Unit 2 – Particles & Waves
Section 4 - Inverse Square Law

2010 **16.** The irradiance of light from a point source is 20 W m^{-2} at a distance of 5·0 m from the source.

What is the irradiance of the light at a distance of 25 m from the source?

A 0·032 W m^{-2}

B 0·80 W m^{-2}

C 4·0 W m^{-2}

D 100 W m^{-2}

E 500 W m^{-2}

2013 **16.** The irradiance of light can be measured in

A W

B W m^{-1}

C W m

D W m^{-2}

E W m^{2}.

2014 **16.** The irradiance of light from a point source is 160 units at a distance of 0·50 m from the source.

At a distance 2·0 m from this source, the irradiance is

A 160 units

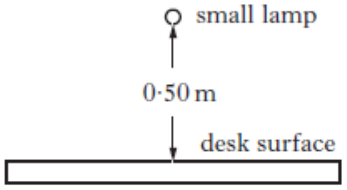
B 80 units

C 40 units

D 10 units

E 5 units.

2015 **17.** A small lamp is placed 0·50 m above the surface of a desk.



There is no other source of light.

The lamp is now moved until the irradiance at the desk surface is halved.

The new distance of the lamp above the desk surface is approximately

A 0·7 m

B 1·0 m

C 1·4 m

D 1·5 m

E 2·0 m.

2016 15. The irradiance of light from a point source is $32\,W\,m^{-2}$ at a distance of 4·0 m from the source.

The irradiance of the light at a distance of 16 m from the source is

A $0{\cdot}125\,W\,m^{-2}$

B $0{\cdot}50\,W\,m^{-2}$

C $2{\cdot}0\,W\,m^{-2}$

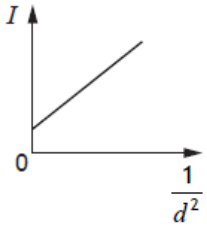
D $8{\cdot}0\,W\,m^{-2}$

E $128\,W\,m^{-2}$.

2017 14. A student carries out an experiment to investigate how irradiance varies with distance.

A small lamp is placed at a distance d away from a light meter. The irradiance I at this distance is displayed on the meter. This measurement is repeated for a range of different distances.

The student uses these results to produce the graph shown.



The graph indicates that there is a systematic uncertainty in this experiment.

Which of the following would be most likely to reduce the systematic uncertainty in this experiment?

A Repeating the readings and calculating mean values.

B Replacing the small lamp with a larger lamp.

C Decreasing the brightness of the lamp.

D Repeating the experiment in a darkened room.

E Increasing the range of distances.

2017 15. A point source of light is 8·00 m away from a surface. The irradiance, due to the point source, at the surface is $50{\cdot}0\,mW\,m^{-2}$. The point source is now moved to a distance of 12·0 m from the surface.

The irradiance, due to the point source, at the surface is now

A $22{\cdot}2\,mW\,m^{-2}$

B $26{\cdot}0\,mW\,m^{-2}$

C $33{\cdot}3\,mW\,m^{-2}$

D $75{\cdot}0\,mW\,m^{-2}$

E $267\,mW\,m^{-2}$.

2018 12. The irradiance on a surface 0·50 m from a point source of light is I.
The irradiance on a surface 1·5 m from this source is

A $0{\cdot}11I$

B $0{\cdot}33I$

C $1{\cdot}5I$

D $3{\cdot}0I$

E $9{\cdot}0I$.