

Physics 20 Placement Test Formula Sheet

Note: use 9.81 m/s^2 for the acceleration due to gravity and $6.67 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$ for the universal gravitation constant

$$v = \frac{d}{t}$$

$$a = \frac{v_f - v_i}{t}$$

$$v_{ave} = \frac{\Delta d}{\Delta t}$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$d = \left(\frac{v_i + v_f}{2} \right) t$$

$$d = v_f t - \frac{1}{2} a t^2$$

$$a_{ave} = \frac{\Delta v}{\Delta t}$$

$$v_f^2 = v_i^2 + 2ad$$

$$|v_c| = \frac{2\pi r}{T}$$

$$|a_c| = \frac{v^2}{r} = \frac{4\pi^2 r}{T^2}$$

$$F_{net} = ma$$

$$F_c = \frac{mv^2}{r}$$

$$g = \frac{F_g}{m}$$

$$|F_g| = \frac{Gm_1 m_2}{r^2}$$

$$|g| = \frac{Gm}{r^2}$$

$$|F_f| = \mu |F_N|$$

$$F_s = -kx$$

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

$$E_p = mgh$$

$$E_p = \frac{1}{2} kx^2$$

$$W = |F||d| \cos \theta$$

$$W = \Delta E$$

$$T = 2\pi \sqrt{\frac{l}{g}}$$

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

$$T = \frac{1}{f}$$

$$f_d = f_{source} \left(\frac{v_{sound}}{v_{sound} \mp v_{source}} \right)$$

$$\frac{T_A^2}{r_A^3} = \frac{T_B^2}{r_B^3}$$

$$\% \text{efficiency} = \frac{W_{out}}{W_{in}} \times 100\%$$