

Tier 2 Physics Formula Sheet

Motion

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

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

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

$$v_f^2 = v_o^2 + 2a\Delta d$$

$$v_{avg} = \frac{v_i + v_f}{2}$$

Force and Energy

$$F_{net} = ma$$

$$F_f = \mu F_N$$

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

$$F_g = mg$$

$$PE_g = mgh$$

$$KE = \frac{1}{2} m v^2$$

$$F_{\Theta} = m \frac{v^2}{r}$$

$$F_s = -kx$$

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

Momentum, Period, Torque

$$p = mv$$

$$\text{Imp} = \Delta p = Ft$$

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

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

$$\tau = F_{\perp} l$$

Work and Power

$$W = F_{\parallel} \cdot d$$

$$W_{Net} = \Delta KE$$

$$P_{avg} = \frac{W}{\Delta t}$$

$$P = F \cdot v$$

Waves and Pressure

$$v = \lambda f$$

$$P = \frac{F}{A}$$

$$PV = nRT$$

Thermodynamics

$$Q = mC\Delta T$$

$$S = \frac{\Delta Q}{T}$$

$$\Delta U = Q - W$$

$$\text{Eff} = \left| \frac{W}{Q_H} \right|$$

Electricity and Magnetism

$$F_E = q_1 E = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2}$$

$$PE_E = q_1 V = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r}$$

$$C = \frac{Q}{V} = \frac{\epsilon_0 A}{d}$$

$$PE_C = \frac{1}{2} QV = \frac{1}{2} CV^2$$

$$V = IR$$

$$P = IV$$

$$F_B = qvB \sin \theta = lBI \sin \theta$$

$$\epsilon_{avg} = -\frac{\Delta \phi_m}{t} = Blv$$

Constants

$$g = -9.8 \text{ m/s}^2$$

$$G = 6.67 \cdot 10^{-11} \frac{\text{m}^3}{\text{kg} \cdot \text{s}^2}$$

$$c = 3.00 \times 10^8 \text{ m/s}$$

$$k_e = \frac{1}{4\pi\epsilon_0} = 9.0 \cdot 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2}$$

$$\epsilon_0 = 8.85 \times 10^{-12} \frac{\text{C}^2}{\text{N} \cdot \text{m}^2}$$

$$e = 1.60 \times 10^{-19} \text{ C}$$

$$1\text{eV} = 1.60 \times 10^{-19} \text{ J}$$

$$R = 8.31 \text{ J}/(\text{mol K})$$

$$1 \text{ atm} = 1.0 \times 10^5 \text{ N/m}^2$$

$$1 \text{ mol} = 6.02 \times 10^{23} \text{ molecules}$$

$$m_p = m_n = 1.67 \times 10^{-27} \text{ kg}$$

$$m_e = 9.11 \times 10^{-31} \text{ kg}$$

