

## Formulae

uniformly accelerated motion,

$$s = ut + \frac{1}{2}at^2$$
$$v^2 = u^2 + 2as$$

work done on/by a gas,

$$W = p\Delta V$$

gravitational potential,

$$\phi = -\frac{Gm}{r}$$

simple harmonic motion,

$$a = -\omega^2 x$$

velocity of particle in s.h.m.,

$$v = v_0 \cos \omega t$$
$$v = \pm \omega \sqrt{(x_0^2 - x^2)}$$

resistors in series,

$$R = R_1 + R_2 + \dots$$

resistors in parallel,

$$1/R = 1/R_1 + 1/R_2 + \dots$$

electric potential,

$$V = \frac{Q}{4\pi\epsilon_0 r}$$

capacitors in series,

$$1/C = 1/C_1 + 1/C_2 + \dots$$

capacitors in parallel,

$$C = C_1 + C_2 + \dots$$

energy of charged capacitor,

$$W = \frac{1}{2}QV$$

alternating current/voltage,

$$x = x_0 \sin \omega t$$

hydrostatic pressure,

$$p = \rho gh$$

pressure of an ideal gas,

$$p = \frac{1}{3} \frac{Nm}{V} \langle c^2 \rangle$$

radioactive decay,

$$x = x_0 \exp(-\lambda t)$$

decay constant,

$$\lambda = \frac{0.693}{t_{\frac{1}{2}}}$$

critical density matter of the Universe,

$$\rho_0 = \frac{3H_0^2}{8\pi G}$$

equation of continuity,

$$Av = \text{constant}$$

Bernoulli equation (simplified),

$$p_1 + \frac{1}{2}\rho v_1^2 = p_2 + \frac{1}{2}\rho v_2^2$$

Stokes' law,

$$F = Ar\eta v$$

Reynolds' number,

$$R_e = \frac{\rho v r}{\eta}$$

drag force in turbulent flow,

$$F = Br^2 \rho v^2$$