

## Exam 1 Equations

$$v = 331 \text{ m/s} \sqrt{1 + \frac{T}{273}}$$

T in degrees Celsius

$$F = -kx$$

$$a = -\frac{k}{m} x$$

$$T = 1/f$$

$$\text{Springs: } T = 2\pi \sqrt{\frac{m}{k}}$$

$$f = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$$

$$\text{pendulum: } T = 2\pi \sqrt{\frac{L}{g}} \quad f = \frac{1}{2\pi} \sqrt{\frac{g}{L}} \quad g = 9.8 \text{ m/s}^2$$

$$E = \frac{1}{2} kx^2 + \frac{1}{2} mv^2$$

$$U_g = mgh$$

$$K = \frac{1}{2} mv^2$$

$$\text{Equations of motion general: } x = A \cos(2\pi f t)$$

$$v = -2\pi f A \sin(2\pi f t) \quad a = -(2\pi f)^2 A \cos(2\pi f t)$$

$$v_{max} = 2\pi f A$$

$$a_{max} = A (2\pi f)^2$$

$$v = \sqrt{\frac{T}{\mu}}$$

$$v = \lambda f$$

$$I = \frac{P}{4\pi r^2}$$

$$\beta = 10 \log\left(\frac{I}{I_0}\right) \quad I_0 = 1 \times 10^{-12} \text{ W/m}^2$$

$$f' = f \frac{v \pm v_o}{v \pm v_s}$$

+ observer moving towards, - observer moving away,

- source moving towards, + source moving away.