5. The number of revolutions per second made by an electron in the first Bohr orbit of hydrogen atom is of the order of 3

(A) 10^{20} (B) 10^{19}

(C) 10^{17} (D) 10^{15}

Sol: (D) $mvr = \frac{h}{2\pi}$ (for first orbit)

$$\Rightarrow m\omega r^2 = \frac{h}{2\pi} \Rightarrow m \times 2\pi v \times r^2 = \frac{h}{2\pi} \Rightarrow v = \frac{h}{4\pi^2 mr^2}$$

$$= \frac{6.6 \times 10^{-34}}{4(3.14)^2 \times 9.1 \times 10^{-31} \times (0.53 \times 10^{-10})^2} = 6.5 \times 10^{15} \frac{rev}{sec}$$