Find the radius and energy of a He^+ ion in the states (a) $n = 1$, (b) $n = 4$ and (c) $n = 10$.

a) $n = 1, r = \frac{\varepsilon_0 h^2 n^2}{\pi m Z e^2} = \frac{0.53 n^2}{Z}$ A°

$= \frac{0.53 \times 1}{2} = 0.265$ A°

$\varepsilon = \frac{-13.6 z^2}{n^2} = \frac{-13.6 \times 4}{1} = -54.4$ eV

b) $n = 4, r = \frac{0.53 \times 16}{2} = 4.24$ A

$\varepsilon = \frac{-13.6 \times 4}{164} = -3.4$ eV

c) $n = 10, r = \frac{0.53 \times 100}{2} = 26.5$ A

$\varepsilon = \frac{-13.6 \times 4}{100} = -0.544$ A