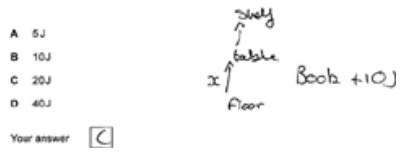
Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1		i	Electrons✓ Light✓	2 (2 × AO 1.1)	**Examiner's Comments** The majority of candidates scored 1 mark. The common errors were confusing atoms with electrons and sound with light.
		ii	**First check the answer on the answer line** **If answer = 240 (J) award 2 marks** (E =) 0.08 x 3000 ✓ (E =) 240 (J) ✓	2 (2 × AO 2.1)	**Examiner's Comments** The majority of candidates correctly multiplied the potential difference by the charge.
		iii	(Risk of) an (electric) shock / electrocution / **AW** ✓	1 (AO 3.2a)	**IGNORE** dangerous / injury / death unqualified **Examiner's Comments** There were many vague answers of the power supply being dangerous or causing death. It was expected that candidates would refer to the risk of electrocution or electric shock.
			Total	**5**	
2	a		0.06(0) (kW) ✓	1 (AO 1.2)	**Examiner's Comments** This was well answered. A common incorrect answer was 0.6 kW.
	b		**First check the answer on the answer line** **If answer = 260 (kW h) award 2 marks** (E =) 0.01 x 26 000✓ (E =) 260 (kW h) ✓	2 (2 × AO 2.1)	**Examiner's Comments** This question was answered well. Where errors occurred, it was either using 0.1 instead of 0.01 or calculating the energy transferred for the filament lamp.
	c		(£) 0.20 ✓	1 (AO 2.2)	**ALLOW** 20 p with unit or (£) 0.2 or (£) 0.20 p **Examiner's Comments** This question proved to be a little challenging. The common incorrect answer was £5 where, in effect, the candidates had inversely found the

					energy transferred per pound of cost, i.e. 5 KW h per pound.
			Total	**4**	
3			C	1 (AO 2.1)	**Examiner's Comments** The majority of candidates correctly answered C. Most candidates who did not gain credit answered B, which corresponds to the increase in gravitational potential energy for a distance *x* from the table to the shelf, but not the **total** increase in gravitational potential energy from the floor to the shelf. Candidates should be encouraged to underline the key words. As shown in the exemplar below, a quick sketch/diagram is helpful in questions like this. Exemplar 1  In this response, the candidate has used the white space around the question to help interpret the question. The diagram has assisted in understanding what is meant by 10 J as well as indicating the change in moving the book from the floor to the shelf.
			Total	**1**	
4			**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 1600 (J) award 3 marks** potential energy = mass × gravitational field strength × height ✓ (potential energy =) 80 × 10 × 2.0 ✓ (potential energy =) 1600 (J) ✓	3 (AO1.2) (2 × AO2.1)	**Examiner's Comments** Some candidates incorrectly converted 80 kg to 80,000 g. Other candidates omitted to include the gravitational field strength.
			Total	**3**	
5			**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 6 × 10^6 (kWh) award 2**	2 (2 × AO2.1)	**ALLOW** 6 000 000 (kWh) **Examiner's Comments**

			marks Energy transferred = $3 \times 2 \times 10^6$ ✓ (Energy transferred =) 6×10^6 (kWh) ✓		The question was generally well answered with most candidates multiplying the power output by 3. Many candidates (correctly) gave their answer in standard form. A significant number of candidates converted the time to minutes (and some candidates then to seconds).
			Total	**2**	
6	a		**Any two from**: Energy transferred electrically from the supply to the heating element or energy transferred by heating from element to the water. ✓ (So) thermal energy store of the element increases. ✓ (So) thermal energy store of water increases. ✓	2 (2 × AO2.1)	**IGNORE** conduction and convection (as question refers to energy stores). **Examiner's Comments** Few candidates were able to write about energy stores in their answers.
	b		**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 3 150 000 (J) award 3 marks** Temperature change = 95-20 = 75°C ✓ Change in thermal energy = 10 × 4200 × 75 ✓ (Change in thermal energy =) 3 150 000 (J) ✓	3 (AO2.2) (2 × AO2.1)	**ALLOW ECF** from their temperature change. **Examiner's Comments** This question was well answered. Most candidates correctly worked out the temperature change and gained the correct answer.
			Total	**5**	
7			A ✓	1 (AO2.2)	**Examiner's Comments** This was very well answered. The majority of candidates read the information correctly from the graph. Often, more successful response drew lines indicating the read-offs
			Total	**1**	
8			D ✓	1 (AO1.2)	**Examiner's Comments** This question tested candidates

					understanding of the unit prefix k, kilo. This was reasonably well answered although a significant number of candidates gave incorrect responses. **Helpful Tip** Use the “white space” around the question to write down working and/or equations (to assist with answering the question and to help check answers at the end of the examination)
			Total	**1**	