

Mark schemes

1.	(a) Peak power = 107 / 108 mW and load resistance = 290 / 310 Ω ✓	1
	Use of power = I^2R with candidate values ✓	1
	0.0186 – 0.0193 A ✓	1
	(b) Area of cell = 36 x 10 ⁻⁴ m ² and solar power arriving = 730 x (an area) ✓	1
	$\frac{0.108}{2.63}$ seen ✓	1
	0.041 (correct answer only; lose if ratio given unit) ✓	1
	(c) energy of one photon = $\frac{hc}{\lambda} = 4.0 \times 10^{-19} \text{J}$ ✓	1
	Number of photons = $\frac{730 \times 36 \times 10^{-4}}{4.0 \times 10^{-19}} = 6.6 \times 10^{18} \text{ s}^{-1}$ ✓	1
	(d) Two from	
	Intensity of the sun at the Earth's surface	
	Average position of the sun	
	Efficiency of the panel	
	Power output of 1 panel	
	Weather conditions at the installation=	
	✓✓	
	<i>Allow other valid physics answers=</i>	2
		[10]
2.	C	[1]
3.	B	[1]