GCSE 2004
June Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Science: Double Award
Specification B (Co-ordinated)
3462/1F

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.

Further copies of this Mark Scheme are available from:

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Set and published by the Assessment and Qualifications Alliance.

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SCIENCE: DOUBLE AWARD CO-ORDINATED

INFORMATION FOR EXAMINERS

1. General

The mark scheme for each question shows:

- the marks available for each part of the question;
- the total marks available for the question;
- the typical answer or answers which are expected;
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; e.g. allow smooth / free movement.)

3. Marking points

3.1 Marking of Quality of Written Communication

Where *Quality of written communication* appears in the mark scheme, one mark is to be awarded for either of the following points:

- Using correct scientific terms
- Correct sequencing or linking of ideas or points

The mark scheme will specify which of the points is to be awarded in a particular question. A QoWC mark can be awarded for a scientific answer, even if it is not accurate. It cannot be awarded for a nonsensical or non-scientific answer.
On the script, the QoWC tick should be identified by a 'q' written next to it.

3.2 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.3 Use of chemical symbols/formulae

If a candidate writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.4 The marking of quantitative relationships

Full credit can be given for a correct quantitative relationship expressed in:

- named units;
- physical quantities;
- standard symbols;
- a combination of physical quantities and units.

No credit can be given for any quantitative relationship expressed in terms of:

- a combination of physical quantities, units and symbols;
- a diagram, e.g. the ohm's law triangle, unless the rest of the answer shows clearly that the candidate understands the relationships involved.

3.5 Marking procedure for calculations

3.5.1 Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.
However:

- if the answer is incorrect, mark(s) can be gained by correct substitution/working and this is shown in the 'extra information' column;
- if the answer is correct, but an incorrect relationship is written in the working, then no marks can be awarded (see 3.5.2).

3.5.2 Where calculations are based on incorrectly recalled relationships, neither the incorrectly recalled relationship, nor the resulting calculation based on the incorrect relationship, will be credited.

3.6 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.7 Errors carried forward

There should be no error carried forward from a previous answer which has been based on wrong science. Any error in the answers to a structured question should be penalised once only.

Examples

(a) A candidate who calculates average speed using speed = time/distance **and** then proceeds to use this incorrect answer to calculate an acceleration based on the correct quantitative relationship should be given credit for the use of the correct acceleration relationship but none for either numerical answer.

(b) A candidate who incorrectly calculates average speed using speed = distance/time and then proceeds to use this incorrect value to calculate an acceleration based on the correct quantitative relationship, should be given credit for the use of both correct quantitative relationships **and** for the correct substitution and use of the incorrect value in the calculation of the rate of acceleration.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.8 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.9 Brackets

(…..) is used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.10 Interpretation of marginal points

There will be times when the answer is almost, but not quite, correct. Some examiners would award a mark while others would not. In any one script, an attempt should be made to balance these nearly correct answers by giving the mark on some occasions but not on others. If this is not done, the marking would end up being too lenient or too harsh.

3.11 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

Double Award
Foundation Tier 3462/1F

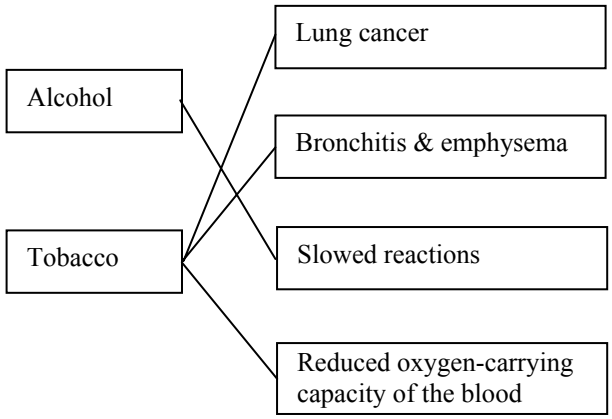
3462/1F Q1

question	answers	extra information	mark
	<u>In sequence</u>:		
	retina		1
	(optic) nerve		1
	iris		1
	sclera		1
	(suspensory) ligament		1
total			5

3462/1F Q2

question	answers	extra information	mark
(a)(i)	**A** = nucleus		1
	B = (cell) <u>membrane</u>		1
(ii)	(cell) membrane		1
(b)	70	if correct answer, ignore working or lack of working $\frac{63 + 78 + 69}{3}$ for **1** mark	2
total			5

3462/1F Q3

question	answers	extra information	mark
(a)	**Drug** **Effect**  	If **2** lines to **one** Effect box, do **not** award that mark	3
(b)	nicotine		1
(c)	it increases the death rate / it **or** the earlier the person starts smoking the more chance of dying (earlier) **or** the longer the person has been smoking the more chance of dying (earlier)	do **not** accept 'smoking kills' **or** 'smokers more likely to die' **or** 'the more you smoke the more chance of dying'	1
total			5

3462/1F Q4

question	answers	extra information	mark
(a)	<u>In sequence</u>:		
	(ribcage) up / out		1
	(diaphragm) down / flatter		1
(b)(i)	<u>On diagram</u>:		
	oxygen arrow to blood from air **and** CO_2 arrow to air from blood		1
	oxygen arrow to red blood cell		1
	CO_2 arrow from plasma		1
(ii)	diffusion		1
(iii)	large surface **or** large area	do **not** accept space	1
total			7

3462/1F Q5

question	answers	extra information	mark
(a)	<u>In sequence</u>: heron frog slug lettuce		1
(b)(i)	light / sun	ignore photosynthesis / respiration cancel mark if water / ions etc given do **not** accept heat	1
(ii)	traps / absorbs light	accept energy for light do **not** accept collects / attracts do **not** accept 'traps sun'	1
(iii)	162	if correct answer, ignore working / lack of working $\frac{10 \times 1620}{100}$ for **1** mark	2
total			5

3462/1F Q6

question	answers	extra information	mark
	<u>In sequence</u>: light gravity moisture hormones dark more		 1 1 1 1 1 1
total			6

3462/1F Q7

question	answers	extra information	mark
(a)	(in table) 4920		1
(b)	exercise produces heat **or** causes rise in body temperature / makes athlete hot	named activity produces heat	1
	needs to cool **or** needs to maintain temperature **or** sweat helps to cool the body		1
(c)	more / a lot of <u>water</u> lost in sweating / breathing		1
	replace water / prevent dehydration		1
total			5

3462/1F Q8

question	answers	extra information	mark
(a)(i)	increases		1
(ii)	decreases		1
(b)	any **two** from: • competition for water • competition for ions / minerals / salts / nutrients • competition for light	 accept correct named example do **not** accept food do **not** accept <u>all</u> ignore space	2
(c)	kills / harms other / named organisms		1
total			5

3462/1F Q9

question	answers	extra information	mark
(a)	**X** (no mark) **X** is more visible **or** **Y** is more camouflaged		1
(b)(i)	so camouflage not changed **or** so not easier to see		1
(ii)	25 7		1 1
(iii)	any **one** from: • eaten (by birds) / died • mixed in with large number of unmarked moths • moved away		1
(c)(i)	DNA		1
(ii)	the <u>gene</u> / <u>allele</u> for being dark / dominant		1
total			7

3462/1F Q10

question	answers	extra information	mark
(a)(i)	protease	accept peptidase **or** named protease e.g. pepsin / trypsin allow 'proteinase'	1
(ii)	amino acids	accept peptides / polypeptides / peptones	1
(b)	points plotted accurately	± $\frac{1}{2}$ square deduct **1** mark per error	2
	best fit curve **or** ruled point-to-point	if double line within $\frac{1}{2}$ square allow sharp apex do **not** allow single straight line if no points line defines points if (5,0) not plotted only penalise **1** mark bar graph wide bars – **no** marks bar graph ± $\frac{1}{2}$ square max **2** for points	1
(c)(i)	2 **or** correct from candidate's graph	± $\frac{1}{2}$ square	1
(ii)	stomach		1
(d)	proteins are large / product is small		1
	proteins (may be) insoluble / product is soluble		1
	cannot be absorbed / cannot enter blood **or** cannot pass through gut lining	accept reverse referring to product	1
total			10

3462/1F Q11

question	answers	extra information	mark
(a)(i)	any **one** from: • chemical messenger • chemical / substance released in one part to have effect elsewhere in body • chemical / substance which affects another / target organ / tissues / cells	allow chemical from endocrine gland	1
(ii)	in blood / circulatory system / any named part including plasma	extra wrong answer would cancel example **not** red blood cells	1
(b)	**Quality of written communication**: correct use of at least two relevant scientific term**s** spelt phonetically	e.g. pregnancy, ovulation, FSH, oestrogen, progesterone, ovary, follicle, circulation, thrombosis, feminisation, sperm count, STD Q ✓ or Q X	1
	any **three** from: Oral contraceptives: (benefit) • prevent (unwanted) pregnancy **or** prevent egg release • regulate menstrual cycle / periods (problems) • prolonged use may prevent later ovulation / cause infertility • named side-effect on female body e.g. circulatory problems / weight gain / nausea / headache / breast cancer / mood swings • increased promiscuity / increase in STD's / STI's • named side-effect on environment e.g. feminisation of fish **or** lowered sperm count in human males Fertility drugs: (benefit) • can enable woman to have children **or** to become pregnant **or** stimulates egg release (problem) • multiple births	for full marks must score at least **one** re contraceptives **and** at least **one** re fertility drugs if unclear which type of hormone maximum **2** marks from 3	3
total			6

3462/1F Q12

question	answers	extra information	mark
(a)	burning fossil fuels / named example	accept <u>driving</u> cars / lorries etc burning fuels in power stations ignore combustion unqualified do **not** accept catalytic converter on its own **or** emissions from power stations	1
(b)(i)	pollutants / smoke <u>breathed in</u>		1
(ii)	SO_2 and deaths rise (and fall) at same times **or** SO_2 and deaths parallel each other / show same pattern		1
(iii)	no – could be due to some other factor / pollutant / to smoke **or** correlation not precise / described	explanations must come to a conclusion named examples must be plausible allow 'coincidence'	1
total			4

3462/1F Q13

question	answers	extra information	mark
(a)	**A** = protein (coat)	accept capsid / capsomere	1
	B = DNA / gene(s) / genetic material / nucleic acid	allow RNA do **not** allow chromosome	1
(b)(i)	any **two** from: • skin • scabs / clot • mucus • stomach acid / gut protease	allow tears	2
(ii)	diagram shows extensions of intact cell membrane around viruses		1
(iii)	antibodies	allow enzymes re (ii) allow interferon ignore antitoxins / proteins	1
(c)	<u>virus</u> is transferred		1
	(virus in) blood / body fluids – transfer (via needles)		1
total			8

3462/1F Q14

question	answers	extra information	mark
(a)(i)	lower – **B** loses less (water / mass) than **C** **or** described in terms of petroleum jelly	accept converse re Leaf **C**	1
(ii)	yes - **B** and **C** lose less than **D** **or** **B** and **C** lose more than **A** **or** **D** loses the <u>most</u> **or** **A** loses the <u>least</u>	do **not** accept just 'all leaves lose some weight'	1
(b)(i)	**X** = stoma **Y** = guard cell	accept stomata / stomatal pore do **not** accept air space	1 1
(ii)	petroleum jelly blocks stomata / pores **or** petroleum jelly prevents water loss **or** petroleum jelly waterproofs water (mainly) lost via stomata / pores / **X** **or** stomata on lower surface only	allow pores are blocked in **B**	1 1
total			6

3462/1F Q15

question	answers	extra information	mark
(a)	**Quality of written communication**: ideas given in a <u>sensible order</u>	broken down giving products (could be CO_2, minerals or gas) (used by trees) Q ✓ or Q X	1
	any **three** from:		3
	• microorganisms / bacteria / fungi / saprotrophs	accept saprophytes / saprobionts / detritivores (named)	
	• digest / break down organic matter / leaves / decompose / reference decomposers / decay / rot		
	• use of enzymes / correct named example		
	• absorption by <u>diffusion</u> / <u>active transport</u>	must be of breakdown <u>products</u>	
	• respiration / combustion		
	• release of carbon dioxide		
	• CO_2 can be used (by trees) in photosynthesis	do **not** accept CO_2 taken in by roots	
(b)	any **two** from:		2
	• warmth / suitable temperature	do **not** accept heat / hot weather	
	• damp / water / rain / humid / moisture		
	• oxygen		
	• suitable pH		
total			6