# Answer on Question #75623 | Chemistry – General Chemistry

Calculate the energy required to excite the Na electron form level n=1 to n=2. Calculate the frequency of light absorbed by Na atom in its ground state to reach this excited state. h = 6.626 x 10-34 J s

**Solution**

To answer this question we should use Rydberg formula for hydrogen-like chemical elements:

$1/\lambda = R \cdot Z^2 \cdot (1/n_1^2 - 1/n_2^2)$

$E = h \cdot \nu = h \cdot c/\lambda$

Then combined equation is:

$\Delta E = - R \cdot Z^2 \cdot h \cdot c\ (1/n_1^2 - 1/n_2^2) = -k \cdot Z^2 \cdot (1/n_1^2 - 1/n_2^2)$, where $k = 2.179 \cdot 10^{-18}$ J

$\Delta E = - 2.179 \cdot 10^{-18} \cdot 11^2 \cdot (1/2^2 - 1/1^2) = 1.977 \cdot 10^{-16}$ J

$\nu = E/h = 1.977 \cdot 10^{-16} / 6.626 \cdot 10^{-34} = 2.98 \cdot 10^{17}\ s^{-1}$

**Answer:** $\Delta E = 1.977 \cdot 10^{-16}$ J, $\nu = 2.98 \cdot 10^{17}\ s^{-1}$