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

....

....

.... [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 1.0×10^{-2} 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]

[Total: 10]