

AQA Style

GCSE
PHYSICS

F

Foundation Tier

Physics Paper 1

Mark Scheme



Question 1

Question	Answers	Extra information	Mark
01.1	cables		1
01.2	potential difference	Answers in this order only.	1
	energy		1
01.3	a current that repeatedly changes direction	If more than one box is ticked, award no marks.	1
01.4	230V	If more than one box is ticked, award no marks.	1
01.5	neutral (wire)		1
01.6	plastic is a good (electrical) insulator	Accept plastic is a poor conductor.	1
	so it prevents electric shock (if someone touches the cable)		1
01.7	110×1.2	An answer of 132 (W) with no working scores 2 marks.	1
	= 132 (W)		1
Total			10



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: <ul style="list-style-type: none">• 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	Any two from: <ul style="list-style-type: none">• rocks• cosmic rays• nuclear weapons testing• nuclear accidents• nuclear power (stations)• radon gas	Accept named accident. Accept nuclear waste.	2
02.4	alpha (particle)		1
02.5	90	Accept 90 written in box in Figure 3 .	1
02.6	a neutron		1
02.7	chain reaction		1
02.8	the mass stays the same/does not change		1
Total			9

Question 3

Question	Answers	Extra information	Mark
03.1	<div> <div>diode</div> <div>fuse</div> <div>variable resistor</div> </div> <div> </div>	<p>1 mark for each correct line.</p> <p>If more than one line is drawn from one box, award no marks for that box.</p>	3
03.2	5Ω		1
03.3	0.6A the current is the same throughout a series circuit		1 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	<div>current</div> <div>potential difference</div>	If more than one box is ticked, award no marks.	1
03.6	4×120 $= 480 \text{ (C)}$	An answer of 480 (C) 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 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 (J)	Allow $0.5 \times 1000 \times 400$ Allow 200kJ	1 1
04.6	sound		1



04.7	advantage Any one from: <ul style="list-style-type: none">• no pollution/greenhouse gases/acid rain• renewable• produces electricity on demand• reliable• low running costs		1
	disadvantage Any one from: <ul style="list-style-type: none">• 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 line of best fit for incorrectly plotted points.	2 1
05.6	4 (hours)	Allow 1 mark for evidence of finding half-life on Figure 9 .	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 = $\frac{\text{useful energy output}}{\text{total energy output}}$	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: <ul style="list-style-type: none"> • measure the mass using balance/scales • calculate density using $\text{density} = \frac{\text{mass}}{\text{volume}}$ (allow $\rho = \frac{m}{v}$) Regular objects: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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	Accept goes down/ is lower.	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	$9450 = 0.5 \times c \times 9$	An answer of 2100 (J/kg °C) with no working scores 3 marks.	1
	$\frac{9450}{0.5 \times 9}$ or $\frac{9450}{4.5}$		1
	$= 2100 \text{ (J/kg °C)}$		1
08.2	specific heat capacity is the amount of energy required to raise the temperature of one kilogram (of the substance) by one degree Celsius	Allow °C for degree Celsius.	1
	specific latent heat is the amount of energy required to change the state of one kilogram (of the substance) (with no change in temperature)		1
08.3	the temperature stays the same		1
08.4	the mass stays the same	Allow the mass is 0.5kg.	1
	because the number of particles does not change/no particles have been lost		1
08.5	it will recover its original properties if the change is reversed	Allow chemical changes cannot be easily reversed.	1
Total			9



Question 9

Question	Answers	Extra information	Mark
09.1	hat and hair rub together	Accept there is friction between the hat and the hair.	1
	<u>electrons</u> transfer (from the hair to the hat/from the hat to the hair)	Hat and hair must be mentioned at least once for the second mark to be awarded.	1
09.2	each hair has the same type of charge/is negatively/positively charged	Allow each hair gains/loses electrons.	1
	the (positive/negative) charges repel	Accept the electrons repel.	1
09.3	nylon		1
09.4	take more measurements/repeats		1
	calculate a new mean		1
09.5	reproducible		1
09.6	minimum of three arrows perpendicular to the surface with all arrows pointing outwards	Judge by eye. Do not accept any arrows pointing inwards.	1
09.7	there is a potential difference between the dome and the earthed sphere	Do not accept the dome is charged.	1
	which causes electrons/charges to move from the earthed sphere/to the metal dome		1
Total			11

Question 10

Question	Answers	Extra information	Mark
10.1	Level 3: There are descriptions of the particles in both solids and gases and these are linked to at least one property of each state.		5-6
	Level 2: There are descriptions of the spacing and movement of the particles in both solids and gases or a description of the spacing and movement of particles in one of the states, linked to the properties of that state of matter.		3-4
	Level 1: There are simple statements that describe the particles in either solids or gases. Two marks can be given for any two valid statements.		1-2
	No relevant content.		0
	Indicative content: Solids <ul style="list-style-type: none"> • particles are close together • (so) there is no room for the particles to move closer/be squashed/compressed • vibrate about a fixed point • (so) it keeps its own shape Gases <ul style="list-style-type: none"> • particles are far apart • (so) the space between the particles makes it easy to compress/squash • particles move randomly • (so) spread out in all directions to fill the container 		
10.2	80		1
10.3	pressure would increase	Allow any value of pressure above 1Pa.	1
	because the particles (of gas) would have more (average) kinetic energy	Allow higher (average) speed.	1
	(so) would exert a greater force on the walls of the container or there would be more frequent collisions with the walls of the container		1



10.4	$80 \times 1.2 = 96$		1
	$96 = 120 \times p$	Allow $p = \frac{80 \times 1.2}{120}$	1
	$p = 0.8 \text{ (Pa)}$	for the first two marking points. An answer of 0.8 (Pa) with no working scores 3 marks.	1
Total			13