

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE

COMBINED SCIENCE DOUBLE AWARD PHYSICS

9204/PC

PAPER 3 – CORE TIER

Mark scheme

Specimen material

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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.

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Question 1

Question	Answers	Extra information	Mark
01.1	11 A		1
01.2	($P = I \times V$) $P = 110 \times 11$ 1 210 (W)	allow 1 mark for $P =$ their answer to 01.1 \times 110 allow 1 210 (W) with no working shown for 2 marks allow 2 marks for their 01.1 \times 110 correctly calculated	1 1
01.3	the fuse would blow the current through the circuit exceeds 13A/the rating of the fuse		1 1
01.4	if live wire touches case current flows to earth/ground		1 1
01.5	(outer) case is made of insulator cable is (also) insulated		1 1
Total			9

Question 2

Question	Answers	Extra information	Mark
02.1	air resistance		1
02.2	weight		1
02.3	the resultant force on the raindrop is zero therefore acceleration is zero	accept force A = force B	1 1
02.4	$v = s / t$ $s = v \times t$ s (at constant speed) = 500×5 s (at constant speed) = 2 500 (m) $s = 2\,500 + 100 = 2\,600$ (m)	 allow 2 600 (m) with no working shown for 4 marks	1 1 1 1
02.5	$0.1 \text{ g} = 1 \times 10^{-4} \text{ kg}$ ($F = m \times a$) $F = 1 \times 10^{-4} \times 9.8$ 9.8×10^{-4} (N)	 allow 0.00098 (N) allow 9.8×10^{-4} (N) with no working shown for 3 marks	1 1 1
Total			11

MARK SCHEME – INTERNATIONAL GCSE COMBINED SCIENCE DOUBLE AWARD
PHYSICS – CORE TIER – SPECIMEN MATERIAL

Question	Answers	Extra information	Mark
03.1	150 J		1
03.2	it is stored in a less useful way	allow it warms the surroundings	1
03.3	450/600 0.75	allow 75% allow 0.75 or 75% with no working shown for 2 marks	1 1
03.4	600/20 30 (W)	allow 30 (W) with no working shown for 2 marks	1 1
03.5	manufacturer's claims may exaggerate product's value		1
03.6	they use less power they need replacing (much) less frequently		1 1
Total			9

Question 4

Question	Answers	Extra information	Mark
04.1		<p>1 mark per correct line – if more than one line is drawn from a component then do not allow the mark</p>	1 1 1
04.2	half		1
04.3	3 (V)		1
04.4	V_1		1
04.5	potential difference of the power supply	<p>allow voltage for potential difference</p> <p>allow the power supply</p> <p>allow number of cells</p> <p>allow same cells</p> <p>do not accept same ammeter/switch/wires</p>	1
04.6	bar drawn – height 1(.00) A	<p>ignore width of bar</p> <p>allow 1 mark for bar shorter than 3rd bar</p>	2
04.7	as the number of resistors increases the current decreases		1
Total			10

Question 5

Question	Answers	Extra information	Mark
05.1	88 °C		1
05.2	18 (°C) or 88 to 70 8 (°C) or 70 to 62		1 1
05.3	greater temperature difference between water and surroundings (at start)		1
05.4	black temperature falls the fastest (in L) black is a good/the best/ better emitter (of heat/radiation)		1 1 1
05.5	Can L will be the same temperature as Can M		1
05.6	line starts at 88 curves down and stays above line M		1 1
Total			10

Question 6

Question	Answers	Extra information	Mark
06.1	(smallest) Earth Sun Milky Way Universe (largest)		1
06.2	atomic nuclei inside the star join together		1
06.3	stable inwards to just balance		1
06.4	the greater the mass of the star the shorter the main sequence	allow bigger the star the shorter the time	1
06.5	do not know (exact) mass of the star		1
06.6	(larger stars have a shorter 'main sequence' period) so they must have a faster rate of nuclear fusion the end of 'main sequence' happens as the hydrogen in (the core of) a star is used up		1 1
06.7	red giant supernova neutron star or black hole		1 1 1
Total			10

Question 7

Question	Answers	Extra information	Mark
07.1	neutrons and protons		1
07.2	polonium-213 has (three more neutrons in its nucleus)		1
07.3	it is a gamma emitter so the radiation will be detectable outside the body		1
	it has a short half-life so will not remain radioactive for a long time		1
07.4	18		1
07.5	systematic	allow zero error	1
7.6	alpha radiation has a very short range (in air) so reading would be zero/18 at 0.4m		1
7.7	points plotted correctly		2
	line of best fit drawn correctly		1
Total			10

Question 8

Question	Answers	Extra information		Mark
08.1	Examiners should also refer to the information on page 3.			6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)	
No relevant content.	Simple statements are made which demonstrate some understanding of some of the relevant scientific techniques and procedures. The response may lack a logical structure and would not lead to the production of valid results.	A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant techniques and procedures. The steps in the method are logically ordered. The method would lead to the production of valid results.	A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant techniques and procedures. The steps in the method are logically ordered. The method would lead to the production of valid results.	
<p>Indicative content</p> <p>Equipment Measuring cylinder, stop watch, thermometer, cups.</p> <p>Variables Independent variable – cup Dependent variable – temperature change Control variables(s)– mass/volume/amount of water, starting temperature.</p> <p>Method Measure temperature change in a given time Measure time taken for a given temperature change</p>				
08.2	table with heading of Time and Temperature change			1
	units of time (s) or (min) and units of temperature (°C) or (K)			1
08.3	spot anomalous results			1
	take a mean of results to reduce the effect of anomalous results	allow take a mean of results		1
Total				10

Question 9

Question	Answers	Extra information	Mark
09.1	frequency		1
09.2	echoes		1
09.3	25 000 × 0.0136 340 (m/s)	allow 340 (m/s) with no working shown for 2 marks allow 0.34 for 1 mark	1 1
09.4	(a wave where the) oscillations are parallel to the direction of energy transfer causing (areas of) compression and rarefaction	allow correct description in terms of particles	1 1
09.5	use of infrared any one from: <ul style="list-style-type: none"> • remote controls • fibre optic (communications). use of microwaves any one from: <ul style="list-style-type: none"> • mobile / cell phones • satellite (communications/TV) • wi-fi • Bluetooth. 		1 1

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PHYSICS – CORE TIER – SPECIMEN MATERIAL

Question	Answers	Extra information	Mark
09.6	any two from: <ul style="list-style-type: none"> • same speed or travel at the speed of light (in a vacuum) • transverse • transfer energy (from one place to another) • can be reflected • can be refracted • can be diffracted • can be absorbed/ transmitted • can travel through a vacuum/space • can be polarised. 	allow a full description of a transverse wave	2
Total			10

Question 10

Question	Answers	Extra information	Mark
10.1	only the particles with the most energy leave the surface	allow water for sweat	1
	this reduces the (average) energy (of the remaining particles)	allow fastest particles	1
	(and hence) the temperature of the sweat decreases		1
	the sweat will now be at a lower temperature than the skin		1
10.2	any two from: <ul style="list-style-type: none"> • increased speed of air flow across the skin • increased surface area • decreased humidity. 	allow there is a wind/draught allow a description of humidity	2
10.3	hot air rises or cold air falls		1
	(close to the ceiling) the air conditioner collects warmer air		1
10.4	$6000 = m \times 1250 \times 15$		1
	$m = 6000 / 1250 \times 15$		1
	0.32 kg	allow 0.32 kg with no working shown for 3 marks	1
Total			11

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