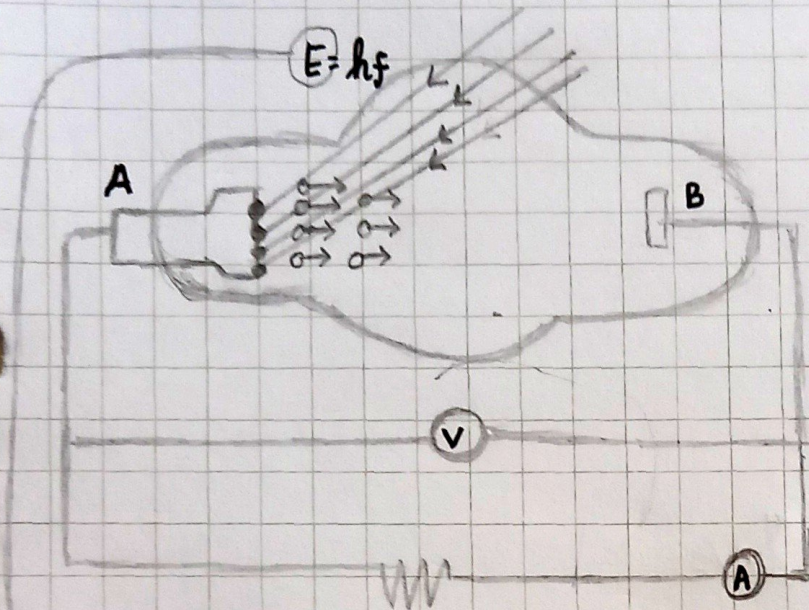


## "EFEK FOTOLISTRIK"



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

$$f = \frac{c}{\lambda}$$

$$\lambda = \frac{c}{f}$$

$$\lambda = 7000 \text{ \AA}$$

$$E = hf$$

$$E = hf - hf_0$$

$$eV =$$

$$f = \frac{c}{\lambda} = \frac{3 \times 10^8}{7 \times 10^{-7}} = 4,29 \times 10^{14} \text{ Hz.}$$

contoh :

Berkas sinar merah dengan intensitas yang kuat dengan panjang gelombangnya 1000 nm. Berapa eV energi cahaya, besar momentum dan besar kecepatan elektronnya ?

Jawab :

$$E = \frac{hc}{\lambda} = \frac{6,626 \times 10^{-34} \text{ Js} \cdot 3 \times 10^8}{10^{-6}}$$

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

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

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

$$E = \frac{1,9878 \times 10^{-19}}{1,6 \times 10^{-19}} = 1,24 \text{ eV.}$$

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

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

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

momentum

$$p = \frac{h}{\lambda}$$

$$= \frac{6,626 \times 10^{-34}}{1000 \times 10^{-9}}$$

$$= 6,626 \times 10^{-29} \text{ kg m/s}$$

kec. elektron

$$E_k = E - W$$

$$E_k = E$$

$$E_k = E$$

$$E_k = E$$

$$E_k = \frac{1}{2} m v^2$$

$$v = \sqrt{\frac{2E_k}{m_e}}$$

Substitusi

$$v = \sqrt{\frac{2 \times 1,9828 \times 10^{-19}}{9,109 \times 10^{-31}}}$$

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

$$v \approx 2,09 \times 10^5 \text{ m/s}$$

## 2. Momentum Foton

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

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

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

## 3. $E = \frac{1}{2} mv^2$

dengan :

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

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

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

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

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

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

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

$$= 660,642 \text{ m/s}$$

## Panjang Gelombang Cahaya

$$E = 3,3 \text{ eV}$$

$$h = 6,626 \times 10^{-34} \text{ J.s}$$

$$c = 3,0 \times 10^8 \text{ m/s}$$

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

Jawab :

$$E = \frac{hc}{\lambda} = 3,3 \times (1,6 \times 10^{-19})$$
$$= 5,28 \times 10^{-19}$$

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

$$= \frac{6,626 \times 10^{-34} \times 3 \times 10^8}{5,28 \times 10^{-19}}$$

$$= \frac{1,9878 \times 10^{-25}}{5,28 \times 10^{-19}}$$

$$\lambda = 3,76 \times 10^{-7} \text{ m}$$
$$= 376 \text{ Nm}$$