

- 6 (a) State what is meant by a *photon*.

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.....

..... [2]

- (b) A narrow parallel beam of laser light is incident on a surface at an angle of incidence of 52° , as shown in Fig. 6.1.

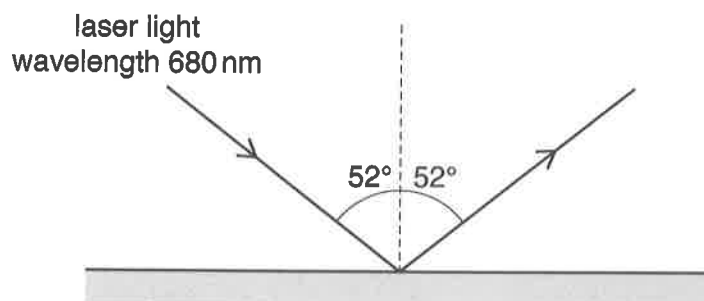


Fig. 6.1

The beam has a circular cross-section of diameter 1.2 mm.
The laser light has wavelength 680 nm and intensity $3.1 \times 10^3 \text{ W m}^{-2}$.

- (i) Determine the energy of a photon of the laser light.

energy = J [2]

- (ii) Show that the number of photons incident per unit time on the surface is $1.2 \times 10^{16} \text{ s}^{-1}$.

[2]





- (c) For the laser light incident on the surface in Fig. 6.1, only 55% of the photons are reflected and the remainder are absorbed.

Calculate the force F normal to the surface that is exerted by the laser light on the surface.

$F = \dots\dots\dots$ N [6]

[Total: 12]

