

AQA Style

GCSE

COMBINED SCIENCE

Foundation Tier

Physics Paper 1

F

Mark Scheme

Question 1

Question	Answers	Extra Information	Mark
01.1	a current that repeatedly changes direction	If more than one box is ticked, award no marks.	1
01.2	230V	If more than one box is ticked, award no marks.	1
01.3	neutral (wire)		1
01.4	plastic is a good (electrical) insulator	Accept plastic is a poor conductor.	1
	so it prevents electric shock (if someone touches the cable)		1
01.5	110×1.2	An answer of 132 (W) with no working scores 2 marks.	1
	= 132 (W)		1
Total			7

Question 2

Question	Answers	Extra Information	Mark
02.1	Y	If more than one box is ticked, award no marks. Accept a clear indication that box Y on the diagram has been chosen (i.e. tick/circle/arrow) only if no answer boxes are ticked.	1
02.2	Any one from: • use tongs to pick up the source/wear gloves/avoid direct contact • wear protective clothing • use/work behind (lead/concrete/glass) shielding • minimise handling/exposure time • maximise the distance between the source and the handler • don't point the sources at people/students	Accept any other sensible and practical suggestion.	1
02.3	alpha		1
02.4	90	Accept 90 written in box in Figure 3 .	1
02.5	the mass stays the same/does not change		1
Total			5

Question 3

Question	Answers	Extra Information	Mark
03.1		1 mark for each correct line. If more than 1 line is drawn from/to 1 box, award no marks for that box.	3
03.2	5Ω		1
03.3	0.6A		1
	the current is the same throughout a series circuit		1
03.4		Allow any placement of the voltmeter relative to the circuit providing the wires are connected either side of the battery.	1
03.5		If more than one box is ticked, award no marks.	1
0.36	4×120 $= 480 \text{ (C)}$	An answer of 480 with no working scores 2 marks.	1 1
Total			10

Question 4

Question	Answers	Extra Information	Mark
04.1	the energy source can be replenished as it is used	Allow replaced/ restored. Allow replaced faster than it is used. Do not allow renewed. Do not allow reused. Do not allow can be used again.	1
04.2	Any one from: • coal • oil • natural gas • fossil fuel • nuclear	If more than one answer is given, subtract one mark for each incorrect answer. Do not award less than 0 marks.	1
04.3	wind <u>only</u> generates electricity when the wind blows/is strong enough	Accept that power output depends on the wind speed.	1 1
04.4	gravitational potential		1
04.5	$0.5 \times 1000 \times (20)^2$ $= 200\,000 \text{ (J)}$	Allow $0.5 \times 1000 \times 400$ Allow 200kJ	1 1

04.6	sound		1
04.7	advantage Any one from: • no pollution/greenhouse gases/acid rain • renewable • produces electricity on demand • reliable • low running costs disadvantage Any one from: • loss of habitat • expensive set up costs • limited by location		1
Total			10

Question 5

Question	Answers	Extra Information	Mark
05.1	protons neutrons	Both answers are required for the mark.	1
05.2	electrons have a charge of -1/are negative and protons have a charge of +1/are positive the number of protons is equal to the number of electrons	If no other mark is awarded, allow 1 mark for the charges cancel out.	1 1
05.3	atoms of the same element that have a different number of neutrons	Allow the same number of protons.	1 1
05.4	the (average) time taken for the amount/ number of nuclei/atoms (in a sample) to halve	Allow the time taken for the count-rate/radioactivity to fall to half.	1
05.5	all points plotted correctly curve of best fit	Allow $\pm \frac{1}{2}$ a small square. Allow 1 mark for 3 or 4 points plotted correctly. Do not award the mark if a straight line has been drawn. Allow correct curve of best fit for incorrectly plotted points.	2 1
05.6	4 (hours)	Allow 1 mark for evidence of finding half-life on Figure 8.	2
Total			11

Question 6

Question	Answers	Extra Information	Mark
06.1	electrical	Answers in this order only.	1
	thermal		1
	sound		1
06.2	transferred to the surroundings		1
06.3	efficiency = $\frac{\text{useful energy output}}{\text{total energy input}}$	Allow any correct rearrangement.	1
06.4	$\frac{66}{200}$	An answer of 0.33 with no working scores 2 marks.	1
	0.33	Allow 33%	1
Total			7

Question 7

Question	Answers	Extra Information	Mark
07.1	kg/m ³	If more than one box is ticked, award no marks.	1
07.2	Level 3: There is a clear description which would produce an accurate measurement of both the regular and irregular objects. Steps are logically ordered and could be followed to obtain valid results.		5 - 6
	Level 2: There is a clear description of one method to measure density, or a partial description of both methods. Steps may not be logically ordered.		3 - 4
	Level 1: There are simple statements that give a brief description of parts of the method(s).		1 - 2
	No relevant content.		0
	Indicative content: For both: • measure the mass using balance/scales • calculate density using $\text{density} = \frac{\text{mass}}{\text{volume}}$ (allow $\rho = \frac{m}{v}$) Regular objects: • measure the length of the object's/cube's sides using a ruler/tape measure/Vernier callipers • evidence of volume = length × width × height Irregular objects: • immerse in water/eureka can • measure the volume of water displaced/collected/change in volume of water • the volume of the object is equal to the volume of water displaced		

07.3	density decreases		1
	because the particles have more (kinetic) energy		1
	(so) the particles are spread further apart/take up more space		1
Total			10

Question 8

Question	Answers	Extra Information	Mark
08.1	vibrate (about fixed positions)		1
08.2	$9450 = 0.5 \times c \times 9$ $\frac{9450}{0.5 \times 9}$ or $\frac{9450}{4.5}$ $= 2100 \text{ (J/kg } ^\circ\text{C)}$	An answer of 2100 (J/kg °C) with no working scores 3 marks.	1 1 1
08.3	specific heat capacity is the amount of energy required to raise the temperature of one kilogram (of the substance) by one degree Celsius specific latent heat is the amount of energy required to change the state of one kilogram (of the substance) (with no change in temperature)	Allow °C for degree Celsius.	1 1
08.4	the temperature stays the same		1
08.5	the mass stays the same because the number of particles does not change/no particles have been lost	Allow the mass is 0.5kg.	1 1
08.6	it will recover its original properties if the change is reversed	Allow chemical changes cannot be easily reversed.	1
Total			10