

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Mark Schemes

Q1.

	Answer	Acceptable answers	Mark
(a)(i)	11x 0.4 (substitution) (1) 4.4 (V) (1)	Full marks for correct answer with no calculation	(2)
(a)(ii)	0.6 - 0.4 (A) (1)	0.2 or 1/5 (A)	(1)
(a)(iii)	B		(1)
(b)	An explanation linking: electrons (1) colliding with / bumping into ions in the lattice /atoms in the metal (1)	colliding with other electrons If no other marks scored, allow for 1 mark for "electrical energy transferred/changed into thermal/heat energy" <u>do not allow</u> energy being created or produced	(2)

		Indicative Content	Mark
QWC	*(c)	A explanation including some of the following points Light dependent resistors (LDR) • Resistance changes with light intensity • Bright light , low resistance • No light (dark), high resistance • Low resistance gives high current.(RA) Thermistor • Resistance changes with temperature • Negative	(6)

		temperature coefficient • High temperature, low resistance • Low temperature, high resistance • Low resistance gives high current (RA)	
Level	0	No rewardable content	
1	1 - 2	• a limited explanation linking light affecting LDR AND heat affecting thermistor OR a correct relationship for one device, e.g. thermistors change resistance when the temperature changes and LDRs change resistance when it gets dark OR the resistance decreases/ current increases of a LDR when the light gets brighter • 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 correctly linking the temperature and light with resistance or current for both devices OR a correct relationship for one device with a link to the way this affects the current and resistance. e.g. the resistance of a LDR increases when the light gets dimmer and when the temperature lowers the resistance of a thermistor increases OR the resistance of a LDR decreases when the light gets brighter and this increases the current • 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 including the qualitative relationships for both devices and a link to the way resistance change affects the current in BOTH of them, e.g. the resistance of a LDR is less when the light gets brighter which increases the current. When the temperature lowers the resistance of a thermistor increases. This means that the current will decrease as the thermistor cools down. • the answer communicates ideas clearly and coherently uses a range of	

		scientific terminology accurately • spelling, punctuation and grammar are used with few errors
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Total for question = 12 marks

Q2.

	Answer	Acceptable answers	Mark
(i)	11x 0.4 (substitution) (1) 4.4 (V) (1)	Full marks for correct answer with no calculation	(2)
(ii)	0.6 - 0.4 (A) (1)	0.2 or 1/5 (A)	(1)
(iii)	B		(1)

Q3.

	Answer	Acceptable answers	Mark
(a)(i)	Correctly plotted point (1)	+/- ½ a small square	(1)
(a)(ii)	Smooth line through most (at least 5) crosses / points (1)	Do not accept clearly dot-to-dot or excessive tramlining Ignore any part of line after 45	(1)
(a) (iii)	Substitution: (1) $12 = 0.047 \times R$ Transposition: (1) $R = 12/0.047$ Evaluation: (1) $R = 260$	transposition and substitution in either order substitution mark can be scored when incorrectly transposed word/symbol equation is given 255.3, 255 give full marks for correct answer no working power of 10 errors with no working score max 1 mark	(3)
(a) (iv)	An explanation linking • current increases with temperature (1) with • (so) resistance decreases(1) or • the voltage is constant (1) with • (so)	(for this first MP) ignore faster/slower (charge/current) ignore references to heat, current flows more can score both marks by quoting two suitable pairs of values from graph For full	(2)

	resistance decreases (with temperature increase)(1)	marks, there must be a reference to change of either I or R with temperature	
(b)(i)	An explanation linking • electrons / negative charges (1) • collide with ions/lattice/electrons (1)	atoms / nuclei allow for 1 mark, electrical energy transferred to thermal/heat energy if no other scored	(2)
(b) (ii)	A suggestion including energy transfer in the thermistor/ any component part of the electrical circuit causes a rise in temperature of thermistor (above surroundings)(1)	thermistor/resistor gets hot/is heated	(1)