**1**

Fig. 1.1 shows an incident photon of momentum $7.30 \times 10^{-22}$ kg m $s^{-1}$ colliding with a stationary electron.

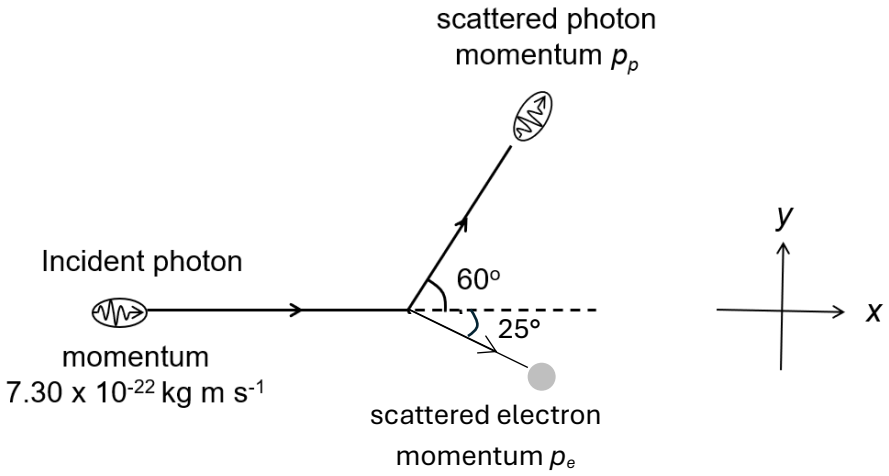


**Fig. 1.1**

After the collision, the photon is scattered off through an angle of 60° and has a momentum $p_p$. The electron gets scattered off at an angle of 52° with a momentum $p_e$. Their scattering angles are measured with respect to the path of the incident photon.

**(a)**

Explain why linear momentum is conserved in this collision for the system of photon and electron.

.....

.....[1]

**(b)**

Consider the photon and electron as a system.

**(i)**

State the total momentum of the system along the

**1.**

*x*-direction,

momentum in *x*-direction = ..... kg m $s^{-1}$ [1]