



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Science: Double Award Modular

3468

Paper 1H

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3468/1H Q1

	answers	extra information	mark
(a)	pituitary (gland) ovaries		1
		allow corpus luteum	1
(b)	idea of stimulating release of eggs preventing release of eggs	allow FSH increases fertility	1
		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 LH neutral	1
total			4

3468/1H 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

3468/1H Q3

	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>idea of mutation or variation</p> <p>(resistant cells) survive antibiotic</p> <p>(resistant cells) breed / multiply / clone</p>	<p>do not allow ‘bacteria get used to antibiotics’ or idea that antibiotics change the bacteria or ‘bacteria become immune’ or references to adaptation or evolution</p>	<p>1</p> <p>1</p> <p>1</p>
(b)	<p>EITHER (yes)</p> <p>keep animals disease free (1) so grow faster (1 mark) or live longer</p> <p>OR (no)</p> <p>resistant bacteria may develop (1) risk to human or animal health (1)</p>	<p>accept produce high quality do not accept wasted energy trying to overcome illness</p> <p>allow bacteria become resistant / immune</p>	<p>2</p>
total			5

3468/1H 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

3468/1H Q5

	answers	extra information	mark
(a)	8 electrons in outer shell	accept anywhere in outer shell accept dots or crosses	1
	negative sign outside bracket		1
(b)	liquid aqueous	accept dissolved in <u>water</u> / in solution in <u>water</u>	1 1
(c)(i)	$\text{Cl}_2(\text{aq}) + \underline{2} \text{KBr}(\text{aq}) \rightarrow$ $\underline{2} \text{KCl}(\text{aq}) + \text{Br}_2(\text{aq})$	both '2s' needed accept $\frac{1}{2} \text{Cl}_2$ and $\frac{1}{2} \text{Br}_2$	1
(ii)	chlorine more reactive (than <u>bromine</u>)	do not credit higher up group allow 'higher up reactivity series' do not credit more reactive than an <u>incorrect</u> substance	1
total			6

3468/1H Q6

	answers	extra information	mark
(a)	any two successive peaks labelled W	accept any 2 points on same part of adjacent waves correct by eye	1
	half 'height' of wave labelled A	correct by eye N.B. at least one of the answers must be labelled	1
(b)	0.2	correct answer with no working = 2 allow 1 mark for $s = f \times w$ or correct working i.e., 2×0.1 N.B. correct answer from incorrectly recalled relationship = 0	2
	m/s (unit)	independent mark do not allow mps or mHz	1
total			5

3468/1H Q7

	answers	extra information	mark
	beta alpha absorbed by paper or beta absorbed by aluminium allow beta can penetrate paper or gamma would affect all of film	allow beta <u>and</u> alpha second mark is linked to first i.e., cannot obtain second mark unless first mark is correct	1 1
total			2

3468/1H Q8

	answers	extra information	mark
	(ultrasonic) waves or vibrations or oscillations in fluid	N.B. must mention fluid or liquid or water	1
	idea of shaking dirt particles off watch	allow cavitation / implosion of small bubbles	1
total			2

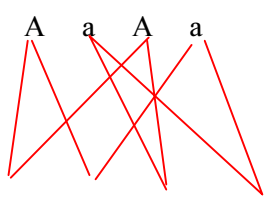
3468/1H Q9

	answers	extra information	mark
(a)	any three from (concentration of) oxygen increases by 60 (units) (concentration of) carbon dioxide decreases from 46 to 40 / by 6 units	allow oxygen more than doubles for 2 marks allow 'by a small amount' N.B. usually the first 2 marks will be for the change in oxygen and carbon dioxide. The third mark will be for a quantitative comment on one of these changes	3
(b)	plasma red (blood) cell / haemoglobin / oxyhaemoglobin		1 1
total			5

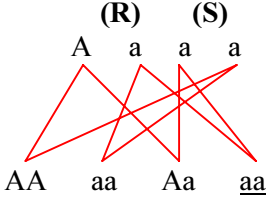
3468/1H Q10

	answers	extra information	mark
	sodium nitrate NaNO ₃	do not credit lower case N or O, upper case A	1 1
	potassium sulphate K ₂ SO ₄	accept potassium hydrogen sulphate or KHSO ₄ do not credit lower case K, S or O ignore charges on ions	1 1
total			4

3468/1H 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 F ₁ genotypes corresponding to ‘lines’ – 1 lines must be correct Albino (aa) identified – 1 (lower case)										
	OR											
	<table border="1"> <tbody> <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> </tbody> </table>		A	a	A	AA	Aa	a	Aa	<u>aa</u>	gametes – 1 boxes all correct – 1 albino (aa) identified – 1	
	A	a										
A	AA	Aa										
a	Aa	<u>aa</u>										

3468/1H Q11 (continued)

<p>(b)</p>	<p>$\frac{1}{2}$ / half / 50% evens / 1 in 2</p>	<p>do not credit 1 to 2 or 50/50</p>	<p>1</p>								
	<p>gametes A or a a or a or one parent heterozygous, one parent homozygous recessive</p>		<p>1</p>								
	<p>F₁ genotypes correctly derived</p>		<p>1</p>								
	<p>OR</p>										
	<p>(R) (S) </p>	<p>gametes correctly identified – 1</p> <p>F₁ genotypes correctly derived – 1</p>									
	<p>OR</p> <p>(R)</p> <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	<p>gametes correctly derived – 1</p> <p>F₁ genotypes correctly derived – 1</p>
	A	a									
(S) a	Aa	aa									
a	Aa	aa									
<p>total</p>		<p>6</p>									

3468/1H 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

3468/1H Q13

	answers	extra information	mark
(a)	X chlorine	accept Cl ₂	1
	Y sodium hydroxide (solution)	accept NaOH	1
	Z hydrogen	accept H ₂	1
		NB formulas must always be correct e.g. do not accept chlorine(Cl ²)	
(b)	2 Na + 2 H ₂ O → 2 NaOH + H ₂		1
	reactant symbol: formulae correct	do not credit lower case N, H, O or H ₂ O or upper case A in Na	1
	products symbol: formulae correct	do not credit lower case N, H, O or H ²	1
	balancing all correct	accept (1),(1),(1), $\frac{1}{2}$ or multiples the balancing mark can be obtained with some minor errors e.g. H ₂ O	
total			6

3468/1H 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	do not credit lower down group do not credit larger / more shells	1
	more easily lost / attraction from nucleus less	accept screening of inner electrons	1
total			3

3468/1H Q15

	answers	extra information	mark
(a)	X – (metal) atom / ion		1
	Y – electron		1
(b)	free electrons or electrons move		1
	(allow metal) atoms / ions to slide over each other		1
	OR		
	bonding non-directional for 2 marks		
total			4

3468/1H Q16

	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

3468/1H Q17

	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

3468/1H Q18

	answers	extra information	mark
(a)	any two from P (waves) fast, S waves slow P longitudinal, S transverse P travel through solids and liquids, S only through solids	accept faster: comparative needed accept P waves arrive before S both points needed accept suitable description P can go through core, S cannot	2
(b)(i)	3600 – 4200		1
(ii)	wave speed changes wave gets faster (2 marks)	accept slow down	1 1
total			5

3468/1H Q19

	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

3468/1H Q20

	answers	extra information	mark
(a)	low in winter / named months /when the days are short	accept increases in spring / December – June	1
	high in summer / named month(s) / (when days are long	decreases in autumn / June – December	1
	reasonable quantitative statement	accept any reasonable calculated / translated quantitative statement higher in summer than in winter for 2 marks comparative statements may be worth 2 marks but 8/11 times higher in summer than in winter for 3 marks	1
(b)	no artificial light given in summer / light only given in winter		1
	since natural light greatly exceeds minimum / 600 J (required to produce tomatoes) OR light only given in winter as natural light less than the minimum needed (to grow them) or 600 J OR for 2 marks: percentage increase in growth from artificial light only significant in winter	accept day length if linked to light energy	1
total			5

TOTAL MARKS FOR PAPER = 90