$$R_{1s}(r) = 2a^{-3/2} e^{-r/a}$$

$$\langle V \rangle = \int_0^\infty 4a^{-3} e^{-2r/a} \cdot \left(\frac{-e^2}{4\pi\varepsilon_0 r}\right) r^2\, dr \qquad a = \frac{4\pi\varepsilon_0 \hbar^2}{\mu e^2}$$

so $\dfrac{e^2}{4\pi\varepsilon_0} = \dfrac{\hbar^2}{a\mu}$.

$$\langle V \rangle = -4a^{-3} \frac{\hbar^2}{a\mu} \int_0^\infty r\, e^{-2r/a}\, dr = -\frac{4\hbar^2}{a^4\mu} \cdot \frac{1}{(2/a)^2} = -\frac{\hbar^2}{a^2\mu}$$

$$\langle V \rangle = -\frac{\hbar^2}{\mu}\left(\frac{\mu e^2}{4\pi\varepsilon_0 \hbar^2}\right)^2 = -\frac{\mu e^4}{16\pi^2 \varepsilon_0^2 \hbar^2} = 2\, E_{1s}.$$

$$\left\langle \frac{\hat{p}^2}{2m} \right\rangle = E_{1s} - \langle V \rangle = -E_{1s}.$$