



'O' Levels



PHYSICS

01



Dynamics

$$force_{net} (N) = mass (kg) \times acceleration (ms^{-2})$$

$$weight (N) = mass (kg) \times g (gravitational\ field\ strength)$$

Kinematics

$$speed (ms^{-1}) = \frac{distance (m)}{time (s)}$$

$$acceleration (ms^{-2}) = \frac{change\ in\ velocity (ms^{-1})}{change\ in\ time (s)}$$

02



Moment

$$moment (Nm) = force (N) \times perpendicular\ distance\ to\ pivot (m)$$

03



04

Density

$$\text{density } (\rho) = \frac{\text{mass (kg)}}{\text{volume (m}^3\text{)}}$$



05



Pressure

$$\text{pressure (Pa)} = \frac{\text{force (N)}}{\text{area (m}^2\text{)}}$$

$$\text{pressure (Pa)} = h \text{ (m)} \times \rho \text{ (density)} \times g \text{ (gravitational field strength)}$$

Energy, Work, Power

$$\text{work done (J)} = \text{force (N)} \times \text{distance (m)}$$

$$\text{power (W)} = \frac{\text{work done (J)}}{\text{time (s)}}$$

$$\text{kinetic energy (J)} = \frac{1}{2} \times \text{mass (kg)} \times \text{velocity}^2 \text{ (ms}^{-1}\text{)}$$

$$\text{gravitational potential energy (J)} = \text{mass (kg)} \times g \times \text{height (m)}$$



06

07



Wave Properties

$$\text{velocity (ms}^{-1}\text{)} = \text{frequency (Hz)} \times \lambda \text{ (wavelength m)}$$

$$\text{frequency (Hz)} = \frac{1}{T \text{ (period)}}$$

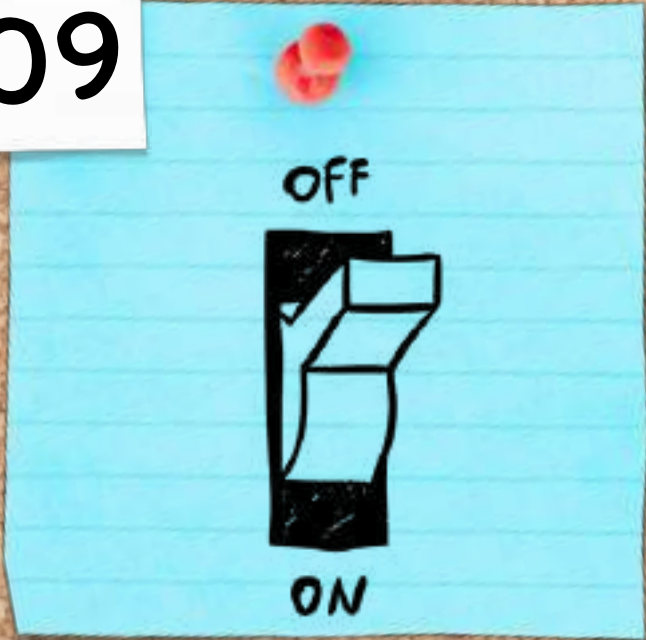
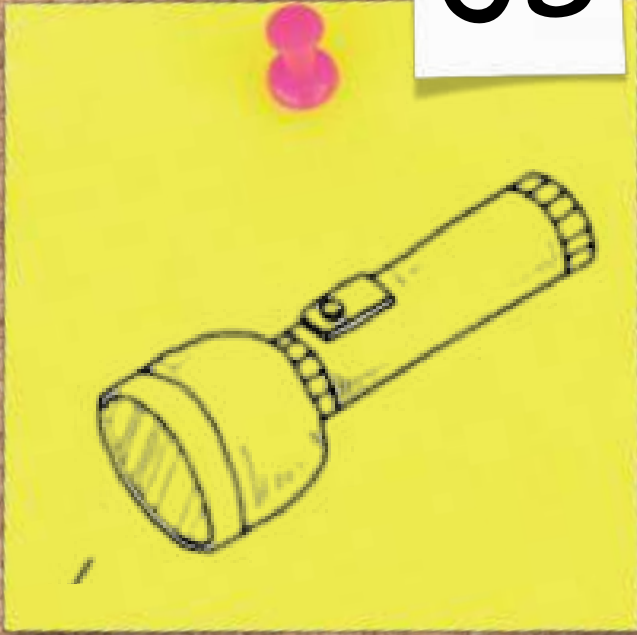
period = time taken for one wave

Light

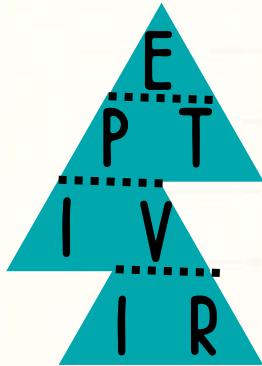
$$\text{refractive index } (n) = \frac{\sin i \text{ (angle of incidence)}}{\sin r \text{ (angle of refraction)}}$$

$$\text{refractive index } (n) = \frac{\text{speed of light in vacuum}}{\text{speed of light in medium}}$$

$$\text{refractive index } (n) = \frac{1}{\sin C \text{ (critical angle)}}$$



Electricity



E = energy (J)

P = power (W)

T = time (s)

I = current (a)

V = voltage (V)

R = resistance (ohms)

$$I (a) = \frac{Q \text{ (charge C)}}{\text{time (s)}}$$

Circuits

Series Circuit

$$I = I_1 = I_2 = I_3$$

$$V = V_1 + V_2 + V_3$$

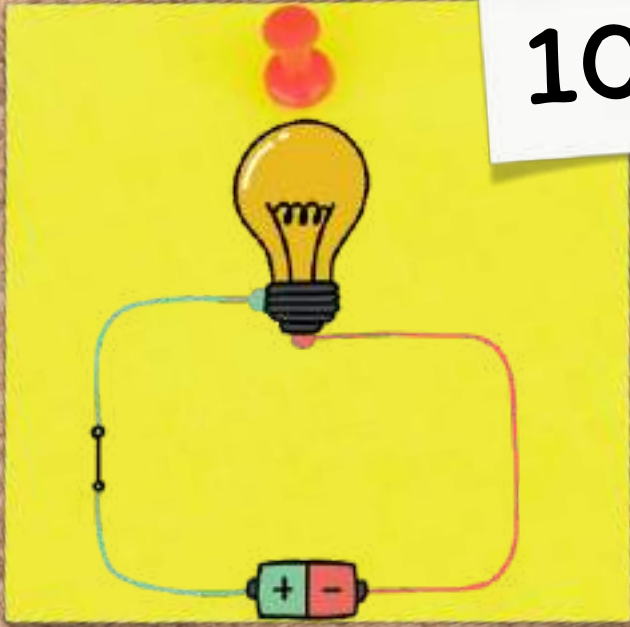
$$R_T = R_1 + R_2 + R_3$$

Parallel Circuit

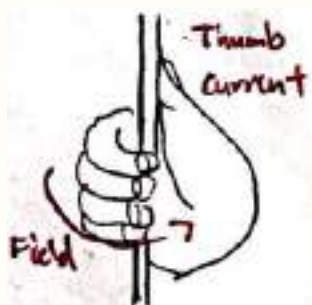
$$V = V_1 = V_2 = V_3$$

$$I = I_1 + I_2 + I_3$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$



Flemings



Right Hand Grip Rule



Left Hand Rule



Right Hand Rule