Question Number	Answer	Mark
3(a)	• Voltmeter connected in parallel to solar cell only (1) • Ammeter connected in series with the solar cell **and** resistor (1) MP1 - Accept voltmeter connected in parallel to the resistor only, if no other resistance components (e.g. variable resistor, bulb, etc) are added Additional cells added – Not MP2.	**2**
3(b)	**Max 2 from** • Same distance between lamp and solar cell (1) • Keep angle of solar cell to light the same (1) • Block background light **Or** control background light level **Or** avoid casting shadows on the solar cell (1)	**2**
3(c)	• Suitable method to vary solar cell temperature e.g. immersion in a water bath, clamped a fixed distance from a hair dryer (must include a method, rather than just naming a heat source) (1)	**1**
3(d)	• Use of $P = VI$ (1) • $P = 0.12$ W (1) <u>Example of calculation</u> $P = VI$ $P = 2.74\text{V} \times 45\times10^{-3}\text{A}$ $P = 0.12$ W	**2**
3(e)	• Use of $I = P / A$ (1) • Use of efficiency = useful power output / total power input (1) • Efficiency = 0.17 (17%) (1) Allow ecf from 3(d) for useful power output For MP1 & 2 accept a calculation of power output per m^2 and efficiency calculated using input of 200 W m^{-2} For MP3 there should be no unit given or correct conversion to % <u>Example of calculation</u> $I = P / A$ $P = 200\text{ W m}^{-2} \times (60\times10^{-3})^2$ $P = 0.72$ W Efficiency = useful power output / total power input Efficiency = 0.12 W / 0.72 W = 0.17	**3**
3(f)(i)	**Max 2 from** • Too few readings (1) • Too small a range of temperatures (1) • Inconsistent intervals in temperature readings (1) • Inconsistent d.p. in current values (1)	**2**