

36. (a) The average speed is

$$v_{\text{avg}} = \frac{\sum n_i v_i}{\sum n_i} = \frac{2(1.0) + 4(2.0) + 6(3.0) + 8(4.0) + 2(5.0)}{2 + 4 + 6 + 8 + 2} = 3.2 \text{ cm/s} .$$

(b) From $v_{\text{rms}} = \sqrt{\sum n_i v_i^2 / \sum n_i}$ we get

$$v_{\text{rms}} = \sqrt{\frac{2(1.0)^2 + 4(2.0)^2 + 6(3.0)^2 + 8(4.0)^2 + 2(5.0)^2}{2 + 4 + 6 + 8 + 2}} = 3.4 \text{ cm/s} .$$

(c) There are eight particles at $v = 4.0 \text{ cm/s}$, more than the number of particles at any other single speed. So 4.0 cm/s is the most probable speed.