

Energy

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

$$F = \Delta p / \Delta t$$

$$\Delta GPE = mg\Delta h$$

$$W = Fd = \Delta E$$

$$W = Fd$$

$$(\%) \text{ efficiency} = (\text{useful energy output} / \text{total energy input}) \times 100\%$$

$$(\%) \text{ efficiency} = (\text{useful power output} / \text{total power input}) \times 100\%$$

$$P = W / t$$

$$P = \Delta E / t$$

$$p = F / A$$

$$\Delta p = \rho g \Delta h$$

$$T (\text{in K}) = \theta (\text{in } ^\circ\text{C}) + 273$$

$$pV = \text{constant}$$

$$c = \Delta E / m\Delta\theta$$

Forces

$$\Delta p = \rho g \Delta h \text{ (liquid pressure)}$$

$$\text{Pressure} = \text{force} / \text{area}$$

$$W = m \times g$$

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

$$a = v - u / t$$

$$R.F = F.F - B.F$$

$$R.F \text{ or } F = m \times a$$

$$R.F \text{ or } F = m \times a = m \times (v - u / t) = mv - mu / t = \text{change in momentum} / t$$

$$F = \Delta \text{ momentum} \text{ or } P / \Delta t$$

$$\text{impulse} = R.F \text{ or } F \times \Delta t$$

$$\text{impulse} = \text{change in momentum} / \text{change in time}$$

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2 \text{ (conservation of momentum)}$$

$$m_1u_1 + m_2u_2 = (m_1 + m_2) \times v \text{ (when objects stick together)}$$

Thermal physics

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

$$F = \Delta p / \Delta t$$

p is inversely proportional to V

$$W = Fd = \Delta E$$

$$p_1v_1 = p_2v_2$$

$$c = \Delta E / m\Delta\theta$$

specific heat capacity = change in thermal energy / mass x change in temperature

$$P = \Delta E / t$$

$$p = F / A$$

$$\Delta p = \rho g \Delta h$$

$$T (\text{in K}) = \theta (\text{in } ^\circ\text{C}) + 273$$

$$pV = \text{constant}$$

$$c = \Delta E / m\Delta\theta$$

waves

where n is the refractive index, V is speed of light

$$n = \sin(i) / \sin(r)$$

$$n = 1 / \sin(c)$$

$$n_2/n_1 = V_1/V_2 = \sin(i) / \sin(r)$$

$$n (\text{in air}) = 1$$

$$V (\text{in air}) = 3 \times 10^8$$

$$v = f \lambda$$

Electrical quantities

potential difference is the work done by a unit charge passing through a component, measured between two points in volts (V)

electromotive force (e.m.f.) is the electrical work done by a source in moving a unit charge around a complete circuit measured in volts (V)

kilowatt-hour (kWh) 1000	1 kWh = 3.6
watts per one hour	$\times 10^6 \text{ J}$

resistance, the opposition of a component to the flow of electric current through it measured in ohms (Ω)

charge is measured in coulombs, where one coulomb is the charge on 6.24×10^{18} electrons

Electrical quantities (cont)

$$R_1/R_2 = V_1/V_2$$

$$R \text{ total} = R_1 \times R_2 = R_1 + R_2 \text{ or product/sum}$$

Electricity

$$I = Q / t$$

$$\text{emf} = W/Q$$

$$pd = W/Q$$

$$R = V/I$$

$$P = IV$$

$$E = IVt$$

$$R_1/R_2 = V_1/V_2$$

$$R \text{ total} = R_1 \times R_2 = R_1 + R_2 \text{ or product/sum}$$

Motion

$$\text{Density} = \text{Mass} / \text{Volume}$$

$$(\text{constant}) S = \text{distance} / \text{time}$$

$$a = v - u / t$$

$$D (\text{while accelerating}) = v + u \times t$$

$$D = \text{area under the graph}$$

$$W = m \times g$$

$$R.F / F = m \times a$$

$$R.F = F.F - B.F$$

Moment = force x perpendicular distance from the pivot

$$\text{Pressure} = \text{force} / \text{area}$$

$$(\text{Liquid}) \text{ pressure} = \text{Density} \times g \times \text{height}$$

$$X = L \text{ new} - L \text{ original}$$

$$F = k/x, \text{ where } k \text{ is the spring constant}$$

