

Question Number	Answer	Mark
16ai	Use of area = $1.20 \text{ (m)} \times 0.80 \text{ (m)}$ (1) Use of $I = P/A$ (needs to be a dimensionally-correct area) (1) Use of efficiency = useful power output / total power input (1) Efficiency = 14 % (1) <u>Example of calculation</u> P of Sun at solar cell = $I \times A = 1040 \text{ W m}^{-2} \times 1.20 \text{ m} \times 0.80 \text{ m} = 998 \text{ W}$ Efficiency = $\frac{140 \text{ W}}{998 \text{ W}} = 0.14$ (14 %)	4
16aii	Any two from: Light from the sun may not be incident on the solar panel at 90° (1) Intensity might be lower due to clouds/rain/fog (1) Light may be reflected at the solar panel (1) Pump may not be 100% efficient (1) Friction between the water and the pipe Or Energy transferred to thermal energy (1)	2
16bi	Unpolarised has oscillations/vibrations in all/many planes (1) Plane polarised has oscillations/vibrations in one plane (1) which includes the direction of (wave) travel (1) (MP3 dependent on MP1 or MP2 being awarded) Or Unpolarised has oscillations/vibrations in all/many directions (1) Plane polarised has oscillations/vibrations in one direction (1) which is perpendicular to the direction of (wave) travel (1) (MP3 dependent on MP1 or MP2 being awarded)	3
16bii	(Light directed through a) polarising filter (1) No change in intensity as filter is rotated Or if it was polarised, the intensity would change as the filter is rotated (1)	2
Total for question 16		11