PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

PHYSICS



MARK SCHEME

TOPIC 10: ELECTRICITY AND CIRCUITS (PAPER 2)

SCORE	PERCENTAGE
/155	%

STEMUP

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Mark Scheme

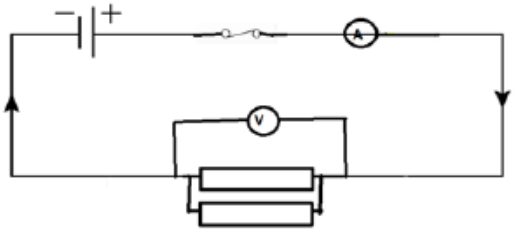
Q1.

Question Number	Answer	Mark
*	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. AO1(6 marks) Circuit diagram including • power supply • ammeter • voltmeter • filament lamp • means of varying potential difference Description of method • measure current with ammeter • measure potential difference with voltmeter • vary the potential difference • calculate the resistance • repeat and compare	**(6)** AO 1 2

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• An explanation that demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific, enquiry, techniques and procedures lacks detail. (AO1) • Presents an explanation that is not logically ordered and with significant gaps. (AO1)
Level 2	3-4	• An explanation that demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas, enquiry, techniques and procedures is not fully detailed and/or developed. (AO1) • Presents an explanation of the procedure that has a structure, which is mostly clear, coherent and logical with minor steps missing. (AO1)
Level 3	5-6	• An explanation that demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas, enquiry, techniques and procedures is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure, which is clear, coherent and logical. (AO1)

(**Q16 1SC0/2PH, June 2018**)

Q2.

Question number	Answer	Additional guidance	Mark
(i)	 voltmeter in parallel across resistor (1) second resistor in parallel (1)		**(2)**

Question number	Answer	Additional guidance	Mark
(ii)	potential difference/ voltage (drop across resistors in parallel) (1) current (in the circuit) (1)	voltmeter reading ammeter reading	(2)

Question number	Answer	Additional guidance	Mark
(iii)	1 Ω	one ohm	(1)

Question number	Answer	Additional guidance	Mark
(iv)	Comments to include: the (overall) resistance decreases as the number of resistors (in parallel) increases (1) the relationship is non-linear (1) any two relevant values from the graph (1)	 decreases at a decreasing rate the relationship is inversely proportional scores first 2 marks	(3)

(**Q05a 1SC0/2PH, Nov 2020**)

Q3.

Question Number	Answer	Additional guidance	Mark
(i)	**A** live pin **B** is incorrect because the mains plug has no negative pin **C** is incorrect because the neutral pin is at 0 V **D** is incorrect because the mains plug has no positive pin		(1) AO1.1

Question Number	Answer	Additional guidance	Mark
(ii)	An explanation linking the fuse melts (1) (so) stops / switches off current (1)	 allow fuse blows / breaks circuit is broken allow switches off {charge flow / circuit / TV / appliance / supply / electricity / voltage / power / energy}	**(2)** **AO2.2**

Question Number	Answer	Additional guidance	Mark
(iii)	**any one** from circuit breaker (1) earth (wire/pin) (1) surge protector (1) cable clamp (inside plug) (1) insulation / armouring (1) socket protector/cover (1)	 accept RCD / ELCB / RCCB / GFCI / MCB allow ground accept SPD accept rubber coating accept plug cover ignore switch / fuse / fuse box	**(1)** **AO1.1**

(**QU06c 1SC0/2PF, June 2025**)

Q4.

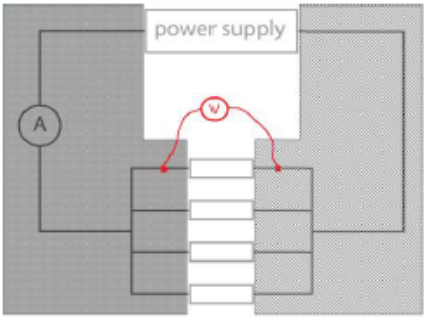
Question Number	Answer	Additional guidance	Mark
(i)	**A** live pin **B** is incorrect because the mains plug has no negative pin **C** is incorrect because the neutral pin is at 0 V **D** is incorrect because the mains plug has no positive pin		**(1)** **AO1.1**

Question Number	Answer	Additional guidance	Mark
(ii)	An explanation linking the fuse melts (1) (so) stops / switches off current (1)	 allow fuse blows / breaks circuit is broken allow switches off {charge flow / circuit / TV / appliance / supply / electricity / voltage / power / energy}	**(2)** **AO2.2**

Question Number	Answer	Additional guidance	Mark
(iii)	**any one** from circuit breaker (1) earth (wire/pin) (1) surge protector (1) cable clamp (inside plug) (1) insulation / armouring (1) socket protector/cover (1)	 accept RCD / ELCB / RCCB / GFCI / MCB allow ground accept SPD accept rubber coating accept plug cover ignore switch / fuse / fuse box	**(1)** **AO1.1**

(**QU02c 1SC0/2PH, June 2025**)

Q5.

Question	Answer	Additional guidance	Mark
(i)	voltmeter in parallel with resistors (1)	 one voltmeter connection in each shaded region	**(1)** **AO1.2**

Question	Answer	Additional guidance	Mark
(ii)	36(.4) (mA) (1)	allow 36 to 37 inclusive may be seen in table in Figure 12	**(1)** **AO3.2**

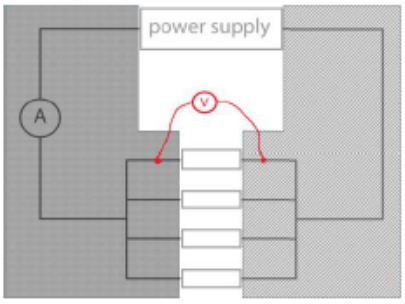
Question	Answer	Additional guidance	Mark
(iii)	substitution into $V = IR$ (1) $6(.00) = 9.1 (\times 10^{-3}) \times R$ rearrangement (1) $(R =) \frac{6(.00)}{9.1 (\times 10^{-3})}$	allow substitution and rearrangement in either order accept 18.2/2 or 27.3/3 or (36 to 37)/4 in place of 9.1 allow substitution of correct values into a visible, incorrectly rearranged algebraic equation for this mark only $(R =) \frac{V}{I}$	**(3)** **AO2.1**

	evaluation (1) 660 (Ω)	 allow values that round to 660 e.g. 659.3 award full marks for the correct answer without working. value rounding to 660 to any other power of 10 scores 2 marks	

Question	Answer	Additional guidance	Mark
(iv)	an explanation linking: (total) resistance increases (1)		**(3)** **AO3.2**
	(because) current decreases (1) (and) voltage stays the same (1)	fewer paths for the current resistance calculations supporting increasing resistance	

(QU05b 1SC0/2PF, June 2024)

Q6.

	Answer	Additional guidance	Mark
(i)	voltmeter in parallel with resistors (1)	 one voltmeter connection in each shaded region	**(1)** **A)1.2**

	Answer	Additional guidance	Mark
(ii)	36(.4) (mA) (1)	allow 36 to 37 inclusive may be seen in table in Figure 6	(1) AO3.2

	Answer	Additional guidance	Mark
(iii)	substitution into $V = IR$ (1) $6(.00) = 9.1 (\times 10^{-3}) \times R$	allow substitution and rearrangement in either order accept 18.2/2 or 27.3/3 or (36 to 37)/4 in place of 9.1 allow substitution of correct values into a visible, incorrectly rearranged algebraic equation for this mark only	(3) AO2.1
	rearrangement (1) $(R =) \frac{6(.00)}{9.1 (\times 10^{-3})}$ evaluation (1) 660 (Ω)	$(R =) \frac{V}{I}$ allow values that round to 660 e.g. 659.3 award full marks for the correct answer without working. value rounding to 660 to any other power of 10 scores 2 marks	

	Answer	Additional guidance	Mark
(iv)	an explanation linking: (total) resistance increases (1) (because) current decreases (1) (and) voltage stays the same (1)	 fewer paths for the current resistance calculations supporting increasing resistance	(3) AO3.2

(**QU01b 1SC0/2PH, June 2024**)

Q7.

Question number	Answer	Additional guidance	Mark
(i)	**either** calculation of time: substitution (1) $(t =)\ \frac{126\ (\times 10^6)}{15 \times 400\ (\times 3600)}$ evaluation (1) (t=) 5.8(3) (h)	 accept correct time conversion e.g. 5h 50 min 350 min 21 000 s award 2 marks for correct answer without working. award 1 mark for answer of either 2.1 or 5.8(3) to any other power of ten	**(3)** **AO3**

	conclusion (1) claim is justified as the time is less (than 6 hours) **or** calculation of energy: substitution (1) $6\ (\times 3600) = \frac{E}{15 \times 400}$ rearrangement and evaluation (1) E = 130 MJ conclusion (1) claim is justified as energy (in 6 hours) is more than (126 MJ) required.	allow relevant comment based on incorrectly calculated time (independent mark) accept 129.6 MJ accept 129 600 000 J allow relevant comment based on incorrectly calculated energy (independent mark)	

Question number	Answer	Additional guidance	Mark
(ii)	substitution (1) $126 (x 10^6) = Q \times 400$ re-arrangement and evaluation (1) (Q =) 315 000 (coulombs)	alternative method re-arrangement (1) $(Q =) \frac{E}{V}$ **or** $(Q =) \frac{126 (x 10^6)}{400}$ (substitution and) evaluation (1) (Q =) 315 000 (coulombs) accept answers rounding to 320 000 (coulombs) allow one mark for answers rounding to 3.2 to any other power of ten award two marks for correct answer without working.	**(2)** **AO2**

(**QU05b 1SC0/2PH, June 2023**)

Q8.

Question number	Answer	Additional guidance	Mark
(i)	17.7 (A)		**(1)** **AO1**

Question number	Answer	Additional guidance	Mark
(ii)	(The resistance) increases		**(1)** **AO1**

Question number	Answer	Additional guidance	Mark
(iii)	B 5 A fuse A is incorrect because it has a smaller value than the expected current C and D are incorrect because they have a much higher value than the expected current		**(1)** **AO1**

Question number	Answer	Additional guidance	Mark
(iv)	An explanation linking **two** of thick(er) wires have low(er) resistance (1) less thermal energy transferred (in the wires)(1) less potential difference / voltage (drop) across the wires (1)	allow reverse argument allow so wires do not get hot allow less voltage is lost more current can be carried	**(2)** **AO1**

(**Q05b 1SC0/2PH, Nov 2021**)

Q9.

Question	Answer	Additional guidance	Mark
	substitution (1) (current =) $\frac{1.2}{4(.0)}$ evaluation (1) (current =) 0.3(0) (A)	 award full marks for the correct answer without working	**(2)** **AO2.2**

(**QU01b 1SC0/2PF, June 2024**)

Q10.

Question number	Answer	Additional guidance	Mark
	substitution into P = V × I (1) 2600 = 230 × I rearrangement (1) I = P ÷ V evaluation (1) 11 (A)	Substitution and re-arrangement in either order I = 2600 ÷ 230 for 2 marks allow answers that round to 11 award full marks for correct answer without working allow I = 2.6 ÷ 230 for 1 mark allow 0.011 (A) for 2 marks max if no other marks scored, award 1 mark for 2.6 kW = 2600 W	**(3)**

(**Q06a 1SC0/2PF/S2, SAM**)

Q11.

Question number	Answer	Additional guidance	Mark
	substitution into P = V × I (1) 2600 = 230 × I rearrangement (1) I = P ÷ V evaluation (1) 11 (A)	Substitution and re-arrangement in either order I = 2600 ÷ 230 for 2 marks allow answers that round to 11 award full marks for correct answer without working allow I = 2.6 ÷ 230 for 1 mark allow 0.011 (A) for 2 marks max if no other marks scored, award 1 mark for 2.6 kW = 2600 W	**(3)**

(**Q02a 1SC0/2PH/S2, SAM**)

Q12.

Question number	Answer	Additional guidance	Mark
i	substitution (1) $(I = \frac{P}{V})$ = 1.9 (x 10^3) / 230 (1) evaluation (1) 8.3 (A)	 8.3 / 8.26 (A) award full marks for correct answer without working award one mark for 8.26 x 10^{-3} / 0.0083	**(2)** **AO2**

Question number	Answer	Additional guidance	Mark
ii	choice and substitution (1) $E = I \times V \times t$ = 7.4 x 230 x 120 evaluation (1) 200000 (J)	 accept 204000 / 204240 award full marks for correct answer without working award 1 mark for 3400 / 3404 (J) (using 2 minutes as time)	**(2)** **AO2**

(**Q03a 1SC0/2PF, Nov 2021**)

Q13.

Question number	Answer	Additional guidance	Mark
	conversion of time (1) 1 x 60 (s) substitution (1) (I =) $\frac{9000}{230 \text{ (x } 60)}$ evaluation (1) (I =) 0.65 (A)	 any value that rounds to 0.65; e.g. 0.65217 0.7 0.6 award full marks for the correct answer without working allow 2 marks for answer of 39(.130)	**(3)** **AO2**

(**QU03b 1SC0/2PF, June 2022**)

Q14.

Question Number	Answer	Additional guidance	Mark
	2.5(A)	Accept $2\frac{1}{2}$ (A)	**(1)**

(**Q01b 1SC0/2PF, June 2019**)

Q15.

Question Number	Answer	Additional guidance	Mark
(i)	substitution (1) (ΔQ) = 1.5 x 4200 x 50 evaluation (1) 320 000 (J)	 accept 315 000 (J) 310 000 (J) award full marks for the correct answer without working 320 000 000 315 000 000 310 000 000 score 1 mark (mass in grams)	(2)

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) 3500 = $\frac{670\,000}{t}$ rearrangement (1) (t=) $\frac{670\,000}{3500}$ evaluation (1) 190(s)	accept substitution and rearrangement in either order accept any answer that round to 190(s) power of ten error award 2 marks maximum award full marks for the correct answer without working	(3)

(**Q04c 1SC0/2PF, June 2019**)

Q16.

Question number	Answer	Additional guidance	Mark
	substitution (1) (E =) 0.042 x 1.5 evaluation (1) (E =) 0.063 (J) (1)	 6.3×10^{-2} award 2 marks for the correct answer without working accept 0.063 to any other power of 10 for 1 mark	**(2)** **AO2**

(**QU05a 1SC0/2PF, June 2023**)

Q17.

Question number	Answer	Additional guidance	Mark
(i)	recall and substitution (1) V = 0.20 x 15 evaluation (1) 3 (V)	 7(V) gains 1 mark (use of 15 + 20) award full marks for the correct answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
(ii)	addition and substitution (1) (P=) $0.20^2 \times 35$ evaluation (1) 1.4 (W)	 award full marks for the correct answer without working	**(2)**

Q18.

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) (power =) 12000 x 0.64 evaluation (1) R = 7700 (W)	 allow (power =) 240 x 32 any answer that rounds to 7700 (W) e.g. 7680 (W) award full marks for the correct answer without working	**(2)** **AO3**

Question number	Answer	Additional guidance	Mark
(ii)	substitution (1) ($\frac{\text{number of turns in secondary coil}}{\text{number of turns in primary coil}}$ =) $\frac{1600}{80000}$ or $\frac{1}{50}$ evaluation (1) 0.02(0)	 0.02(0) to any other power of 10 scores 1 mark award full marks for correct answer without working accept for 1 mark (seen anywhere) $\frac{50}{1}$, $\frac{80000}{1600}$, 50 **or** (from counting turns) $\frac{4}{15}$, 0.27	**(2)** **AO2**

Question number	Answer	Additional guidance	Mark
(iii)	(ratio =) 240 : 12000 (1) 1 : 50 (1)	 0.02 : 1 award full marks for correct answer without working	**(2)** **AO2**

(**QU03c 1SC0/2PF, June 2023**)

Q19.

Question Number	Answer	Additional guidance	Mark
	substitution (1) (P=) 0.53 x 230 evaluation (1) 120 (W)	 accept values that round down to 120 to 2s.f. e.g.121.9 or 122 award full marks for the correct answer without working	(2) **AO2.1**

(**QU06b 1SC0/2PF, June 2025**)

Q20.

Question Number	Answer	Additional guidance	Mark
	substitution (1) (P=) 0.53 x 230 evaluation (1) 120 (W)	 accept values that round down to 120 to 2s.f. e.g.121.9 or 122 award full marks for the correct answer without working	**(2)** **AO2.1**

(**QU02b 1SC0/2PH, June 2025**)

Q21.

Question	Answer	Additional guidance	Mark
(i)	substitution (1) (P =) $\frac{130\,000}{87}$ evaluation (1) (P =) 1494 (W) value to 2sf (1) 1500 (W)	 award two marks for the correct answer without working independent mark for **any** number to 2sf	**(3)** **AO2.1**

Question	Answer	Additional guidance	Mark
(ii)	substitution (1) (efficiency =) $\frac{96\,000}{130\,000}$ evaluation (1) (efficiency =) 0.74	 accept values that round to 0.74 e.g. 0.7385 accept 74 % for 2 marks allow 74 without % sign for 1 mark only allow 0.73 or 73% for 1 mark award full marks for the correct answer without working	**(2)** **AO2.1**

(QU04b 1SC0/2PF, June 2024)

Q22.

Question	Answer	Additional guidance	Mark
	substitution (1) $P = 9.0 \times 230$ evaluation (1) 2100 (W)	 allow values that round to 2100 (W) e.g. 2070 (W) award full marks for the correct answer without working	**(2)** **AO2.1**

(**QU05c 1SC0/2PF, June 2024**)

Q23.

Question Number	Answer	Additional guidance	Mark
	substitution (1) (Q=)0.9 x 50 evaluation (1) 45 unit (1) coulomb	 award 2 marks for the correct answer without working If no substitution seen 4.5 or 450 scores 1 mark only independent mark C, c, As Accept recognisable spellings of coulomb	**(3)**

(**Q01c 1SC0/2PF, June 2019**)

Q24.

	Answer	Acceptable answers	Mark
	substitution (1) 10/0.44 or 250/11 evaluation (1) 23 (ohms)	give full marks for correct answer, no working 22.7(ohms),22.73 (ohms), 22.72(ohms) Ignore excessive decimal places.	**(2)**

(**Q05 1SC0/2PF, Mar 2013**)

Q25.

Question Number	Answer	Additional guidance	Mark
(i)	recall and substitution into $P = I^2 \times R$ (1) $130 = 14^2 \times R$ rearrangement (1) $R = \frac{130}{14^2}$ evaluation to **2 sig fig** (1) (R =) 0.66 (Ω)	substitution and rearrangement may be in either order alternative route: **V** (= $\frac{P}{I}$) = $\frac{130}{14}$ OR 9.3 V (1) R (= $\frac{V}{I}$) = $\frac{9.3}{14}$ (1) award full marks for the correct answer without working award 2 marks for 0.663.. or 0.67	**(3)**

Question Number	Answer	Additional guidance	Mark
(ii)	**rate** of flow of charge in the immersion heater is greater than in the kettle / heating element (1) the direction of the flow of charge in the kettle / heating element keeps changing (whereas it remains in the same direction in the immersion heater) (1)	accept reverse arguments more charge per second in the immersion heater allow (in this context) faster (rate of) flow in immersion heater 14 coulombs per sec in immersion heater and 8.3 coulombs per sec in kettle / heating element flows both ways in the kettle / heating element (one way in the heater) simply referring to alternating current and direct current is not enough	(2)

(**Q06a 1SC0/2PH, June 2019**)

Q26.

Question number	Answer	Additional guidance	Mark
(i)	Substitution and evaluation (1) 15 (Ω)		**(1)** **AO2**

Question number	Answer	Additional guidance	Mark
(ii)	select / recall (1) (power =) V x I or (power =) I^2 x R or (power =) $\frac{V^2}{R}$ substitution and evaluation (1) (power =) 1.4 (W)	 (power =) 4.5 x 0.3 0.3^2 x 15 $\frac{4.5^2}{15}$ allow 1.3(5) (W) award full marks for the correct answer without working	**(2)** **AO2**

(**QU05a 1SC0/2PF, June 2022**)

Q27.

Question number	Answer	Additional guidance	Mark
(i)	Substitution and evaluation (1) 15 (Ω)		**(1)** **AO2.1**

Question number	Answer	Additional guidance	Mark
(ii)	select / recall (1) (power =) V x I or (power =) I^2 x R or (power =) $\frac{V^2}{R}$ substitution and evaluation (1) (power =) 1.4 (W)	 (power =) 4.5 x 0.3 0.3^2 x 15 $\frac{4.5^2}{15}$ allow 1.3(5) (W) award full marks for the correct answer without working	**(2)** **AO2.2**

(**QU01a 1SC0/2PH, June 2022**)

Q28.

Question number	Answer	Additional guidance	Mark
	substitution (1) 1.56 = 0.45 x R rearrangement and evaluation (1) (R =) 3.5 (ohms)	alternative method rearrangement (1) (R =) $\frac{V}{I}$ **or** (R=) $\frac{1.56}{0.45}$ (substitution and) evaluation (1) (R =) 3.5 (ohms) allow values that round to 3.5 e.g. 3.46(666) 3.47 etc award full marks for the correct answer without working	**(2)** **AO2**

(**QU05d 1SC0/2PF, June 2023**)

Q29.

Question number	Answer	Additional guidance	Mark
	substitution (1) 1.56 = 0.45 x R rearrangment and evaluation (1) (R =) 3.5 (ohms)	alternative method rearrangement (1) (R =) $\frac{V}{I}$ **or** (R=) $\frac{1.56}{0.45}$ (substitution and) evaluation (1) (R =) 3.5 (ohms) allow values that round to 3.5 e.g. 3.46(666) 3.47 etc award full marks for the correct answer without working	**(2)** **AO2**

(**QU01c 1SC0/2PH, June 2023**)

Q30.

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) (charge) = 0.46 x 30 evaluation (1) (charge) = 14 (C)	 any number that rounds to 14 e.g. 13.8 award full marks for the correct answer without working	**(2)** **AO2**

Question number	Answer	Additional guidance	Mark
(ii)	substitution (1) (energy transferred) = 0.46 x 6.0 x 60 evaluation (1) (energy transferred) = 170 (J)	 allow (energy transferred) = 0.46 x 6.0 x 1 or (energy transferred) = 0.46 x 6.0 x 30 any number that rounds to 170 e.g. 165.6 or 166 allow answers that round to 2.8 or 83 e.g. 2.76 or 82.8 for 1 mark only award full marks for the correct answer without working	**(2)** **AO2**

(**QU01c 1SC0/2PF, June 2023**)

Q31.

Question Number	Answer	Additional guidance	Mark
(i)	recall and substitution into V = IR (1) 5.0 = 0.26 x R rearrangement (1) (R =) $\frac{5.0}{0.26}$ evaluation (1) 19 (Ω)	accept substitution and rearrangement in either order (R =) $\frac{V}{I}$ $\frac{5.0}{0.26}$ scores 2 marks accept answers that round to 19 (Ω) (e.g. 19.23) accept answer written in table if not written on answer line. award full marks for the correct answer without working	**(3)**

Question Number:	Answer	Additional guidance	Mark
(ii)	a comment that includes the following points idea that resistance increases with potential difference (1) idea that doubling the potential difference does not result in doubling of resistance (1) **OR** V = constant x R is not supported by this data (1) correct processing of data from the table to support either of the above mark points (1)	idea that equal increments of potential difference do not cause equal increments of resistance reverse argument e.g. if student was correct then equal increments of p.d. would cause equal increment of resistance if student was correct then current would be constant ignore simple quoting of data for this mark	**(3)**

(**Q06b 1SC0/2PF, June 2019**)

Q32.

Question Number	Answer	Additional guidance	Mark
(i)	recall and substitution into V = IR (1) $5.0 = 0.26 \times R$ rearrangement (1) (R=) $\frac{5.0}{0.26}$ evaluation (1) 19 (Ω)	accept substitution and rearrangement in either order (R=) $\frac{V}{I}$ $\frac{5.0}{0.26}$ scores 2 marks accept answers that round to 19 (Ω) (e.g. 19.23) accept answer written table if not written on answer line. award full marks for the correct answer without working	**(3)**

Question Number	Answer	Additional guidance	Mark
(ii)	a comment that includes the following points idea that resistance increases with potential difference (1) idea that doubling the potential difference does not result in doubling of resistance (1) **OR** V = constant × R is not supported by this data (1) correct processing of data from the table to support either of the above mark points (1)	idea that equal increments of potential difference do not cause equal increments of resistance reverse argument e.g. if student was correct then equal increments of p.d. would cause equal increment of resistance if student was correct then current would be constant ignore simple quoting of data for this mark	**(3)**

Question Number	Answer	Additional guidance	Mark
(iii)	A description that includes add a variable resistor (1) **with** in series (with the lamp / power supply) (1) **OR** add a potential divider (1) **with** in parallel with power supply (1)	marks may be obtained from a circuit diagram rheostat accept between / before / after for in series potentiometer across the power supply ignore replacing power supply / using fixed resistor(s) / LDR / thermistor in both cases, second mark conditional on first mark	**(2)**

(**Q02b 1SC0/2PH, June 2019**)

Q33.

Question number	Answer	Additional guidance	Mark
	substitution (1) 0.15 x 40 evaluation (1) 6(.0) (V)	 award full marks for correct answer without working	**(2)** **AO2**

(**Q01b 1SC0/2PF, Nov 2021**)

Q34.

Question number	Answer	Additional guidance	Mark
(a)	Rearrangement of equation (1) $Q = \frac{E}{V}$ Substitution including change of unit (1) 64 MJ = 64 000 000 J $Q = \frac{64000000}{330}$ Answer and unit (1) Q = 190 000 (C)	 allow answers that round to 190 000, e.g. 193939 if the calculation is worked throughout without changing MJ to J, then maximum of 2 marks unless unit matches quantity	 **(3)**

Question number	Answer	Additional guidance	Mark
(b)	Rearrangement (1) $I = \frac{Q}{t}$ Conversions and substitution (1) 190 (kC) = 190 000 (C) 8 hours = 8 × 3600 (s) = 28 800 (s) $I = \frac{190\,000}{28800}$ Evaluation (1) = 6.6 (A)	ecf from (a) (6.5972) if 193 939 used then accept 6.7	**(3)**

(**Q08ab 1SC0/2PH, SAM 2016**)

Q35.

Question Number	Answer	Additional guidance	Mark
(i)	24 (Ω)		**(1)** **AO1.2**

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) (V=) 0.50 x 12 evaluation (1) 6.0 (V)	 accept 6 award full marks for the correct answer without working	**(2)** **AO2.1**

Question Number	Answer	Additional guidance	Mark
(iii)	time converted to s (1) 300 (s) substitution (1) (E=) 0.4 x 4.5 x 5 (x60) evaluation (1) 540 (J)	accept 5 x 60 seen 0.4 x 4.5 x 300 scores first 2 marks 9 (J) scores 2 marks (no conversion to seconds) 540 to any other power of ten scores 2 marks award full marks for the correct answer without working	**(3)** **AO2.1**

(**QU01a 1SC0/2PF, June 2025**)

Q36.

	Answer	Acceptable answers	Mark
	substitute (1) 3 = I × 12 transformation (1) I = 3 ÷ 12 evaluation (1) 0 .25 (A) Ignore any unit given by candidate	Subst. and transform. either order 1 mark only can be scored for correct substitution after incorrect transposition. Accept any number of sig. figs. that rounds to 0.25 (A) 250 mA gains 3 marks give full marks for correct answer, no working 2.5 × any other power of ten = 2 marks eg 25 (A) gains 2 marks	**(3)**

(**Q24 1SC0/2PF, June 2013**)

Q37.

Question Number:	Answer	Additional guidance	Mark
(i)	substitution (1) (P)= 0.12 x 0.24 evaluation (1) 0.029 (W)	 accept 0.03 (W), 0.0288(W) 0.028 (W) power of ten error is awarded 1 mark award full marks for the correct answer without working	**(2)** AO 2 1

Question Number:	Answer	Additional guidance	Mark
(ii)	chooses /uses (1) E= V x I x t evaluation (1) 1.4 (J)	E =0.3 x0.13 x35 accept an answer that rounds to 1.4 (J) e.g. 1.365(J) a maximum of 1 mark is awarded in the case of a power of ten error award full marks for the correct answer without working	**(2)** AO 2 1

Question Number:	Answer	Additional guidance	Mark
(iii)	substitution (1) (Q)=0.13 x 35 evaluation (1) 4.6 (C)	 accept an answer that rounds to 4.6 e.g. 4.55 or in this context allow 4.5 power of ten error is awarded 1 mark award full marks for the correct answer without working	**(2)** AO 2 1

(**Q14 1SC0/2PF, June 2018**)

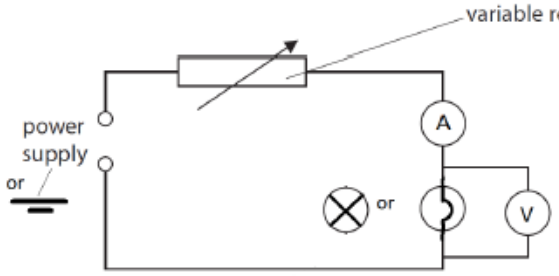
Q38.

Question number	Answer	Mark
(i)	C	(1)

Question number	Answer	Additional guidance	Mark
(ii)	Equating the same variable in both equations (1) $\Delta Q = m \times c \times \Delta\theta = P \times t$ Rearrangement (1) $t = \frac{(m \times c \times \Delta\theta)}{P}$ Substitution and evaluation (1) $t = \frac{(1 \times 4200 \times 77)}{3500}$ = 92 s	allow $\Delta\theta$ seen as 95 − 18 92.4 evaluation must be seen to at least 2 s.f. at some point in the working	(3)

(**Q10a 1SC0/2PH, SAM 2016**)

Q39.

Question number	Answer	Mark
	 ammeter with correct symbol, in series with the lamp (1) voltmeter with correct symbol, in parallel with the lamp (1) valid method of changing the potential difference (1)	(3)

Q40.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	**B**	.	**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	substitution V = 0.039 x 185 (1) evaluation 7.215 (which is about 7.2) (V) (1)	Substitution 7.2 = I x 185 (1) transposition I = 7.2 ÷ 185 (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
(a)(iii)	**C** (same as)		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(iv)	An explanation to include The resistance (of the LDR) changes Greater resistance when in the dark	 LDR has less resistance in the light	**(2)**

Question Number		Indicative Content	Mark
QWC	***(b)**	An explanation linking some of the following. • less current is used at night-time • Resistance (of LDR or circuit) would increase with less ambient light • Higher resistance will allow less current (in the circuit) (ORA) • Less current in circuit means less energy from the battery • Less power required in the dark ORA for light conditions • Less current means less energy transferred (per second) • Total energy transferred is less during night time (than it would otherwise have been) due to the higher resistance of the LDR	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation linking the light level to EITHER resistance OR current. eg. It increases the resistance in the dark. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple explanation linking the light level to TWO of resistance, current, energy. eg. At night-time its resistance would increase. This would reduce the current from the battery • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed explanation linking the light level to resistance AND current, AND energy. e.g. At night-time the resistance would be more. This would reduce the current and mean that the battery will not have to supply as much energy. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(**Q03 1SC0/2PH, June 2015**)