Previous Year JEE Problems

For the Balmer series in the spectrum of H atom,

$\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$, the correct statements among (I) to (IV) are :

(I) As wavelength decreases, the lines in the series converge

(II) The integer n_1 is equal to 2

(III) The lines of longest wavelength corresponds to $n_2 = 3$

(IV) The ionization energy of hydrogen can be calculated from wave number of these lines

A (II), (III), (IV)

B (I), (II), (III)

C (I), (III), (IV)

D (I), (II), (IV)

Explanation

For balmer series : $n_1 = 2$, $n_2 = 3, 4, 5, ...\infty$

For longest wavelength $n_2 = 3$

$$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{3^2}\right)$$

As wavelength decreases the lines in the Balmer series converge. The correct statements are (I), (II) and (III).