AQA Level 1/2 Certificate in Science: Double Award

PHYSICS PAPER 1H

SPECIMEN MARK SCHEME

MARK SCHEME

Information to 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 / ; eg allow smooth / free movement.)

3. Marking points

3.1 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

3.2 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.

3.3 Marking procedure for calculations

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.

3.4 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.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

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.

3.6 Phonetic spelling

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

3.7 Brackets

(…..) are 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.

COMPONENT NUMBER: AQA Level 1/2 Certificate in Science: Double Award

COMPONENT NAME: Physics Paper 1H

STATUS: Accredited

question	answers	extra information	mark
1(a)(i)	has both magnitude and direction		1
1(a)(ii)	120		1
1(a)(iii)	20	allow an error carried forward ie 140 minus their **(a)(ii)** provided answer is not negative	1
1(a)(iv)	because as speed increases the drag force / water resistance / friction / **D** will increase (until) **D** = 140 N **or** (until) **D** = **T**	 forces balance is insufficient	1 1 1
1(b)(i)	(average) speed (of swimmer)		1
1(b)(ii)	any **one** from: • get more data • force may vary (a lot) / change • enables a mean to be calculated	 accept results for data do **not** accept more accurate data references to anomalies, accuracies and precision are insufficient	1

Question 1 continues on the next page . . .

Question 1 continued . . .

question	answers	extra information	mark
1(b)(iii)	any t**wo** from: • (most / some) females produce smaller forces **or** (most / some) males produce larger forces • some females swim as fast as males but use a smaller force • most of the faster swimmers are male **or** most of the slower swimmers are female • range of the (average) speed of males is smaller than the range of the (average) speed of females • range of the (average) force of the males is greater than the range of the (average) force of the females	 do **not** accept <u>all</u> females produce smaller forces do **not** accept <u>all</u> males produce larger forces do **not** accept <u>all</u> males swim faster do **not** accept <u>all</u> females swim slower	2
1(b)(iv)	exert maximum (hand) force (throughout the swim / stroke)	accept (any method to) increase (hand) force practise more is insufficient	1
Total			**11**

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question	answers	extra information	mark
2(a)	*Similarities* same speed both transverse *Differences* microwaves have a higher frequency (than radio waves) or microwaves have a shorter wavelength (than radio waves)	 accept they travel at the speed of light 'they' refers to microwaves different frequency or wavelength is insufficient	 1 1
2(b)	microwaves pass through / transmitted by the plastic / casing microwaves are <u>reflected</u> by the metal / plates	 do **not** accept bounce / deflected etc for reflected if neither marking point scores an answer reflected (back to boat / from the device) scores **1** mark	1 1
2(c)(i)	because the metal reflects microwaves <u>towards the receiver</u> because microwaves pass through plastic and <u>could be hazardous</u>		1 1
2(c)(ii)	so that (measurements / results / scientists) are not biased towards one type / manufacturer of device/s	accept to avoid bias accept so they are not biased	1

Question 2 continues on the next page . . .

Question 2 continued . . .

question	answers	extra information	mark
2(d)(i)	any **two** from: • RCS values for device **B** decrease as angle X increases while for device **A** the RCS values increase as angle X increases • RCS values for device **A** are always less than the values for device **B** • the range of RCS values for device **A** is smaller than the range for device **B** • the change in RCS value for a given change in angle X is always less for device **A** than for device **B**		2
2(d)(ii)	circle 4.6 all other readings are part of a continuous trend		1 1
2(d)(iii)	**D** (no mark) because values are always over 2(.0)	reason cannot score if **D** is not chosen accept the values are consistently the largest	1
Total			**12**

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question	answers	extra information	mark
3(a)	(about) 5 cm	accept any number between 2 and 8 cm	1
	not deflected	accept none	1
3(b)(i)	(they have the same) number of protons	accept same atomic / proton number	1
3(b)(ii)	polonium-213 has 3 more neutrons than polonium-210	accept converse	1
3(c)(i)	(because) technetium-99 has a half-life long enough for examination but short enough not to cause too much damage	short half-life is insufficient	1
	and the gamma (radiation) emitted from the source passes through the body	accept the gamma ray wavelengths that are emitted from technetium-99 are such that they are easily detected by the monitoring equipment gamma emitter **or** gamma detected outside the body is insufficient	1
3(c)(ii)	99 42		1 1
Total			**8**

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question	answers	extra information	mark
4(a)	reflected rays correct		1
	reflected rays traced backwards to cross behind the mirror	judged by eye	1
	image in correct position		1
	arrows correctly shown on rays		1
		if only 1 ray is drawn, the maximum score is **1** mark for a correct reflection	
4(b)	any **two** from: Gamma rays: • are invisible to the eye • penetrate the mirror and are therefore not reflected • are hazardous		2
Total			**6**

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question	answers	extra information	mark
5(a)(i)	The Universe began at a (very) small (initial) point	'it' refers to Universe	1
	rapid expansion sent matter outwards **or** caused Universe to expand	accept gas / dust for matter	1
5(a)(ii)	cosmic microwave background radiation	accept CMBR	1
5(b)	nuclear fusion in stars		1
	results in (light(er)) nuclei joining to form heavier / larger nuclei	accept a specific example	1
5(c)(i)	**K** is closer (to Earth) than **L**	accept converse argument for **L**	1
	K is moving away (from Earth) more slowly than **L**		1
5(c)(ii)	wavelength is decreased		1
	frequency is increased		1
5(d)	becomes a main sequence star	accept enters stable period	1
	expands to become a red supergiant		1
	throws off outer layers as a supernova		1
	core becomes a neutron star		1
	if original mass large enough core shrinks to become a black hole		1
Total			**14**

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question	answers	extra information	mark
6(a)	momentum of car before collision = 1200 x 10 = 12 000		1
	momentum after collision = 12 000		1
	or		
	momentum is conserved		
	equating ie 12 000 = 1200 x 2 + 3200*v*		1
	v = 3 (m/s)		1
		correct answer with or without working gains **4** marks	
6(b)	correct area used from the graph		1
	1.5 (m)		1
6(c)	the time taken for the driver to stop (moving forward) increases		1
	which decreases the rate of change in momentum	accept reduces deceleration	1
	so the force on the driver is reduced		1
Total			**9**