

8 (a) State what is meant by a photon.

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..... [2]

(b) A laser emits red light of a single wavelength. The light is produced when electrons move from a higher energy level to a lower energy level. The difference in energy between the two levels is 1.96 eV.

(i) Calculate the wavelength of the light.

wavelength = m [3]

(ii) The power of the beam emitted by the laser is $1.0 \times 10^{-2} \text{ W}$.

Calculate the number of photons emitted per unit time by the laser.

number per unit time = s^{-1} [1]

(iii) The photons are incident normally on a surface. Half of the number of photons are absorbed by the surface, and half are reflected.

Determine the average force exerted by the beam of photons on the surface.

average force = N [4]