HW 11-2 Soln)

As discussed in class, $E_{tot} = {}^1/_2kA^2 = {}^1/_2mv^2 + {}^1/_2kx^2$

$E_{tot} = ½\,kA^2 = 0.5*350*(0.06^2) =$ 0.63 J

v_{max} occurs when x = 0, so $E_{tot} = {}^1/_2mv_{max}^2$
$v_{max} = [2E_{tot}/m]^{1/2} = [2(0.63)/0.3]^{1/2} =$ 2.05 m/s

Alternately, $v_{max} = 2\pi f_o A = [k/m]^{1/2}A = [350/0.3]^{1/2}*(0.06) =$ 2.05 m/s, although, this is just doing the two steps above in one step.

In general (from the second law), -kx = ma, so

$|a_{max}| = |kx_{max}/m| = kA/m = 350(0.06)/0.3 =$ 70 m/s^2

Alternately, $a_{max} = \omega^2 A$ *et c.*