Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1	a		B (no mark) **AND** Any **two** from: Stronger (electric) field ✓ Larger/greater charge ✓ More (electric) field lines ✓ (Electric) field lines are closer together ✓ Greater (electric) field density ✓	2 (AO 2.2x2)	**DO NOT ALLOW** A (CON) **DO NOT ALLOW** reference to magnet / magnetic field / line(s) (zero marks - CON) **Examiner's Comments** This question required candidates to explain that electric field B was stronger as shown by the field lines being closer together. Candidates should be encouraged to consider the number of marks available in the question. A common error was candidates referring to magnetic field lines.
	b		closed circuit ☑ open circuit ☐ source of potential difference ☑ source of resistance ☐ One correct tick ✓ Two correct ticks ✓✓	2 (AO 1.1x2)	**DO NOT ALLOW** three or four ticks **Examiner's Comments** Most candidates ticked the correct boxes. A few candidates appeared to be confused between open circuit and closed circuit.
			Total	**4**	
2			C	1 (AO 2.2)	**ALLOW** S **Examiner's Comments** The majority of candidates correctly identified that the current would also be 5 A at point S. A significant number of candidates chose either A (not realising that the current would be different with fewer identical lamps in series) or D (not understanding that point T would be the total current in the circuit).

			Total	**1**	
3	a	i	**Any three from:** The metal grid gives the (smoke) particles a charge / gains electrons ✓ The (smoke) particles gain a negative charge ✓ The (smoke) particles are repelled by the metal grid ✓ The (smoke) particles are attracted by / stick to the metal collectors ✓ Opposite charges attract / like charges repel✓	3 (3 ×AO 1.2)	The metal grid gives the (smoke) particles a negative charge scores the first two marking points **Examiner's Comments** This question was generally well answered with the majority of candidates understanding that the negatively charged grid transferred electrons to the smoke particles so that the smoke particles became negatively charged and were attracted to the positive collector plates. Some high scoring candidates correctly stated that the negatively charged smoke particles would also be repelled from the negatively charged grid. This type of question needs candidates to write a logical explanation using relevant physics terms.
		ii	**Any one from:** It stops / reduces the small particles / smoke being released into the atmosphere / environment ✓ It stops / reduces people having to breathe the small particles / smoke ✓ It stops / reduces smog / pollution✓	1 (AO 2.2)	**IGNORE** all references to CO_2 / SO_2 / greenhouse gases / acid rain **Examiner's Comments** Candidates needed to relate their response to the context of the question. Answers such as to prevent damage to the environment were considered too vague. The key point was that the precipitator would reduce the smoke being released.
	b		High voltages can cause electric shocks / electrocution ✓	1 (AO 1.1)	**IGNORE** unqualified it is dangerous **IGNORE** heating **ALLOW** description of electrocution in terms of damage to nervous system or heart **Examiner's Comments** Many candidates gave a vague response about harm and death, as opposed to relating their responses to the high voltage. High scoring

					candidates discussed the possibility of electric shocks and electrocution. Some very detailed responses which also gained full credit discussed the interference with the heart and damage to the nervous system.
	c		**First check the answer on answer line** **If answer = 3 (A) award 3 marks** I = Q ÷ t ✓ I = 360 ÷ 120 ✓ I = 3 (A) ✓	3 (AO 1.2) (AO 2.1) (AO 2.1)	**ALLOW** 180 (A) 2 marks (no unit conversion). Rearrangement of equation **ALLOW ECF** for incorrect time conversion if clearly shown. **Examiner's Comments** This question was answered well. Where errors occurred, it was often due to not changing the time to seconds.
			Total	**8**	
4			**C**	1 (AO 1.1)	**Examiner's Comments** The majority of candidates gained credit. Common incorrect responses were B and D.
			Total	**1**	
5			D ✓	1 (AO1.1)	**Examiner's Comments** This question was very well answered by all candidates. The good approach to answer this type of question is for candidates to read each statement and eliminate the statements by placing a small cross by each distractor.
			Total	**1**	
6			D ✓	1 (AO2.1)	**Examiner's Comments** Most candidates answered this question well. A significant minority of candidates answered B indicating that they had not changed the minutes to seconds.
			Total	**1**	