

Q1. (2018)

a)

04.2	charge flow = current $\times$ time	allow the equation given in symbols	1	AO1 6.2.1.2
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b)

04.3	$Q = 2.95 \times 60$	an answer of 177 scores 2 marks	1	AO2 6.2.1.2
	$Q = 177 \text{ (C)}$	allow 180 (C)	1	

c)

04.4	straight line with a different positive gradient	must go through the first and third quadrant	1	AO1 6.2.1.4
	straight line with positive gradient through the origin		1	

Q2. (2019)

a)

01.1	LED		1	AO1.1 AO1 in isolation 6.2.1.1	A
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b)

01.2	the same as		1	AO1.1 6.2.1.2	G
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c)

01.3		an answer of 600 (thousand) or 600 000 scores 2 marks		AO2.2 6.2.1.2 WS 3.2	G
		two correct readings from the graph scores 1 mark	1		
	1500 – 900	allow a range of 1480 to 1520 and a range of 880 to 920	1		
	600 (thousand)	allow an answer in the range of 560 (thousand) to 640 (thousand) consistent with their allowed readings			

d)

01.4	repeat the experiment using exactly the same method		1	AO3.3a 6.2.1.2	A
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Q3. (2019)

a)

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
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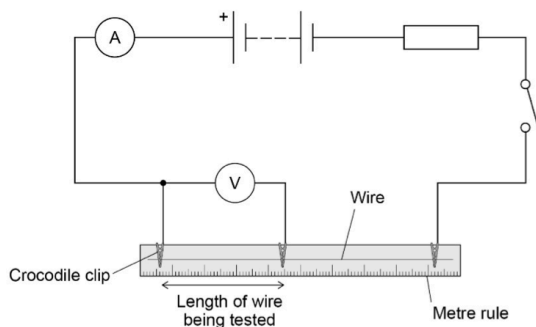
b)

06.2	current decreased	ignore slows down	1	AO1/1 6.2.1.3 RP 16 WS 3.6	E
c)					
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
d)					
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
e)					
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
f)					
06.6	$3.0 = 0.12 \times R$ $R = \frac{3.0}{0.12}$ $R = 25 (\Omega)$	an answer of 25 (Ω) scores 3 marks	1 1 1	AO2/1 6.2.1.3 RP 16 WS 3.3	E

Q4. (2020)

a)

01.1	both symbols correct and in the correct position	1	AO1 6.2.1.3 6.2.1.4 RPA 15
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b)

01.2	the length of the wire being tested	1	AO1 6.2.1.3 RPA 15
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c)

01.3	the resistance of the wire		1	AO1 6.2.1.3 RPA 15
d)				
01.4	mean p.d. = $\frac{0.16 + 0.17 + 0.15}{3}$		1	AO2 6.2.1.3 RPA 15
	mean p.d. = 0.16 (V)		1	
e)				
01.5	R = 0.32/0.50		1	AO2/1 6.2.1.3
	R = 0.64 (Ω)		1	6.2.1.3 RPA 15
f)				
01.7	charge flow = 0.50×17		1	AO2 6.2.1.2
	8.5 (C)		1	
g)				
01.8	a straight line through the origin with a lower gradient		1	AO1/2 6.2.1.3 RPA 15

Q5. (2021)

03.2	the flow of electrical charge		1	AO1 6.2.1.2
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Q6. (2021)

a)				
03.4	decrease the resistance of the variable resistor		1	AO1 6.2.1.3
b)				
03.6	charge flow = current $\times$ time $Q = It$		1	AO1 6.2.1.2
c)				
03.7	200 mA = 0.2 A		1	AO2 6.2.1.2
	charge flow = 0.2×15	allow a correct substitution using an incorrectly/not converted value for current	1	
	charge flow = 3.0 (C)	allow a correct calculation using an incorrectly/not converted value for current	1	

d)

03.8	1.6		1	AO3 6.2.1.2
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e)

03.9	260 mA to 380 mA		1	AO2 6.2.1.2
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Q7. (2021)

a)

05.1	$V = IR$		1	AO1 6.2.1.3
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b)

05.2	$3.9 = 0.12 \times R$		1	AO2 6.2.1.3
	$R = \frac{3.9}{0.12}$		1	
	$R = 32.5 (\Omega)$	allow $R = 33 (\Omega)$	1	

c)

05.5	thermistor		1	AO1 6.2.1.1
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d)

05.6	the current will increase		1	AO1 6.2.1.4
	(because) the resistance decreases		1	

Q8. (2022)

a)

01.1	battery		1	AO1 6.2.1.1
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b)

01.2	variable resistor	allow resistor allow battery / cells allow correct circuit symbol	1	AO1 6.2.2
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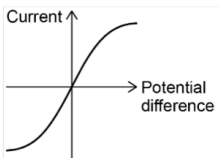
c)

01.3	subtract 0.4 volts from each reading		1	AO1 6.2.1.4
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d)

01.4	$\text{mean} = \frac{0.54+0.58+0.53}{3}$	allow $\text{mean} = \frac{1.65}{3}$	1	AO2 6.2.1.3
	mean = 0.55 (A)		1	

e)

01.6	$R = \frac{4.8}{0.75}$ $R = 6.4 \text{ } (\Omega)$		1 1	AO2 6.2.1.3
f)				
01.7	increase increase		1 1	AO1 6.2.1.4
g)				
01.8			1	AO1 6.2.1.4
Q9. (2023)				
a)				
04.1			1	AO1 6.2.1.1
b)				
04.2	charge		1	AO1 6.2.1.2
c)				
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	
d)				
04.4	non-linear		1	AO1 6.2.1.4
e)				
04.5	(resistance changes from) 200 (Ω) to 80 (Ω)		1	AO2 6.2.1.4
	change in resistance = 120 (Ω)		1	

Q10. (2023)

a)

06.3	potential difference = current × resistance		1	AO1 6.2.1.3 RPA15
	or			
	$V = IR$			

b)

06.4	480 mA = 0.48 A		1	AO2 6.2.1.3 RPA15
	$V = 0.48 \times 7.5$	allow a correct substitution of an incorrectly / not converted value for current	1	
	$V = 3.6$ (V)	allow an answer consistent with their incorrectly / not converted value for current	1	

c)

06.5	x-axis labelled resistance of R in Ω and y-axis labelled Total resistance (of resistors) in Ω		1	AO2 6.2.1.3 RPA15
	both points plotted correctly	points must be plotted within $\frac{1}{2}$ small square	1	
	curved line of best fit drawn	allow a line of best fit which ignores an outlier	1	

d)

06.6	reading from graph consistent with their line of best fit	allow an answer within $\frac{1}{2}$ small square	1	AO3 6.2.1.3 RPA15
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Q11. (2024)

a)

01.4	$R = \frac{1.5}{1.2}$		1	AO2 6.2.1.3
	1.25 (Ω)	allow 1.3 (Ω)	1	

b)

01.5	$Q = 1.2 \times 40$		1	AO2 6.2.1.2
	48 (C)		1	

c)

01.6	the temperature of each lamp increases		1	AO1 6.2.1.4
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Q12. (2024)

a)

04.1	voltmeter symbol correct		1	AO1 6.2.1
	voltmeter connected across diode	allow voltmeter connected across diode and ammeter	1	6.2.1.4 RPA16

b)

04.2			1	AO1 6.2.1 6.2.1.4 RPA16
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c)

04.3	random		1	AO3 6.2.1.4 RPA16
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d)

04.4	$\frac{0.27 + 0.32 + 0.31}{3}$		1	AO2 6.2.1.4 RPA16
	0.3 (A)	allow 0.30 (A)	1	

e)

04.5	both points plotted correctly	allow a tolerance of $\pm \frac{1}{2}$ small square	1	AO2 6.2.1.4 RPA16
	line of best fit	ignore line before 0.5 V	1	

f)

04.6	non-linear		1	AO2 6.2.1.4 6.2.1.4 RPA16
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g)

04.7	the current decreased to 0.00 A		1	AO1 6.2.1.4 6.2.1.4 RPA16
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Q13. (2024)

06.7	decreases		1	AO1 6.2.4.1
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