

39. (a) We use Eq. 40-31. At $r = 0$, $P(r) \propto r^2 = 0$.

(b) At $r = a$

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

(c) At $r = 2a$

$$P(r) = \frac{4}{a^3} (2a)^2 e^{-4a/a} = \frac{16e^{-4}}{a} = \frac{16e^{-4}}{5.29 \times 10^{-2} \text{ nm}} = 5.54 \text{ nm}^{-1} .$$