

PRACTICE EXAM 3 – SOLUTIONS TO WORD PROBLEMS

Problem 1

$$(A) A_1 v_1 = \pi(4.24 \times 10^{-2} \text{ m})^2 (0.800 \text{ m/s}) = \underline{\underline{4.52 \times 10^{-3} \text{ m}^3/\text{s}}}$$

$$(B) A_1 v_1 = A_2 v_2 \rightarrow v_2 = \underline{\underline{1.60 \text{ m/s}}}$$

$$(C) P_1 + \frac{1}{2} \rho v_1^2 = P_2 + \frac{1}{2} \rho v_2^2 \rightarrow P_2 = \underline{\underline{340 \text{ Pa}}}$$

Problem 2

$$(A) \omega = 2\pi f = \frac{2\pi}{T} = \sqrt{\frac{k}{m}} \rightarrow T = 2\pi \sqrt{\frac{m}{k}} = \underline{\underline{0.237 \text{ sec}}}$$

$$(B) E = \frac{1}{2} k A^2 = \underline{\underline{0.0280 \text{ J}}}$$

$$(C) E = \frac{1}{2} m v^2 + \frac{1}{2} k x^2 \rightarrow v = \underline{\underline{0.700 \text{ m/s}}}$$

Problem 3

$$(A) \kappa = \frac{2\pi}{\lambda} = 0.80 \text{ rad/m} \rightarrow \lambda = \underline{\underline{7.85 \text{ m}}}$$

$$(B) \omega = 2\pi f = 50 \text{ rad/s} \rightarrow f = \underline{\underline{7.96 \text{ Hz}}}$$

$$(C) v = \lambda f = \sqrt{\frac{F}{\mu}} \rightarrow F = \underline{\underline{266 \text{ N}}}$$

Problem 4

$$(A) I_{\text{pain}} = 1.00 \text{ W/m}^2 = \frac{P}{4\pi r^2} \rightarrow r = \underline{\underline{0.691 \text{ m}}}$$

$$(B) I_0 = 1.00 \times 10^{-12} \text{ W/m}^2 = \frac{P}{4\pi r^2} \rightarrow r = \underline{\underline{6.91 \times 10^5 \text{ m}}}$$