

a) $E_1 = -36 \text{ eV}$

$E_4 = -1 \text{ eV}$

$\Delta E = E_4 - E_1$

$(-1 \text{ eV}) - (-36 \text{ eV})$

$$\Delta E = 35 \text{ eV}$$

b) Long λ = low energy

$\Delta E = E_4 \rightarrow E_3 \text{ for low energy}$

$\Delta E = (-4 \text{ eV}) - (-1 \text{ eV})$

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

$E = \frac{h \cdot c}{\lambda}$

$(3 \text{ eV}) = \frac{1240 \text{ eV} \cdot \text{nm}}{\lambda}$

$$\lambda = 413 \text{ nm}$$

c) Short λ = high energy

$\Delta E = E_4 \rightarrow E_1 \text{ for high energy}$

$\Delta E = (-36 \text{ eV}) - (-1 \text{ eV})$

$\Delta E = 35 \text{ eV}$

$E = \frac{h \cdot c}{\lambda}$

$(35 \text{ eV}) = \frac{1240 \text{ eV} \cdot \text{nm}}{\lambda}$

$$\lambda = 35.4 \text{ nm}$$