



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Science: Single Award Co-ordinated

3463

Paper 1H

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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

Examiners are reminded of the need to assess QoWC by the following statement appearing in the appropriate parts of the mark scheme:

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.

The maximum marks available to a candidate whose answer is not well expressed will be (the number of marks available –1).

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.

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 $\text{speed} = \text{time}/\text{distance}$ **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 $\text{speed} = \text{distance}/\text{time}$ 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 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.



**Single Award
Higher Tier 3463/1H**

3463/1H Q1

question	answers	extra information	mark
(a)	any two from: no nucleus or DNA / chromosome / genetic material free in cytoplasm (only) has one chromosome circular DNA / chromosome no mitochondria has cell wall	accept converse as long as specified not a chromosome ignore shape	2
(b)	any two from: skin – barrier (to entry) (blood) <u>clotting</u> – barrier to (entry) tears – kill bacteria (antiseptic / lysozyme) <u>mucus</u> – traps bacteria <u>cilia</u> – <u>remove</u> bacteria <u>stomach acid</u> – <u>kills</u> bacteria / <u>denatures</u> protein / <u>denatures</u> enzyme w.b.c.s. / phagocytes – (involved in) phagocytosis w.b.c.s. / lymphocytes / T or B cells – antibody / antitoxin production	must be feature and what it does allow alternatives to bacteria, germs etc accept scab ignore hairs accept ‘engulfs’ bacteria ignore ‘eats’ / ‘destroys’ bacteria	2
(c)(i)	kills / destroys <u>bacteria</u> or prevents growth of <u>bacteria</u>	do not allow germs do not allow fights or gets rid of	1
(ii)	any two from: bacteria may be resistant / immune (treatment futile) or bacteria would not be killed may select for resistant type may cause increased incidence of resistance or Penicillin less effective in future sore throat might be due to a virus – Penicillin would not work	accept descriptions from table accept ‘fights’ here do not accept people resistant	2
total			7

3463/1H Q2

question	answers	extra information	mark
(a)	burning / combustion fossil fuels / burning wood	accept named fossil fuel accept driving cars / any vehicles do not accept burning / combustion unqualified do not accept factories ignore factory chimneys unqualified ignore respiration	1
	deforestation		1
(b)(i)	(overall) increase		1
	fluctuations	highs are higher <u>and</u> lows are not as low = 2 marks	1
(ii)	no – could be due to some other factor or could be coincidence or fluctuations \pm same size as the overall rise or large fluctuations or sometimes when CO ₂ rises temperature doesn't		1
(c)	any one biotic or abiotic effect eg: changes in rainfall ice-caps melting / rise in sea level changed pattern of winds changed pattern of migration changed species survival changed growth	do not credit just “climate / weather change” allow <u>extreme</u> climate / weather change accept drought, desert formation accept flooding	1
total			6

3463/1H Q3

question	answers	extra information	mark
(a)(i)	(need new roots) to take in water	ignore minerals / anchorage	1
(ii)	create humid atmosphere or reduce water loss / transpiration or prevent wilting	ignore warmth	1
(b)	<p>Quality of written communication <i>The answer to this question requires 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><u>seed</u> because (no mark)</p> <p><u>sexual</u> reproduction or fusion of gametes / pollination / fertilisation</p> <p>2 sets of (different) genes / chromosomes / DNA combined</p> <p>causes variation in (appearance of) offspring / causes new variety</p>	<p><i>maximum of 2 marks if ideas not well expressed</i></p> <p>accept converse points re cuttings e.g. asexual or no fusion or only cell division / by mitosis</p> <p>do not accept breeding for sexual reproduction</p> <p>genetically identical / is a clone</p> <p>no variation / all identical (in appearance)</p>	<p>1</p> <p>1</p> <p>1</p>
total			5

3463/1H Q4

question	answers	extra information	mark
(a)	A = cornea		1
	B = suspensory ligament		1
(b)	H	extra letters cancel ignore any names	1
(c)	carries impulses / electrical signal / electrical messages / electrical pulses (to the brain)	do not accept “messages” or “the image” or “signal” or pulses unqualified not electronic	1
total			4

3463/1H Q5

question	answers	extra information	mark
(a)	pituitary (gland / body)		1
(b)	oestrogen inhibits the release of FSH	ignore references to LH	1
	FSH stimulates follicle development / causes egg to develop or no follicle / egg development if high oestrogen	accept growth / maturing / ripening for development	1
	no ovulation / no egg release	do not accept no egg to be fertilised	1
total			4

3463/1H Q6

question	answers	extra information	mark
(a)	lipase		1
(b)	fatty acid	ignore glycerol	1
(c)(i)	0.25 or $\frac{1}{4}$	if <u>correct</u> answer ignore working or lack of working $\frac{(8.7 - 7.7)}{4}$ for 1 mark	2
(ii)	fats emulsified or described re. small droplets or large S.A. (for enzyme action) or fats 'mix' better with water	do not allow breakdown / breakup unqualified	1
total			5

3463/1H Q7

question	answers	extra information	mark
(a)(i)	glucose passes through the filter / from plasma to filtrate	ignore diffuses	1
(ii)	glucose is re absorbed or glucose taken back into the blood	ignore filtered	1
(b)	protein (molecules) are (too) large (to pass through the filter)		1
(c)	any three from: <u>blood</u> becomes more concentrated / too salty / has lower water potential or too little water in the <u>blood</u> hypothalamus detects this release of ADH by pituitary increased re absorption of water		3
total			6

3463/1H Q8

question	answers	extra information	mark
(a)(i)	mutation		1
(ii)	not enough <u>oxygen</u> carried in <u>blood</u> or not enough <u>oxygen</u> to <u>body cells</u>	comment about <u>oxygen</u> carriage or delivery	1
(b)(i)	person 7 = H ^A H ^S and person 8 = H ^A H ^S	allow use of 'A' and 'S' for alleles	1
	sickle gamete from <u>each</u> parent	N.B. can pick up chain of logic at any point correctly derived from candidate's previous line accept gametes correctly derived from P genotypes	1
	F ₁ genotype H ^S H ^S correctly derived from candidate's gametes	accept F ₁ genotypes correct from candidate's gametes	1
	F ₁ H ^S H ^S identified as having sickle cell anaemia		1
(ii)	$\frac{1}{4}$ / 0.25 / 25% / 1 in 4 / 1:3 / 1 to 3	not 1:4 / 1 to 4 / 3:1 / $\frac{1}{3}$	1
(c)	any one from: 2 / 3 / 6 / 9 / 10		1
total			8