② $a_{max} = 140 \text{ m/s}^2$

$a_{max} = A\omega^2 \qquad \omega = 2\pi f = 2\pi(32) = 201.06$

$140 = A(201.06)^2$

$A = .00346 \text{ m}$

$\underline{3.46 \text{ mm}}$

$E = \frac{1}{2} m v_{max}^2 \qquad v_{max} = \omega A$

$= \frac{1}{2}(.650)(201.06)^2(.00346)^2$

$= \underline{.157 \text{ Joule}}$

$\frac{1}{2}kx^2 = \frac{1}{2}\underbrace{\left(\frac{1}{2}kA^2\right)}_{\text{TOTAL energy}}$

$\uparrow$ spring potential $\quad \frac{1}{2}$ total energy

$x^2 = \frac{1}{2}A^2 \qquad x = \sqrt{\frac{1}{2}}A = (.707)(.00346)$

$= \underline{.00245 \text{ m}}$