

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	230 V		1	AO1 6.2.3.1
01.2	alternating		1	AO1 6.2.3.1
01.3	step down		1	AO1 6.2.4.3
02.1	the live wire — is attached to an alternating p.d. from the supply the neutral wire — completes the circuit the earth wire — is the safety wire	all lines correct for two marks one line correct for one mark	2	AO1 6.2.3.2
02.2	live and neutral		1	AO1 6.2.3.2
02.3	no case cannot		1 1 1	AO1 6.2.3.2
03.1	1000 W more		1 1	AO3 6.2.4.2
03.2	energy transferred = 700W x 60s = 42 000 J		1 1 1	AO1 AO2 6.2.4.2
03.3	the mains thermal		1 1	AO2 6.2.4.2

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04.1	power = potential difference \times current = 6×1.5 = 9 W		1 1	AO1 AO2 4.2.4.1
04.2	power = $\frac{\text{energy}}{\text{time}}$		1	AO1 4.1.1.4
04.3	$g = \frac{\text{energy}}{30}$ energy = 9×30 = 270 (J)	accept 270 with no working for three marks	1 1 1	AO2 4.2.4.2
04.4	both devices transfer the same amount of energy		1	AO2 4.2.4.2
05.1	potential difference = 230 V		1	AO1 6.2.4.2
05.2	energy transferred = charge flow \times potential difference		1	AO1 6.2.4.2
05.3	energy transferred = 10×230 = 2300 (J)		1 1	AO2 6.2.4.2

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05.4	$\text{power} = \frac{\text{energy transferred}}{\text{time}}$ $= \frac{2300}{15}$ $= 153.3 \text{ W}$ $= 150 \text{ W}$	answer given to two significant figures	1 1 1	AO2 6.2.4.2
05.5	(chemical from the mains to energy in a), kinetic (store) and thermal (store)		1 1	AO2 6.2.4.2
06.1	power = potential difference x current		1	AO1 6.2.4.1
06.2	$\text{power} = 230 \times 3.5$ $= 805 \approx 800 \text{ W}$		1 1	AO2 6.2.4.1
06.3	power = current ² x resistance		1	AO1 6.2.4.1
06.4	$805 = (3.5)^2 \times \text{resistance}$ $805 = 12.25 \times \text{resistance}$ $\text{resistance} = \frac{805}{12.25}$ $= 65.71 \approx 66 \Omega$		1 1	AO2 6.2.4.1
06.5	metal conducts electricity if the live wire touches the case and you touch the case, a current can flow through you		1 1	AO3 6.2.3.2

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07.1	kettle	allo1 2.2 kW	1	AO2 6.2.4.1
07.2	power = current x potential difference		1	AO1 6.2.4.1
07.3	microwave		1	AO3 6.2.4.1
07.4	1100 = current x 230 current = $\frac{1100}{230}$ = 4.8 A		1 1 1	AO2
07.5	current in kettle is double/twice/two times the current in the vacuum cleaner		1	AO3 6.2.4.1
08.1	insulating slowly thicker		1 1 1	AO2 6.1.2.1
08.2	glass		1	AO3 6.1.2.1
09.1	the National Grid		1	AO1 4.2.4.3

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09.2	both transformers change the potential difference the transformer near the power station/transformer 1 is a step-up transformer/increases the potential difference the transformer near the house/transformer 2 is a step-down transformer/decreases the potential difference		1 1 1	AO1 4.2.4.3
09.3	(the energy is transferred at a high potential difference so) the current is small so the energy/power/heat lost is small		1 1	AO1 4.2.4.3
10.1	the potential difference of the mains electricity in the UK is – about 230 V the frequency of mains electricity in the UK is – 50 Hz the mains supply in the UK produces a current that is – alternating		1 1 1	AO1 4.2.3.1
10.2	Earth or neutral Earth; neutral in any order live; neutral in any order	either word for the mark either order for the mark either order for the mark	1 2 2	AO1 4.2.3.1
10.3	if the casing on an appliance becomes live, the earth wires conducts the current safely to earth	do not accept 'to protect the user'	1	AO1 4.2.3.1
11.1	power of solar cells = 10 W power of wind turbine = 0.4 W number x 0.4 = 10 number = $\frac{10}{0.4} = 25$	allow 25 without calculation for two marks	1 1	AO2
11.2	cost of 25 wind turbines = 200 x 25 = £5000		1	

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11.3	cost of solar cells = £12 000 the cost of the wind turbines is much less than that of the solar cells the wind turbines take up space/affect the ecosystem there are fewer environmental issues with solar cells	comparison	1 1 1	A03 6.2.4.1