highest percentage saving on cost		1
(b)	transferred to environment / surroundings		1
	as heat / thermal energy		1
total			5

TOTAL MARKS FOR PAPER = 90