



**AQA Level 1/2 Certificate in Science:
Double Award**

PHYSICS PAPER 1F

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 1F****STATUS: Accredited**

question	answers	extra information	mark
1(a)(i)	A = (a) microphone	correct order essential	1
	B = (an) oscilloscope	or cathode ray oscilloscope or CRO	1
1(a)(ii)	the amplitude	accept any unambiguous indication	1
1(a)(iii)	quieter / softer	do not accept less (which could refer to the amplitude, frequency or wavelength)	1
1(b)	because there is no air in space or there is a vacuum		1
	and sound needs a medium to travel through	answers that combine the concepts, eg 'sound cannot travel through a vacuum' gain 2 marks	1
1(c)	frequency / pitch decreases	accept wavelength increases accept it / the note becomes deeper / lower it / the note decreases is insufficient quieter is neutral	1

Question 1 continues on the next page . . .

COMPONENT NUMBER: AQA Level 1/2 Certificate in Science: Double Award**COMPONENT NAME: Physics Paper 1F****STATUS: Accredited****Question 1 continued . . .**

question	answers	extra information	mark
1(d)(i)	models can help to explain an effect or theory.		1
1(d)(ii)	(moving) loudspeaker represents the (moving) galaxy	accept sound waves represent light waves	1
	the decrease in frequency of the sound is like red-shift	accept increase in frequency is like blue-shift accept answers in terms of wavelength change accept source going away from you is like red-shift accept red-shift happens when galaxies / stars move away (from Earth) this accept only scores if first marking point scores	1
1(e)	the Big Bang theory		1
Total			11

COMPONENT NUMBER: AQA Level 1/2 Certificate in Science: Double Award**COMPONENT NAME: Physics Paper 1F****STATUS: Accredited**

question	answers	extra information	mark
2(a)(i)	convection		1
2(a)(ii)	conduction		1
2(b)(i)	2 black is the best <u>absorber</u> (of infrared radiation / thermal energy)	accept black is the best emitter (of infrared radiation / thermal energy) note that a comparative is needed (eg better or best)	1 1
2(b)(ii)	the colour of the metal plates		1
2(b)(iii)	temperature sensor (and data logger) any one from: <ul style="list-style-type: none">• better resolution• better thermal contact• removes (human) reading error• records data automatically		1 1
2(c)(i)	radiation	accept radiates accept infra red (IR) waves do not accept heat waves	1

Question 2 continues on the next page . . .

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

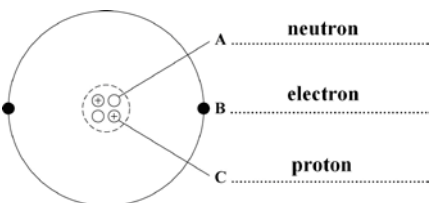
Question 2 continued . . .

question	answers	extra information	mark
2(c)(ii)	to reflect (radiation / thermal energy away from the firefighter)	accept it reflects accept it is a poor absorber (of thermal radiation) do not accept deflect / bounce for reflect	1
2(d)	N transfers / absorbs less energy or gives smallest increase in temperature	the mark is for the reason which does not score if M is chosen accept will keep fire fighters cooler accept N is cooler (after 15 minutes) an answer N goes up to 52°C and M goes up to 100°C is insufficient	1
Total			10

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

question	answers	extra information	mark
3(a)(i)	 <p>A neutron B electron C proton</p>	<p>all 3 labels correct allow 1 mark for 1 correct label</p>	2
3(a)(ii)	has no electrons	<p>it = alpha allow alpha has a positive(charge) allow a helium (atom) has no (charge) do not accept general properties of alpha do not accept general answers in terms of size / density / mass etc</p>	1
3(b)(i)	15 (hours)	accept any answer between 14.8 and 15.2 inclusive	1
3(b)(ii)	15 (hours) or their (b)(i)		1
3(c)(i)	americium-241 has a long half-life		1

Question 3 continues on the next page . . .

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

Question 3 continued . . .

question	answers	extra information	mark
3(c)(ii)	<p>1 mark for each correct line</p> <p>List A Type of nuclear radiation</p> <p>Beta</p> <p>Gamma</p>	<p>List B Property of radiation</p> <p>Has the same mass as an electron</p> <p>Deflected by a magnetic field but not deflected by an electric field</p> <p>Passes through 10cm of aluminium</p> <p>if more than 1 line is drawn from any box in List A, none of those lines gain any credit</p>	2
Total			8

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

question	answers	extra information	mark
4(a)(i)	variable resistor		1
4(a)(ii)	appropriate symbol for component chosen		1
4(a)(iii)	3.3 (W)	allow 1 mark for correct data choice allow 2 marks for substitution of correct data i.e. 0.30×11.0 the following answers gain 2 marks 0.10 / 0.30 / 0.80 / 1.75 allow 1 mark for substitution of incorrect data incorrectly calculated e.g. $0.20 \times 4.0 = 0.6$	3
4(b)	increases		1

Question 4 continues on the next page . . .

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

Question 4 continued . . .

question	answers	extra information	mark
4(c)	<p>three lines drawn correctly</p> <p>Graph A: Current vs p.d. shows a constant current followed by a linear increase. Circuit symbol: A resistor at constant temperature.</p> <p>Graph B: Current vs p.d. shows a curve that starts at the origin and levels off. Circuit symbol: A filament bulb.</p> <p>Graph C: Current vs p.d. shows a straight line through the origin. Circuit symbol: A diode.</p>	<p>allow 1 mark for 1 correct line</p> <p>if more than one line goes from a graph, both are incorrect</p>	2
4(d)	J		1
4(e)	Grid	accept any unambiguous indication	1
4(f)(i)	A (only)		1
4(f)(ii)	D (only)		1
Total			12

COMPONENT NUMBER: AQA Level 1/2 Certificate in Science: Double Award**COMPONENT NAME: Physics Paper 1F****STATUS: Accredited**

question	answers	extra information	mark
5(a)	shallowest slope / gradient	accept smallest distance in biggest time accept longest time to travel the same distance accept the line is not <u>as</u> steep accept it is a less steep line do not accept the line is not steep	1
5(b)	A and B	If 2 or 3 boxes are ticked no mark	1
5(c)(i)	200 m		1
5(c)(ii)	20 s	allow 1 mark for correctly identifying 60 s or 40 s from the graph	2
5(d)(i)	<u>straight</u> line starting at origin passing through t = 200 and d = 500	accept within one small square of the origin	1 1
5(d)(ii)	166	accept any value between 162 and 168 accept where their line intersects given graph line correctly read ± 3 s	1
Total			8

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

question	answers	extra information	mark
6(a)(i)	has both magnitude and direction		1
6(a)(ii)	120		1
6(a)(iii)	20	allow an error carried forward ie 140 minus their (a)(ii) provided answer is not negative	1
6(a)(iv)	because as speed increases		1
	the drag force / water resistance / friction / D will increase		1
	(until) D = 140 N or (until) D = T	forces balance is insufficient	1
6(b)(i)	(average) speed (of swimmer)		1
6(b)(ii)	any one from: <ul style="list-style-type: none"> • 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 6 continues on the next page . . .

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

COMPONENT NAME: Physics Paper 1F

STATUS: Accredited

Question 6 continued . . .

question	answers	extra information	mark
<p>6(b)(iii)</p>	<p>any two from:</p> <ul style="list-style-type: none"> • (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 	<p>do not accept <u>all</u> females produce smaller forces</p> <p>do not accept <u>all</u> males produce larger forces</p> <p>do not accept <u>all</u> males swim faster</p> <p>do not accept <u>all</u> females swim slower</p>	<p>2</p>
<p>6(b)(iv)</p>	<p>exert maximum (hand) force (throughout the swim / stroke)</p>	<p>accept (any method to) increase (hand) force</p> <p>practise more is insufficient</p>	<p>1</p>
<p>Total</p>			<p>11</p>