Question			Expected response	Max mark	Additional guidance
8.	(a)			2	Any mention of laser - 0 marks.
					INDEPENDENT MARKS
			Apparatus (1)		Must have either name or a labelled diagram of <u>all measuring</u> instruments.
			Method used to collect data (1)		Do not accept: light sensor on its own for instrument to measure irradiance.
					Ignore any mention of analysis of data.
	(b)	(i)	The power per unit area (incident on a surface)	1	Accept: power per square metre/power per metre squared/(m²)
					Do not accept: watts per square metre

Question		on	Expected response		Max mark	Additional guidance
8.	(b)	(ii)	$142 \times 0.200^{2} = 5.68$ $63.1 \times 0.300^{2} = 5.68$ $35.5 \times 0.400^{2} = 5.68$ $22.7 \times 0.500^{2} = 5.68$ $15.8 \times 0.600^{2} = 5.69$ statement of $I \times d^{2} = \text{constant}$ OR $I \propto \frac{1}{d^{2}}$	(1)	3	If only 4 sets of data used correctly then maximum 2 marks.  If only 3 sets of data used correctly then maximum 1 mark (for relationship).  If only 1 or 2 sets of data used correctly, award 0 marks.  Must be clear how the candidate has used the data to obtain the relationship.  Accept: $I \times d^2 = 5.68$ Ignore inappropriate averaging in this case.  The 'statement' mark is only available if consistent with the calculations shown. $I_1d_1^2 = I_2d_2^2$ is insufficient on its own for statement of relationship. $I \times d^2 = k$ is insufficient on its own for statement of relationship.  Graphical method: Graph drawn correctly (1) Line of best fit through origin (1) Statement of relationship. (1)
						A sketch graph is not acceptable.
	(c)		Area increases  Power remains the same	(1)	2	'light spreads out' is insufficient for 'area increases'  Accept alternative explanation, provided the candidate refers to irradiance on light detector:  Area remains the same (1) (Incident) power decreases (1)