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- 6. Hydrogen atoms in states of high quantum number are known as the Rydberg [2+2]atoms.
 - (a) Find the quantum number of the Bohr orbit in a hydrogen atom whose radius is $0.01 \ mm$.
 - (b) What is the energy of a hydrogen atom in this state?

a) Let the quantum number be 'n'.

$$Y_n = 0.01 \text{ mm} = 0.01 \times 10^3 \text{ m} = 10^5 \text{ m} \text{ (Given)}$$

$$r_n = n^2 q_0$$
 (according to Bohr's model)
 $1.10^{-5} = n^2 \times 5.292 \times 10^{-11}$

$$E_{n} = \frac{-B.6}{h^{2}} eV$$

$$= \frac{-7.187 \times 10^{-5} eV}{10^{-5}}$$

$$\frac{1}{1000} = -1.15 \times 10^{-23}$$

Ans: a) The quantum number is 435

in this state

