GCSE 2004
June Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

SCIENCE: DOUBLE AWARD (Modular) 3468/1H

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Science: Double Award (Modular)

June 2004 3468/1H

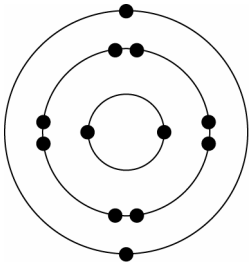
3468/1H Q1

question	answers	extra information	mark
(a)	ovaries	accept ovary	1
	womb	accept uterus	1
	fertility	accept FSH do **not** accept fertilisation	1
	contraceptive(s)	allow birth control accept oestrogen **or** progesterone do **not** accept pill alone	1
(b)	man XY	allow (chromosomes) different	1
	woman XX	allow (chromosomes) same genes and alleles are neutral allow 1 mark for one is XX and one is XY	1
total			6

3468/1H Q2

question	answers	extra information	mark
(a)	genetically identical / same genetic information / same DNA	accept identical / same chromosomes / alleles / genes allow 1 mark for identical / same characteristics	2
(b)	Quality of written communication: Full correct sequence : split → transfer		1
	any **two** from • split apart cells from embryo • before specialised • implant / transplant • into host / mother / uterus/ womb	allow early stage	2
total			5

3468/1H Q3

question	answers	extra information	mark
(a)	9 protons / Proton Number 9	mass / atomic number is neutral	1
	10 neutrons		1
	electron arrangement 2,7 / 9 electrons	incorrect configurations neutral if no points scored, allow 1 mark for nucleus surrounded by electrons **or** nucleus contains neutrons and protons	1
(b)		Mark is for 2,8,2 arrangements. accept electrons anywhere in correct orbit	1
total			4

3468/1H Q4

question	answers	extra information	mark
(a)(i)	$2\ Mg + O_2 \rightarrow 2\ MgO$	both 2s needed allow $\frac{1}{2}\ O_2$ **or** any correct multiple	1
(ii)	solid		1
	gas		1
(b)	$MgC1_2$ /Cl_2Mg	do not accept MG mg mG CL cl cL ignore charges	1
total			4

3468/1H Q5

question	answers	extra information	mark
(a)	1:2	accept 0.5:1 reject 2 to 1	1
(b)	gases combine in simple / whole-number ratios / proportions		1
(c)	(Gay-Lussac) twice as much hydrogen as oxygen (formed when water electrolyses)	answer must refer to volumes not just atoms	1
(d)	reference to (shared) electrons / (covalent) bond	reject ionic bonding accept electric forces	1
total			4

3468/1H Q6

question	answers	extra information	mark
(a)(i)	absorbed by water / water heated hot water heats (rest of) food / idea of particle vibration		1 1
(ii)	300 000 000 / 3×10^8	correct answer with no working = 2 allow 1 mark for s = f x w **or** correct working i.e., 10 000 (000 000) × 0.03 N.B. correct answer from incorrectly recalled relationship / substitution = 0	2
(b)(i)	shock waves / seismic waves / earthquake waves	allow **P** waves and / or **S** waves	1
(ii)	seismometer / seismograph		1
total			6

3468/1H Q7

question	answers	extra information	mark
(a)(i)	cannot penetrate aluminium	allow can only pass through air / paper too weak is neutral	1
(ii)	gamma rays not affected (by aluminium)	allow <u>all</u> / <u>most</u> (gamma rays) to pass through too strong is neutral danger is neutral	1
(b)(i)	(nuclei) unstable		1
(ii)	causes harm / damage to body / cells detail e.g., causes mutations / causes cancer / damages DNA / damages chromosomes	allow radiation sickness allow two effects for 2 marks	1 1
total			5

3468/1H Q8

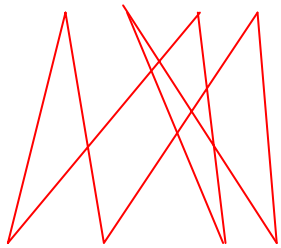
question	answers	extra information	mark
(a)	a qualitative answer i.e fell for 1 mark a quantitative answer for 2 marks i.e to less than half / by 37 (per 100 000) from 54 to 17 (per 100 000)	 allow rate (more or less) constant	1 1
(b)	fewer women than men died women deaths rose (then fell)		1 1
(c)	275	allow 273 – 277	1
(d)	as number of men / women smoking falls so do deaths from lung cancer as numbers of women who smoke increases, so do deaths from lung cancer		1 1
total			7

3468/1H Q9

<table>
<tr><th>question</th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>(a)</td><td>gametes H and h, h and h

F_1 genotypes correctly derived

Phenotypes identified

OR
H h h h
 
Hh Hh hh hh

OR
<table><tr><td></td><td>H</td><td>h</td></tr><tr><td>h</td><td>Hh</td><td>hh</td></tr><tr><td>h</td><td>Hh</td><td>hh</td></tr></table></td><td>gametes – 1

F1 genotypes corresponding to ‘lines’ – 1
lines must be correct

Huntington’s identified (Hh) – 1

gametes – 1
boxes all correct – 1
Huntington’s identified (Hh) – 1</td><td>1

1

1</td></tr>
<tr><td>(b)</td><td>both parents unaffected /don’t have the disease
but
both parents hh / or homozygous recessive or neither parent has H / dominant (allele)</td><td>qualitative answer gains 1 mark

gains 2 marks</td><td>2</td></tr>
<tr><td>total</td><td></td><td></td><td>5</td></tr>
</table>

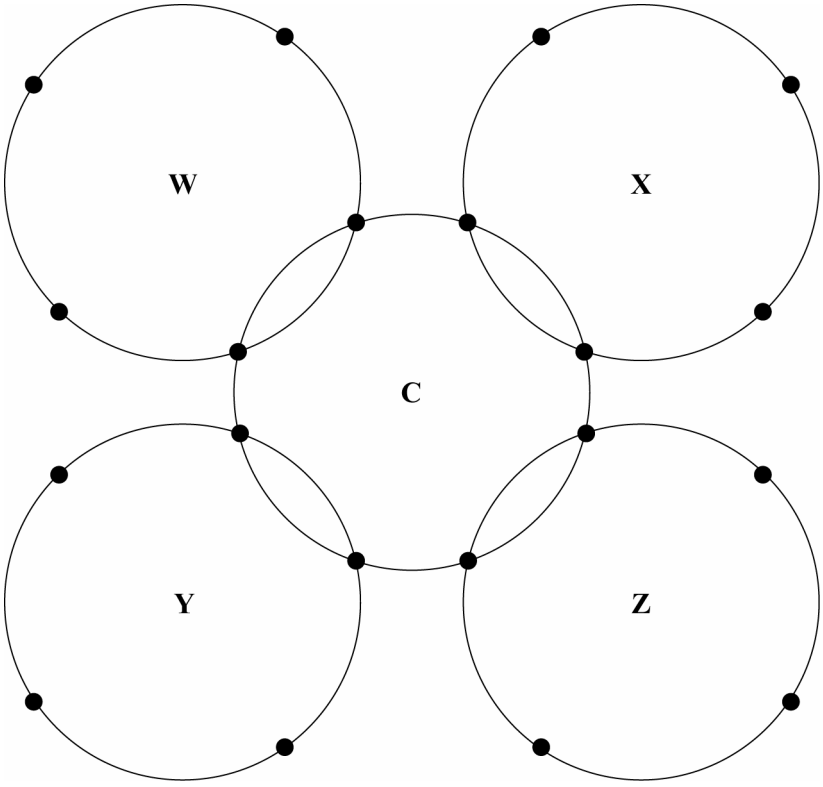
3468/1H Q10

question	answers	extra information	mark
(a)	any **two** from • copies of chromosomes made • cell divides twice **or** 4 cells formed • each gamete / cell now has single set of chromosomes	allow chromosome number halved / cells haploid / cells n	2
(b)	any **two** from • sex cells / gametes fuse / fertilisation • offspring receive genes or chromosomes or alleles from both parents / DNA • alleles in a pair may vary		2
(c)(i)	new form of gene	allow change in genetic material / DNA / chromosomes / gene	1
(ii)	(no) any **two** from • some neutral • exemplified • some increase chances of survival / reference to natural selection or evolution • exemplified	e.g extra digit e.g. example of disease resistance	2
total			7

3468/1H Q11

question	answers	extra information	mark
(a)	Mendeleev arranged known elements in order of mass or properties	reject explanation in terms of electrons and / or atomic number	1
	gaps in Periodic Table / group 1		1
(b)	does not last long enough to experiment / very little of it	allow it has a short half-life	1
(c)(i)	(much) more violent	accept more reactive	1
(ii)	since outer electron / or shell further from nucleus	do not credit lower down group larger / more shells neutral	1
	therefore more easily lost	accept screening by inner electrons	1
total			6

3468/1H Q12

question	answers	extra information	mark
(a)	Quality of written communication: All scientific words used correctly (covalent, bonds, atoms)		1
	any **two** from		2
	• large numbers of covalent bonds	allow giant lattice / structure	
	• between <u>atoms</u>	do not accept between molecules	
	• (covalent) bonds strong	accept need much energy to break	
(b)			
	each carbon has 4 electrons one shared pair four shared pairs		1 1 1
(c)	$Cu^{2+} + 2e^{-} \rightarrow Cu$	this answer only	1
total			7

3468/1H Q13

question	answers	extra information	mark
(a)	(ultrasound) waves reflected at boundary / from muscle	accept 'bounce off'	1 1
(b)(i)	time		1
(ii)	speed of (ultrasound) waves		1
total			4

3468/1H Q14

question	answers	extra information	mark
(a)(i)	two protons 2 neutrons	 if neither point gained allow 1 mark for helium nucleus	1 1
(ii)	electron		1
(b)	neutron splits (to form proton and electron)		1
(c)(i)	7 **or** 8 correct data extracted from graph e.g. takes 8 days to drop from 50 to 25	 allow appropriate annotation of graph	1 1
(ii)	long enough to destroy cancer cells but short enough to minimise damage to surrounding tissues	 do not accept dangerous unqualified	1 1
total			8

3468/1H Q15

question	answers	extra information	mark
(a)	180 **or** 179.9		1
(b)	99.4		1
(c)(i)	reduction		1
(ii)	more concentrated	allow stronger	1
total			4

3468/1H Q16

question	answers	extra information	mark
	carbon dioxide concentration		1
	since atmospheric concentration very low / value give e.g. 0.03 %	allow carbon dioxide used up	1
	temperature high	allow if light chosen as a factor	1
	light intensity high	allow if temperature chosen as a factor	1
total			4

3468/1H Q17

question	answers	extra information	mark
(a)	unreactive / near bottom of reactivity series		1
(b)	carbon more reactive / higher up reactivity series		1
(c)	very reactive / near top of reactivity series		1
	cannot use displacement methods / can only be extracted by electrolysis / had to wait discovery of electricity		1
total			4