

- 1) D  
 2) C  
 3) C  
 4) D  
 5)

(a)	(i) $P = VI$ current = $60/240 = 0.25$ A	C1 A1	
	(ii) $R (= V/I) = 240/0.25$ = $960 \Omega$	M1 A0	[3]
(b)	$R = \rho L/A$ (wrong formula, 0/3) $960 = (7.9 \times 10^{-7} \times L)/(\pi \times \{6.0 \times 10^{-6}\}^2)$ $L = 0.137$ m (use of $A = 2\pi r$ , then allow 1/3 marks only for resistivity formula)	C1 C1 A1	[3]
(c)	e.g. the filament must be coiled/it is long for a lamp (allow any sensible comment based on candidate's answer for L)	B1	[1]
		<b>Total</b>	<b>[7]</b>

(i)	$R = \rho L / A$	B1	
(ii)	strain = $\Delta L / L$ either $\Delta R = \rho \Delta L / A$ or $R \propto L$ with $\rho$ and $A$ constant dividing, $\Delta R / R = \Delta L / L$	B1 B1 A0	[3]

- 6)  
 7)

(a)	power = $VI$ current = $10.5 \times 10^3 / 230$ = $45.7$ A	C1 M1 A0	[2]
(b) (i)	p.d. across cable = $5.0$ V $R = 5.0 / 46$ = $0.11 \Omega$	C1 C1 A1	[3]
(ii)	$R = \rho L / A$ $0.11 = (1.8 \times 10^{-8} \times 16 \times 2) / A$ $A = 5.3 \times 10^{-6} \text{ m}^2$ (wires in parallel, not series, allow max 1/3 marks)	C1 C1 A1	[3]

