AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.2.1.4

Resistors

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**9**
Available paper years	**2019–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

6.2.1.4 Resistors

Answer 01 · Mark scheme June 2019 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
01.1	LED		1	AO1.1 AO1 in isolation 6.2.1.1	A
01.2	the same as		1	AO1.1 6.2.1.2	G
01.3	 1500 – 900 600 (thousand)	an answer of 600 (thousand) or 600 000 scores **2** marks two correct readings from the graph scores **1** mark allow a range of 1480 to 1520 and a range of 880 to 920 allow an answer in the range of 560 (thousand) to 640 (thousand) consistent with their allowed readings	 1 1	AO2.2 6.2.1.2 WS 3.2	G
01.4	repeat the experiment using exactly the same method		1	AO3.3a 6.2.1.2	A
01.5	 power = 0.80 × 0.020 power = 0.016 (W)	an answer of 0.016 (W) scores **2** marks	 1 1	AO2.1 6.2.4.1 WS 3.3	E
01.6	power = (current)^2 × resistance		1	AO1.1 AO1 in isolation 6.2.4.1	A
01.7	temperature increases		1	AO1.1 6.1.1.1	E

6.2.1.4 Resistors

Answer 01 · Mark scheme

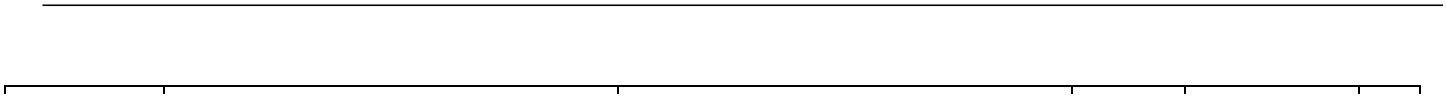
June 2019 | 8464/P/1F | Original Q1

01.8	Q = 0.020 × 180 Q = 3.6 (C)	an answer of 3.6 (C) scores **2** marks	1 1	AO2.1 6.2.1.2 WS 3.3	E
Total			**11**		

6.2.1.4 Resistors

Answer 01 · Mark scheme

June 2019 | 8464/P/1F | Original Q1



6.2.1.4 Resistors

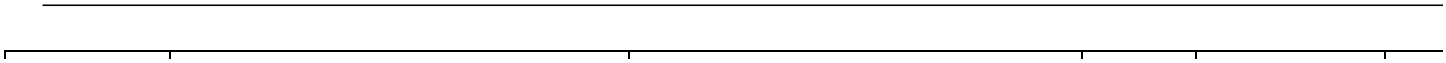
Answer 02 · Mark scheme June 2019 | 8464/P/1F | Original Q6

06.1	ammeter in series with the resistor, voltmeter in parallel with the resistor		1	AO1/1 6.2.1.4 RP 16 WS 2.4	A
06.2	current decreased	ignore slows down	1	AO1/1 6.2.1.3 RP 16 WS 3.6	E
06.3	reverse the connections to the cell	allow battery for cell allow reverse the cell	1	AO1/2 6.2.1.3 RP 16 WS 2.2	E
06.4	(directly) proportional	do not allow inversely proportional do not allow indirectly proportional	1	AO1/2 6.2.1.3 RP 16 WS 3.5	G
06.5	potential difference = current × resistance **or** V=IR	allow voltage for potential difference allow any correct re-arrangement	1	AO1/1 6.2.1.3 RP 16 WS 3.3	E
06.6	 3.0 = 0.12 × R R = $\frac{3.0}{0.12}$ R = 25 (Ω)	an answer of 25 (Ω) scores **3** marks	 1 1 1	AO2/1 6.2.1.3 RP 16 WS 3.3	E
Total			**8**		

6.2.1.4 Resistors

Answer 02 · Mark scheme

June 2019 | 8464/P/1F | Original Q6



6.2.1.4 Resistors

Answer 03 · Mark scheme

November 2021 | 8464/P/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1			1	AO1 6.2.1.1
03.2	the flow of electrical charge		1	AO1 6.2.1.2
03.3	all 4 components connected in a series circuit	allow a cell instead of a battery allow an LED or LDR symbol instead of a lamp ignore the + sign on the battery symbol	1	AO3 6.2.1.1 6.2.2
03.4	decrease the resistance of the variable resistor		1	AO1 6.2.1.3
03.5	P = 0.75 × 0.16 P = 0.12 (W)		1 1	AO2 6.2.4.1
03.6	charge flow = current × time Q = It		1	AO1 6.2.1.2

6.2.1.4 Resistors

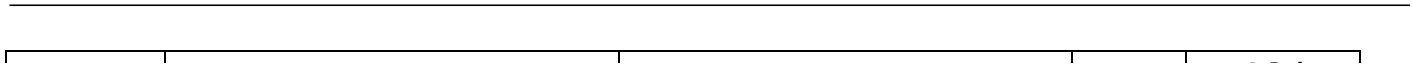
Answer 03 · Mark scheme

03.7	200 mA = 0.2 A charge flow = 0.2 × 15 charge flow = 3.0 (C)	 allow a correct substitution using an incorrectly/not converted value for current allow a correct calculation using an incorrectly/not converted value for current	1 1 1	AO2 6.2.1.2
03.8	1.6		1	AO3 6.2.1.2
03.9	260 mA to 380 mA		1	AO2 6.2.1.2
Total			**12**	

6.2.1.4 Resistors

Answer 03 · Mark scheme

November 2021 | 8464/P/1F | Original Q3



6.2.1.4 Resistors

Answer 04 · Mark scheme

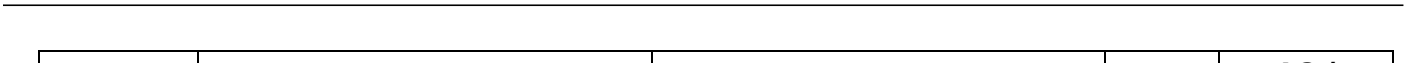
November 2021 | 8464/P/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	$V = I R$		1	AO1 6.2.1.3
05.2	3.9 = 0.12 × R $R = \frac{3.9}{0.12}$ R = 32.5 (Ω)	 allow R = 33 (Ω)	1 1 1	AO2 6.2.1.3
05.3	energy = power × time **or** E = P t		1	AO1 6.2.4.2
05.4	time = 150 000s energy = 0.46 × 150 000 energy = 69 000 (J)	 allow a substitution using an incorrectly/not converted value of time allow a correct calculation using an incorrectly/not converted value of time	1 1 1	AO2 6.2.4.2
05.5	thermistor		1	AO1 6.2.1.1
05.6	the current will increase (because) the resistance decreases		1 1	AO1 6.2.1.4
Total			**11**	

6.2.1.4 Resistors

Answer 04 · Mark scheme

November 2021 | 8464/P/1F | Original Q5



6.2.1.4 Resistors

Answer 05 · Mark scheme

June 2022 | 8464/P/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	battery		1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	variable resistor	allow resistor allow battery / cells allow correct circuit symbol	1	AO1 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	subtract 0.4 volts from each reading		1	AO1 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	mean $= \frac{0.54+0.58+0.53}{3}$ mean = 0.55 (A)	allow mean $= \frac{1.65}{3}$	1 1	AO2 6.2.1.3

6.2.1.4 Resistors

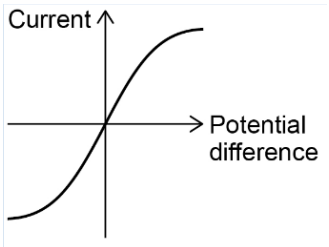
Answer 05 · Mark scheme

June 2022 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	$P = 4.8 \times 0.75$ $P = 3.6$ (W)		1 1	AO2 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	$R = \frac{4.8}{0.75}$ $R = 6.4$ (Ω)		1 1	AO2 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	increase increase		1 1	AO1 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.8			1	AO1 6.2.1.4

Total Question 1		12

6.2.1.4 Resistors

Answer 06 · Mark scheme

June 2023 | 8464/P/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1			1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	charge		1	AO1 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	place the component / thermistor in the water / beaker		1	AO3 6.2.1.4
	record the temperature (of the water) using the thermometer	allow place the thermometer in the water / beaker and record the temperature	1	
	record / measure the resistance (using the resistance meter)		1	
	change the temperature of the water (using the kettle) and repeat the measurements (of temperature and resistance)		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	non-linear		1	AO1 6.2.1.4

6.2.1.4 Resistors

Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	(resistance changes from) 200 (Ω) to 80 (Ω) change in resistance = 120 (Ω)		1 1	AO2 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	power = potential difference × current or $P = V I$		1	AO1 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	$2900 = 230 \times I$ $I = \frac{2900}{230}$ I = 12.6… (A)	 allow 13 (A)	1 1 1	AO2 6.2.4.1

Total Question 4	**13**

6.2.1.4 Resistors

Answer 07 · Mark scheme

June 2024 | 8464/P/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	the current in both lamps is the same		1	AO1 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	(4.5 – 1.5 =) 3 (V)	allow (4.5 – 1.5 =) 3.0 (V)	1	AO2 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	$P = 1.5 \times 1.2$ 1.8 (W)		1 1	AO2 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	$R = \frac{1.5}{1.2}$ 1.25 (Ω)	allow 1.3 (Ω)	1 1	AO2 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	$Q = 1.2 \times 40$ 48 (C)		1 1	AO2 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	the temperature of each lamp increases		1	AO1 6.2.1.4

6.2.1.4 Resistors

Answer 07 · Mark scheme

June 2024 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	lamp **X** no longer emits light because the circuit is no longer complete	 dependent on MP1 allow because there is no current	1 1	AO3 6.2.2

Total Question 1	**11**

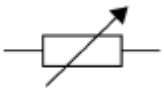
6.2.1.4 Resistors

Answer 08 · Mark scheme

June 2024 | 8464/P/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	voltmeter symbol correct voltmeter connected across diode	 allow voltmeter connected across diode and ammeter	1 1	AO1 6.2.1 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2			1	AO1 6.2.1 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	random		1	AO3 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	$\frac{0.27 + 0.32 + 0.31}{3}$ 0.3 (A)	 allow 0.30 (A)	1 1	AO2 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	both points plotted correctly line of best fit	allow a tolerance of ± ½ small square ignore line before 0.5 V	1 1	AO2 6.2.1.4 RPA16

6.2.1.4 Resistors

Answer 08 · Mark scheme

June 2024 | 8464/P/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	non-linear		1	AO2 6.2.1.4 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	the current decreased to 0.00 A		1	AO1 6.2.1.4 6.2.1.4 RPA16

Total Question 4	**10**

6.2.1.4 Resistors

Answer 09 · Mark scheme

June 2025 | 8464/P/1F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	symbols for filament lamp, ammeter and cell used a simple complete series circuit	allow **1** mark for 2 correct circuit symbols MP3 dependent on scoring at least **1** other mark	2 1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	cell		1	AO1 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	$Q = 1.5 \times 30$ $Q = 45$ (C)		1 1	AO2 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	$R = \frac{12}{1.5}$ $R = 8$ Ω	 allow 8.0 allow ohms	1 1 1	AO2 AO2 AO1 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	as potential difference increases, the current increases non-linear relationship	 allow at a decreasing rate	1 1	AO3 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6	(resistance) increases		1	AO1 6.2.1.4

Question	Answers	Mark	AO / Spec. Ref.
02.7	**Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	3–4	AO3
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO2 6.2.4.2
	No relevant content	0	
	Indicative content • both types of bulb have equal brightness • the same number of bulbs are needed • LED bulbs do not need to be replaced as often **power comparison** • the input power of filament lamp is greater • the input power of the filament lamp is 32 W greater • the input power of filament lamp is 5 times greater • the brightness per watt for the LED bulb is 100 arbitrary units • the brightness per watt for the filament lamp is 20 arbitrary units **consequence** • LED bulb transfers less energy • (number of units of) electricity used is lower for LED bulb • LED bulb wastes less energy • LED bulb running costs are lower • the LED bulb is more efficient • the LED bulb is 5 times more efficient for **Level 2** answers must include a valid calculation		

Total Question 2	**16**

6.2.1.4 Resistors

Answer 01 · Examiner comments June 2019 | 8464/P/1F | Original Q1

Question 1 (Low demand)

01.1 Slightly below 60% of students recognised the LED in this question.

01.2 Around 33% of students knew that the circuit in the diagram is series circuit, so the current is the same through both components.

01.3 More than half of all students gained both marks. Many who did not score appeared to have read the scale of the graph incorrectly, for example reading 850 thousand and 1450 thousand steps when they should have read 900 thousand and 1500 thousand steps.

01.4 Almost 70% of students knew that checking repeatability requires repeating with the same method.

01.5 A simple calculation using a given formula was well answered with slightly less than 90% of students showing clear working and gaining both marks.

01.6 Fewer than 30% of students knew the formula relating power, current and resistance.

01.7 Almost 90% of students knew that a current would increase the temperature of the resistor.

01.8 This straightforward calculation using a given equation was done well, with clear working shown. Over 90% scored both marks. Some students, however, converted 180 seconds to minutes before calculating the answer.

6.2.1.4 Resistors

Answer 02 · Examiner comments June 2019 | 8464/P/1F | Original Q6

Question 6

06.1 Slightly over 35% of students made the correct choice in this question. Some students who used a computer to type their answer did not gain the mark because they typed answers such as 'the ammeter is in series and the voltmeter in parallel' which could have meant either the third or fourth options in the table.

06.2 Just under one in four students knew that increasing the resistance would cause the current to decrease. Current slowing down was not an acceptable alternative but a reduced rate of flow of charge was accepted. Almost 10% did not attempt the question.

06.3 Although this question is based on a Required Practical Activity, fewer than 5% of students could suggest how to give negative readings on both of the meters. Many students suggested making changes to the other components in the circuit that would not have the desired effect, such as swapping the positions of the meters, adjusting the variable resistor, or adding more resistors. Others suggested using a 'negative battery'. Around 20% of students made no attempt. A small proportion stated that the direction of the current needed to be reversed but did not describe how the circuit should have been changed to achieve this.

06.4 This question required the *type* of relationship; around 5% of students could describe the relationship as proportional or directly proportional; about 15% made no attempt.

06.5 The equation linking current, potential difference and resistance was correctly described by around 35% of students in words or symbols. Many students used lower case letters i, v and r to represent current, potential difference and resistance, which was allowed. Also acceptable was a correct combination of symbols and words. Of those who did not gain the mark, many appeared to be making up their own symbols to represent each of the quantities

06.6 Full marks were scored by just under a quarter of students, but almost 10% of students made no attempt to calculate the resistance.

Answer 03 · Examiner comments November 2021 | 8464/P/1F | Original Q3

Question 3 (Low/standard demand)

03.1 Slightly over half the students knew the symbol for a filament lamp.

03.2 Nearly three quarters of all students answered this correctly.

6.2.1.4 Resistors

Answer 03 · Examiner comments November 2021 | 8464/P/1F | Original Q3

03.3 This question was testing whether students were able to draw four components in series. A complete circuit was needed, with no gaps around the components. Many students drew the components at right angles to the wires, and therefore not connected into the circuit. Students were given the symbols in the question, and were expected to draw them correctly, so those who drew a line through the middle of the ammeter, for example, did not gain the mark. Roughly 45% of students gained this mark, with almost 10% not attempting the question at all.

03.4 Just over 40% of students answered correctly, with more than a third opting to place an additional ammeter in the circuit.

03.5 Over 90% gained both marks.

03.6 Just under half the students correctly recalled the equation, but almost 1 student in 8 did not attempt to answer.

03.7 A fair proportion of students attempted to convert 15 seconds into minutes, and then multiplied this by 200, gaining no marks. It was uncommon for students to attempt to convert milliamps into amps. Just over half of all students gained at least 2 marks.

03.8 Many students struggled to answer this question, and less than a quarter of students answered correctly.

03.9 Around than one in ten students selected the correct answer. Roughly a third of students selected the third option, suggesting that the vast majority of these students were not familiar with the ± symbol.

6.2.1.4 Resistors

Answer 04 · Examiner comments

November 2021 | 8464/P/1F | Original Q5

Question 05 (Standard demand)

05.1 Slightly over a third of students selected the correct equation.

05.2 Full marks were gained by approximately a third of the students, with more than 50% failing to gain any credit.

05.3 This equation was correctly recalled by slightly less than half of students.

05.4 Most students did not attempt to convert 2500 minutes into seconds. Very few students gained all 3 marks, although over 60 % gained at least 2 marks.

05.5 Only a very small proportion of foundation tier students were able to correctly identify the symbol for a thermistor.

05.6 Most students failed to recognise that the resistance of the thermistor would decrease as temperature increased, with many students stating that because the potential different across the thermistor was constant, the current in the thermistor must also be constant. Another misconception demonstrated in a number of responses was that the current would increase because the increased temperature gives the current more energy. Nearly one in five students did not attempt the question.

6.2.1.4 Resistors

Answer 05 · Examiner comments

June 2022 | 8464/P/1F | Original Q1

Question 01 (Low demand)

01.1 This multiple-choice question was answered correctly by around 80% of students.

01.2 Slightly more than 40% of students answered this question correctly.

Many students gave the answer of voltmeter, perhaps suggesting that they did not read the word “adjust” in the question.

01.3 Just under 40% of students answered this question correctly.

01.4 Nearly three quarters of all students gained both marks in this calculation.

Some students incorrectly tried to use the number 2.5 in their calculations, for example adding the three currents and dividing by 2.5, or by adding 2.5 V to the sum of the currents before dividing. These responses gained no marks.

01.5 Nearly 90% of students correctly substituted into the equation and calculated the correct answer.

01.6 Almost 90% of students gained both marks for this calculation.

01.7 While almost all students gained at least one mark on this question, only about 15% gave both correct answers.

01.8 Around 60% of students identified the correct graph.

6.2.1.4 Resistors

Answer 06 · Examiner comments June 2023 | 8464/P/1F | Original Q4

Question 04 (Low demand and standard demand)

04.1 Slightly more than half the students correctly chose the thermistor, with the variable resistor being the most common incorrect answer.

04.2 Just under 40% of students recognised that current is a flow of charge. The most common answer was that current is a flow of energy, which did not gain any credit.

04.3 About 60% of students scored at least 1 mark on this question, but less than one in ten students gained full marks. Many students just put the thermistor near to the beaker of water or near to the kettle, so that recording the resistance would not give a relevant measurement. Some measured the resistance of the water rather than the resistance of the thermistor. It was not uncommon for students to pour the iced water or boiling water on the ground and then put the thermistor in the ground. Few students organised their answer into a logical sequence.

04.4 Over 40% of students correctly identified the trend as non-linear.

04.5 About half of the students gained both marks for this calculation, with the majority of the remaining students gaining no credit. Many of those who did not score calculated the change in temperature rather than referring to Figure 5 and determining the change in resistance.

04.6 Only about 85% of students correctly wrote down the equation, despite the equation being given on the Equation Sheet this year. Over 5% of students did not attempt this question.

04.7 Nearly 70% of students scored at least one mark, with about 65% gained full marks for this calculation.

6.2.1.4 Resistors

Answer 07 · Examiner comments

June 2024 | 8464/P/1F | Original Q1

Question 1 (low demand)

01.1 Roughly half of all students recognised that the current in two lamps connected in series is the same.

01.2 Approximately 1 in 2 students answered this question correctly.

Students who demonstrated that they had arrived at the answer of 3.0 V by using incorrect physics did not score this mark. This included those who divided 4.5 V by 1.5 V, and, less commonly, those who calculated a mean of 4.5 V and 1.5 V. If a student gave the correct answer without showing their reasoning, it was assumed that they had used correct physics and the mark was awarded.

0 1 . 2 Lamp **X** and lamp **Y** are **not** identical.

The potential difference across the battery is 4.5 V.

The potential difference across lamp **X** is 1.5 V.

Calculate the potential difference across lamp **Y**.

[1 mark]

4.5V ÷ 1.5V = 3

Potential difference across lamp **Y** = 3 V

0 1 . 2 Lamp **X** and lamp **Y** are **not** identical.

The potential difference across the battery is 4.5 V.

The potential difference across lamp **X** is 1.5 V.

Calculate the potential difference across lamp **Y**.

[1 mark]

4.5 − 1.5

Potential difference across lamp **Y** = 3 V

Both these students have the correct numerical answer of 3 V. However, the first student used incorrect physics to arrive at their answer, so did not gain the mark. The second student scored 1 mark.

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6.2.1.4 Resistors

Answer 07 · Examiner comments June 2024 | 8464/P/1F | Original Q1

01.3 This question was generally very well answered, with around 90% of students able to substitute into the equation and calculate the correct answer.

01.4 Nearly 85% of all students calculated the correct resistance and gained both marks.

01.5 The majority of students gained full marks on this question.

A common mistake was to divide the 40 seconds by 100, before using the time in the equation given. Students who made this error arrived at an incorrect answer but could still gain a mark if their answer was consistent with the current multiplied by their time.

01.6 Slightly less than a third of students recognised that the resistance of a filament lamp increases because the temperature increases. The most common incorrect answer was from students who stated that the power of the battery increases to cause the resistance of the lamp to increase.

01.7 Approximately 35% of students identified that lamp X would no longer emit light if lamp Y breaks, with a high proportion of students selecting that lamp X would get brighter. Approximately 2 in 5 of those students who selected the correct answer were able to articulate a valid reason for this.

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6.2.1.4 Resistors

Answer 08 · Examiner comments

June 2024 | 8464/P/1F | Original Q4

Question 4 (low & standard demand)

04.1 While the majority of students demonstrated that they recalled the symbol for a voltmeter, a small minority were able to position the voltmeter in parallel with the diode.

04.2 Nearly 60% correctly identified the variable resistor as the component that should be used to adjust the potential difference across the diode.

04.3 Around a quarter of students correctly identified that fluctuations in readings, when everything else remained the same, must be examples of random error. The most common answer given was systematic errors.

04.4 This question was generally well answered, with nearly three-quarters of all students gaining both marks. Errors seen from those who did not score any marks included multiplying the numbers together instead of adding them, forgetting to divide the answer by 3, and giving the median value instead of calculating the mean.

04.5 There were many good attempts at drawing the line using a sharp pencil, and clearly marking the points with a cross.

Many students accurately plotted the points on this graph. A lower proportion managed to draw a valid line of best fit, with around 30% of students gaining full marks for the question. A relatively common incorrect attempt at the line was to draw a single straight line.

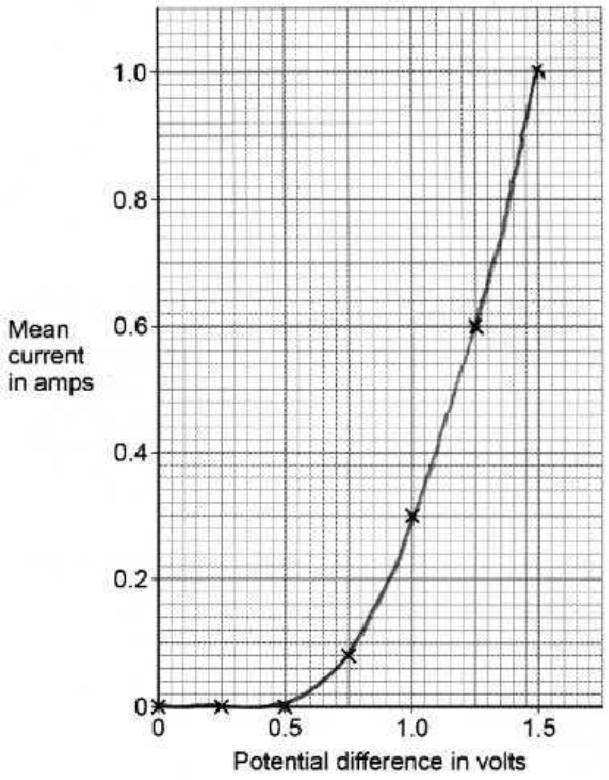
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6.2.1.4 Resistors

Answer 08 · Examiner comments

Figure 7 shows some of the results.

Figure 7



A good example of a well-plotted graph. This student scored both marks.

04.6 Approximately a third of students correctly described the current-potential difference relationship for a diode as non-linear.

04.7 Slightly less than 40% of students recalled that, when reversed, the current in a diode becomes 0.00 A. Slightly more than 40% ticked the box to suggest that the current would remain the same.

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6.2.1.4 Resistors

Answer 09 · Examiner comments

Question 2 (Low demand)

02.1 This question discriminated well and produced a good spread of marks. 35% of students gained 3 marks for selecting the correct circuit symbols and drawing a simple complete series circuit. 70% of students made one error and were awarded 2 marks. Most of the students that scored 2 marks selected an incorrect circuit symbol, but some did select them correctly but could not draw a simple complete series circuit. 10% of students gained 1 mark for 2 correct circuit symbols.

02.2 65% of students correctly identified the cell as the source of energy for the circuit.

02.3 This low demand calculation was well answered with 90% of students gaining both marks. Some students did an unusual conversion of time, dividing 30 by 100.

02.4 85% of students correctly calculated the resistance of the filament lamp and gained both calculation marks. The unit mark was awarded independently, and 60% of students selected the correct unit.

02.5 65% of students gained a mark for describing the current increasing as the potential difference increases. Only a small number of students described the relationship as being non-linear.

02.6 Only 30% of students described the resistance of the filament lamp increasing as the temperature increases.

02.7 This question discriminated well and produced a good spread of marks. Approximately 50% of students wrote Level 2 responses and gained either 3 or 4 marks. 40% of students wrote Level 1 responses because they did not include a calculation. Only a very small number of students did not write anything creditworthy, and a very small number did not attempt the question.

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