BRITISH COLUMBIA | Ministry of Education

Physics 11 Formulae Sheet

Kinetics 1D

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

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

$$v = v_0 + at$$

$$d = v_0 t + \tfrac{1}{2}at^2$$

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

$$d = \tfrac{1}{2}at^2$$

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

$$v^2 = v_0^2 + 2ad$$

Dynamics 1D, Forces

$$F_g = mg$$

$$F_{fr} = \mu F_N$$

$$F_{net} = ma$$

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

$$F = k\Delta x$$

Momentum 1D

$$p = mv$$

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

$$\text{impulse} = \Delta p$$

$$F_{net}\Delta t = m\Delta v$$

Energy

$$W = Fd$$

$$E_p = mgh$$

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

$$\Delta U = Q - W$$

$$W = \Delta E$$

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

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

$$Q = mc\Delta T$$

Electric Circuits

$$I = \frac{Q}{\Delta t}$$

$$P = IV$$

$$\sum_{in} I = \sum_{out} I$$

$$i_2 + i_3 = i_1 + i_4$$

$$R_r = R_1 + R_2 + R_3 \ldots R_n$$

$$V = IR$$

$$V_{terminal} = \varepsilon \pm Ir$$

$$\sum_{loop} v = 0$$

$$i_1 + i_2 + i_3 + i_4 = 0$$

$$\frac{1}{R_r} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots \frac{1}{R_n}$$

Special Relativity

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

$$l = l_0 \sqrt{1 - \frac{v^2}{c^2}}$$

$$v_{total} = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}}$$

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

$$E = mc^2$$

Wave Motion and Geometrical Optics

$$\frac{1}{d_1} + \frac{1}{d_0} = \frac{1}{f}$$

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

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

$$n = \frac{c}{v}$$

$$v = f\lambda$$

Quantum

$$E = hf = \frac{hc}{\lambda}$$

$$\lambda = \frac{hv}{mv^2} = \frac{h}{mv}$$

$$R(T) = \sigma T^4$$

$$\sigma_x \sigma_p \geq n \frac{\hbar}{2}$$

$$E = \frac{hv}{e^{nv/ht} - 1}$$

Nuclear Physics

$${}^{A}_{Z}X \rightarrow {}^{A-4}_{Z-2}Y + {}^{4}_{2}\alpha$$

$${}^{A}_{Z}X \rightarrow {}_{Z+1}^{A}Y + {}^{0}_{-1}\beta$$

$${}^{A}_{Z}X \rightarrow {}^{A}_{Z}Y + {}^{0}_{0}\gamma$$

$$E = mc^2$$

$$\overline{B} = \frac{B}{A} = \frac{(\Delta m)c^2}{A}$$

$$M_d = \left(m_n + m_p\right) - m_o$$