

9. (a) The amplitude is half the range of the displacement, or $x_m = 1.0$ mm.
(b) The maximum speed v_m is related to the amplitude x_m by $v_m = \omega x_m$, where ω is the angular frequency. Since $\omega = 2\pi f$, where f is the frequency,

$$v_m = 2\pi f x_m = 2\pi(120 \text{ Hz}) (1.0 \times 10^{-3} \text{ m}) = 0.75 \text{ m/s} .$$

- (c) The maximum acceleration is

$$a_m = \omega^2 x_m = (2\pi f)^2 x_m = (2\pi(120 \text{ Hz}))^2 (1.0 \times 10^{-3} \text{ m}) = 570 \text{ m/s}^2 .$$