



important formulas for physics

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Pendulum swing period:-

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

Displacement :-

$$s = \frac{1}{2}(u + v)t$$
$$s = ut + \frac{1}{2}at^2$$

Velocity :-

$$v = u + at$$
$$v^2 = u^2 + 2as$$

Gravitation force :-

$$F = \frac{Gm_1m_2}{r^2}$$

Gravitational acceleration :-

$$g = \frac{GM}{r^2}$$

Centripetal force :-

$$F_c = \frac{mv^2}{r}$$

Orbital velocity :-

$$v = \sqrt{\frac{GM}{r}}$$

Kepler's law :-

$$T^2 = \left(\frac{4\pi^2}{GM}\right)r^3 \rightarrow T^2 \propto r^3$$
$$\frac{T_1^2}{T_2^2} = \frac{r_1^3}{r_2^3}$$

Escape velocity :-

$$v = \sqrt{\frac{2GM}{r}}$$

Kinetic energy :-

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

Specific heat capacity :-

$$c = \frac{Q}{m\Delta\theta}$$

Gravitational potential energy :-

$$U = -\frac{GMm}{r}$$

Boyle's law :-

$$P \propto \frac{1}{V}$$

Specific latent heat :-

$$l = \frac{Q}{m}$$

Wave speed :-

$$v = f\lambda$$

Charles's law :-

$$V \propto T$$

Snell's law :-

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$
$$n = \frac{\sin i}{\sin r}$$

Refraction of waves :-

$$\frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$$

Interference of waves:-

$$\lambda = \frac{\alpha x}{D}$$

Critical angle, c :-

$$n = \frac{1}{\sin c}$$

Centripetal acceleration :-

$$a_c = \frac{v^2}{r}$$

Thin lens formula :-

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$



Nuclear power :-

$$E = mc^2$$

Quantum energy :-

$$E = hf$$



Dual wave properties of particles, momentum:-

$$p = mv \text{ (partical properties)}$$

$$p = \frac{h}{\lambda} \text{ (wave properties)}$$

Einstein 's photoelectric theory :-

$$hf = W + \frac{1}{2}mv^2$$

Hooke's law :-

$$F = kx$$

Elastic potential energy :-

$$E_p = \frac{1}{2}Fx$$

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

Fluid pressure :-

$$p = h\rho g$$

Pascal principle, power multiplier :-

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

Archimedes principle, buoyancy :-

$$F_B = \rho Vg$$

Bernoulli principle, buoyancy :-

$$F = (P_2 - P_1)A$$

Electric field strength :-

$$E = \frac{F}{Q}$$

Electric current :-

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

Different capabilities :-

$$V = \frac{W}{Q}$$

Wire resistance :-

$$R = \frac{\rho l}{A}$$

Ohm's law :-

$$R = \frac{V}{I}$$

Kinetic energy of electron :-

$$E_k = eV = \frac{1}{2}mv_m^2$$

Electromotive force :-

$$\varepsilon = V + Ir$$

Electric power :-

$$P = VI = I^2R = \frac{V^2}{R}$$

Transformer efficiency :-

$$\eta = \frac{\text{ouput power}}{\text{input power}} \times 100\%$$
$$= \frac{V_s I_s}{V_p I_p} \times 100\%$$

Amount of resistance in the circuit :-

$$\text{Series: } R_T = R_1 + R_2 + R_3 + \dots$$

$$\text{Parellel: } \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$$

