

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

Question number	Indicative content	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) - the sequence of events is voltage change, conversion to direct current, followed by current limiting - the battery is the load in the secondary circuit, not a store of energy for the primary circuit - a transformer is needed to increase (or step up) the voltage - so a diode is needed to change a.c. to d.c. - the charging current can be limited to 15 A using a fuse (or circuit breaker) - a circuit breaker may be preferable to a fuse, since a fuse would need to be replaced after use - the transformer primary coil is connected between the live and neutral in the primary circuit - the diode is connected in the secondary circuit of the transformer - the battery(which is to be charged), diode, fuse and secondary coil should be connected in series in the secondary circuit	(6)

Level	Mark	Descriptor
	0	No awardable content.
Level 1	1–2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Question number	Answer	Additional guidance	Mark
(i)	explanation linking a suitable improvement (1) with a matching reason (1)	for example place thermometer close(r) to the thermistor stirring digital thermometer thermometer measures same temperature as thermistor to get uniform temperature (for stirring) thermometer with better resolution or scale	(2) AO3.3

Question number	Answer	Additional guidance	Mark
(ii)	an explanation including: method 2 has measurements to more significant figures / more decimal places (than method 1) (1) so the calculated answer can have more s.f.'s / d.p.'s (1)	may be shown via a calculation accept an alternative argument in terms of consistency in final calculated answer ignore restating stem of question – e.g. so more precise ignore more accurate	(2) AO2.2

Q3.

Question Number:	Answer	Additional Guidance	Mark
	an explanation linking: collisions between electrons and lattice (1) lattice {vibrates / moves} more (1)	throughout accept atoms / ions for lattice accept charges / charged particles for electrons allow collision between electrons in this context KE of lattice increases KE of electrons decreases	(2) AO 1 1

Q4.

Question number	Answer	Mark
	An answer that makes reference to: Identification – knowledge (1 mark) and reasoning / justification – knowledge (2 marks) • to begin with (there is) no current as V increases, then, after a certain voltage, the current rises • sharply / with an increasing gradient • associated with a decreasing resistance	(3)

Q5.

Question number	Answer	Mark
	P (ohmic) resistor/wire (1) Q (filament) lamp (1) R (semiconducting) diode (1)	(3)