AQA Level 1/2 Certificate in Physics
PAPER 1

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.

4. Quality of communication and levels marking

In Question 4(b) candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:
- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic
- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear
- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed
- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

question	answers	extra information	mark
1(a)(i)	gravity		1
1(a)(ii)	**C**		1
1(a)(iii)	direction		1
1(b)	4 × 216 000		1
	864 000 (J)	correct answer with or without working gains **2** marks	1
1(c)(i)	15 % of 4.0 = 0.6 **or** 85 % of 4.0 = 3.4	0.6 or 3.4 scores first mark	1
	(from graph, time is therefore) 1.05 (years)	allow range 1.0 to 1.1 years allow **2** marks for an answer in range 1.0 to 1.1	1
1(c)(ii)	not suitable because answer in **(c)(i)** is less than 3 years	ecf from incorrect answer in **(c)(i)**	1
1(d)	there is not enough / insufficient data	accept there are only three pairs of data	1
	the conclusion is only valid for satellites in the range shown		1
	the Internet is not always a reliable source		1
		insufficient data for the intervening heights scores **2** marks	
Total			11

question	answers	extra information	mark
2(a)	Lens **A** both rays converging on other side of lens		1
	Lens **B** both rays diverging on other side of lens		1
	Either refraction at both surfaces within lens or refraction at vertical line through midpoint		1
2(b)	(Lens **B**)		
	parallel rays (from a distant object) are focused in front of the retina		1
	Lens **B** diverges the ray before entering the eye		1
	hence rays appear to come from the far point of the student's eye		1
	and are focused on the retina		1
	producing a sharp image		1
2(c)	laser		1
Total			**9**

question	answers	extra information	mark
3(a)	**J** fuse		1
	K switch		1
	L battery		1
3(b)(i)	a flow of (electrical) charge		1
3(b)(ii)	because voltmeters have a very high resistance		1
3(c)	total resistance = 24 Ω		1
	$\frac{12}{24}$		1
	0.5 (A)	correct answer with or without working gains **3** marks	1
		an answer of 0.66˙ or 0.67 gains **2** marks	
		$\frac{12}{18}$ alone gains **1** mark	
3(d)	the fuse melts		1
	therefore breaking the circuit		1
	because without the 6 Ω resistor as the water reaches the top of the beaker the total resistance approaches 0 Ω		1
	therefore the current rises above the 2 A fuse rating		1
	and the heating effect increases		1
Total			**13**

question	answers	extra information	mark
4(a)(i)	primary	on left hand side	1
	secondary	on right hand side	1
4(a)(ii)	step-up		1

4(b)			

Marks awarded for this answer will be determined by the quality of communication as well as the standard of the scientific response. Examiners should also refer to the information on page 4 and apply a best-fit approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content.	There is a basic explanation of how an a.c. output is produced.	There is a clear explanation of how the transformer acts as a step-up.	There is a clear and detailed explanation of how the transformer acts as a step-up.

examples of the physics points made in the response	extra information
- the magnetic field (in the iron core) is changing / alternating / varying - the magnetic field links with the secondary / other coil - a potential difference is induced in the other coil - the potential difference induced in the other coil is alternating / changing - the number of turns on the output is greater than the number on the input - the turns ratio determines the particular value of the output voltage / potential difference	accept magnetic flux

4(c)	operates at (much) higher frequency	accept a specific frequency value between 50 kHz and 200 kHz accept operates at higher efficiency	1
Total			10

question	answers	extra information	mark
5(a)	liquids are (virtually) incompressible		1
5(b)	force on brake pedal creates a pressure (in the brake fluid)		1
	and this pressure is transmitted equally in all directions		1
	this pressure produces a force on each of the slave pistons		1
	which is greater		1
	as the surface area of the slave pistons is larger than the surface area of the master piston		1
5(c)	the work done by the frictional force (between brake pads and brake discs)		1
	reduces the kinetic energy of the car		1
	the change in kinetic energy is transferred to the brake (discs)		1
	which causes an increase in the temperature of the brake (discs)		1
Total			**10**

question	answers	extra information	mark
6(a)(i)	It is the same as the nucleus of a helium atom.		1
6(a)(ii)	(about) 5 cm	accept any number between 2 and 8 cm	1
	not deflected	accept none	1
6(b)(i)	number of protons	accept same atomic / proton number	1
6(b)(ii)	numbers of neutrons	accept different mass numbers	1
6(c)(i)	because polonium-210 is an alpha emitter		1
	and alpha particles cannot be detected outside body **or** alpha particles produce heavy ionisation		1
6(c)(ii)	because iridium-192 has a long(er) half life		1
	and so will be radioactive for longer		1
6(d)	99		1
	42		1
Total			**11**

COMPONENT NUMBER: AQA Level 1/2 Certificate in Physics

COMPONENT NAME: Paper 1

STATUS: Specimen V6

question	answers	extra information	mark
7(a)(i)	in both views centre of **X** in geometric centre		1
7(a)(ii)	in position **B** the support has a lower centre of mass		1
	and a wider / bigger base (area)		1
7(b)(i)	½ × 480 × 4^2		1
	3840 (J)	correct answer with or without working gains **2** marks	1
7(b)(ii)	statement or symbols showing KE = GPE		1
	or 3840 = mgh		
	or their (b)(i) = mgh		
	$h = \dfrac{3840 \text{ or their (b)(i)}}{4800}$		1
	0.8 (m)	correct answer with or without working gains **3** marks	1
Total			8

question	answers	extra information	mark
8(a)	Big Bang (theory)		1
8(b)	**K** is closer (to Earth) than **L**	accept converse argument for **L**	1
	K is moving away (from Earth) more slowly than **L**		1
	therefore **K**'s red-shift will be smaller than **L**'s		1
8(c)	wavelength is decreased		1
	frequency is increased		1
8(d)	nuclear fusion in stars		1
	results in (light(er)) nuclei joining to form heavier / larger nuclei	accept a specific example	1
Total			**8**

question	answers	extra information	mark
9(a)	equal to **or** the same as		1
9(b)	momentum of car before collision = 1200 x 10 = 12 000		1
	momentum after collision = 12 000 **or** momentum is conserved		1
	equating ie 12 000 = 1200 x 2 + 3200v		1
	3 (m/s)	correct answer with or without working gains **4** marks	1
9(c)	correct area used from the graph		1
	1.5 (m)	correct answer with or without working gains **2** marks	1
9(d)	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			**10**