

1. Berikas sinar merah dengan panjang gelombang 1000 nm. berapa eV energi cahaya merah tersebut? berapa besar mommentumnya? dan berapa besar percepatan elektron?
Penyelesaian:

$$* E = \frac{hc}{\lambda}$$

$$h = 6,626 \times 10^{-34} \text{ Js}$$

$$c = 3 \times 10^8 \text{ m/s}$$

$$\lambda = 1000 \text{ nm} = 1 \times 10^{-6} \text{ m}$$

$$E = \frac{(6,626 \times 10^{-34}) \times (3 \times 10^8)}{1 \times 10^{-6} \text{ m}}$$

$$E = \frac{1,9878 \times 10^{-25}}{1 \times 10^{-6}}$$

$$E = 1,9878 \times 10^{-19} \text{ J}$$

$$1 \text{ eV} = 1,6 \times 10^{-19} \text{ J}$$

$$E = \frac{1,9878 \times 10^{-19}}{1,6 \times 10^{-19}}$$

$$E = 1,24 \text{ eV}$$
$$=$$

$$* p = \frac{E}{c}$$

$$p = \frac{1,9878 \times 10^{-19}}{3 \times 10^8}$$

$$p = 6,63 \times 10^{-28} \text{ kgm/s.}$$

$$* E = \frac{1}{2} mv^2$$

dengan

$$m = 9,109 \times 10^{-31} \text{ kg}$$

$$E = 1,9878 \times 10^{-19} \text{ J}$$

$$v = \sqrt{\frac{2E}{m}}$$

$$v = \sqrt{\frac{2(1,9878 \times 10^{-19})}{9,109 \times 10^{-31}}}$$

$$= \sqrt{\frac{3,9756 \times 10^{-19}}{9,109 \times 10^{-31}}}$$

$$v = \sqrt{4,363 \times 10^{11}}$$

$$v = 6,61 \times 10^5 \text{ m/s} = 660.642 \text{ m/s}$$