Transition A produces light with a wavelength of 470 nm. Transition B involves twice as much energy as A. What wavelength light does it produce?

Solution

We have the $\varepsilon = h\nu$ (ε is energy of one photon, h is Planck constant), $\nu = \frac{c}{\lambda}$, λ is wavelength, ν is frequency, c is speed of light.

If transition A produces

$$\varepsilon_A = h\frac{c}{\lambda_A}$$

And transition B involves

$$\varepsilon_B = 2\varepsilon_A$$

$$\varepsilon_B = h\frac{c}{\lambda_B}$$

From here we have wavelength of transition B

$$\lambda_B = \frac{\lambda_A}{2} = 235nm$$