Assignment

Calculate the wavenumber and wavelength of the second line in the Balmer series of hydrogen spectrum

ANSWER

From Rydberg's equation,

$$v = \frac{1}{\lambda} = R_H \left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

For the second line of Balmer series of hydrogen spectrum, n_1=2 and n_2=3.

$$v = R_H \left[\frac{1}{2^2} - \frac{1}{3^2}\right]$$

$$\frac{1}{\lambda} = R_H \left[\frac{5}{36}\right]$$

$$\therefore \lambda = \frac{36}{5R}$$