

## PHYSICS 11 FORMULAE

*Wave Motion and Geometrical Optics*

$$\frac{1}{d_i} + \frac{1}{d_o} = \frac{1}{f} \quad n = \frac{c}{v}$$

$$n_1 \sin(\theta_1) = n_2 \sin(\theta_2)$$

$$T = \frac{1}{f} \quad v = f\lambda$$

*Kinematics*

$$v = \frac{\Delta d}{\Delta t} \quad a = \frac{\Delta v}{\Delta t}$$

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

$$v = v_0 + at \quad \bar{v} = \frac{v + v_0}{2}$$

$$d = v_0 t + \frac{1}{2}at^2 \quad v^2 = v_0^2 + 2ad$$

*Forces and Dynamics*

$$F_g = mg \quad F_g = G \frac{m_1 m_2}{r^2}$$

$$F_{fr} = \mu F_N \quad F = k\Delta x$$

$$F_{net} = ma$$

$$p = mv \quad \Delta p = F_{net} \Delta t$$

*Energy*

$$W = Fd \quad W = \Delta E$$

$$E_p = mgh \quad E_k = \frac{1}{2}mv^2$$

$$P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$$

$$\text{efficiency} = \frac{W_{out}}{W_{in}} = \frac{P_{out}}{P_{in}}$$

*Special Relativity*

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}} \quad m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$l = l_0 \sqrt{1 - \frac{v^2}{c^2}} \quad v_{total} = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}}$$

$$E = mc^2$$