

QUESTION:

A blood corpuscle has a diameter about 9×10^{-6} m in which excited orbit should a hydrogen atom should be so that it is just about as big as the blood corpuscle?

SOLUTION:

The allowed orbit radius of the electron in a hydrogen atom is

$$r_n = \frac{n^2 \hbar^2}{k_e e^2 m_e}$$

Where m_e is the electron's mass, e is the charge of the electron, k_e is Coulomb's constant, $\hbar = h/2\pi$, n is orbit number.

So,

$$n = \sqrt{\frac{r_n k_e e^2 m_e}{\hbar^2}}$$

$$n = 414.7$$

So, electron must be at least at 415 orbit.

ANSWER:

415