

38. (a) We use Eq. 40-25. At $r = a$

$$\psi^2(r) = \left(\frac{1}{\sqrt{\pi}a^{3/2}} e^{-a/a} \right)^2 = \frac{1}{\pi a^3} e^{-2} = \frac{1}{\pi(5.29 \times 10^{-2} \text{ nm})^3} e^{-2} = 291 \text{ nm}^{-3} .$$

(b) We use Eq. 40-31. At $r = a$

$$P(r) = \frac{4}{a^3} a^2 e^{-2a/a} = \frac{4e^{-2}}{a} = \frac{4e^{-2}}{5.29 \times 10^{-2} \text{ nm}} = 10.2 \text{ nm}^{-1} .$$