

**WEEK 2: FQ#1 MOTION**

Period/Frequency

$$T = \frac{1}{f}$$

Definition of Speed/Velocity

$$v = \frac{\Delta d}{\Delta t}$$

Definition of Acceleration

$$a = \frac{\Delta v}{\Delta t}$$

$$d = vt$$

$$d = \frac{1}{2}at^2$$

$$v = at$$

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

**WEEK 4: FQ#2 ISAAC NEWTON**

Newton's second Law

$$a = \frac{F}{m}$$

Weight/Mass

$$W = mg$$

Law of Universal Gravitation

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

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

**WEEK 7: FQ#3 ENERGY AND MATTER**

Definition of Linear Momentum

$$= mv$$

Newton's Second Law again

$$F = \frac{\Delta(mv)}{\Delta t}$$

Definition of Work

$$= Fd$$

Kinetic Energy

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

Gravitational Potential Energy

$$PE = mgd$$

Definition of Power

$$\frac{Work}{\Delta t} \text{ or } \frac{E}{\Delta t}$$

$$v = \sqrt{2gd}$$

$$d = \frac{v^2}{2g}$$

Definition of Pressure

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

$$p = D_w h = Dgh$$

Definition of Mass Density

$$D = \frac{m}{V}$$

Definition of Weight Density

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

Archimedes' Principle

$$F_b = W_{\text{fluid displaced}}$$

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### WEEK 8: FQ#4 TEMPERATURE AND HEAT

Thermal Expansion

$$\Delta l = \alpha l \Delta t$$

Pressure, Volume, Temperature

$$pV = (\text{constant})T$$

First Law of Thermodynamics

$$\Delta U = \text{Work} + Q$$

Heat needed to raise  $\Delta T$ 

$$Q = Cm\Delta T$$

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### WEEK 10: FQ#5 WAVES AND ELECTRICITY

Speed, Frequency, Wavelength

$$v = f\lambda$$

Coulomb's Law

$$F = \frac{9 \times 10^9 q_1 q_2}{d^2}$$

Definition of Current

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

Definition of Voltage

$$V = \frac{E}{q} = \frac{\text{Work}}{q}$$

Ohm's Law

$$V = IR$$

Power Consumption

$$P = VI$$

Energy Use

$$E = Pt$$

**WEEK 13: FQ#6 E & M**

Input and Output Voltages  $\frac{V_o}{V_i} = \frac{N_o}{N_i}$

Speed, Wavelength, Frequency  $c = f\lambda$

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**WEEK 14: FQ#7 OPTICS**

Lens Formula  $p = \frac{sf}{s-f}$

Magnification of a lens system  $M = \frac{\text{Image Height}}{\text{Object Height}}$

Magnification using p and s  $M = \frac{-p}{s}$

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**WEEK 15: FQ#8 ATOMS AND NUCLEI**

Energy of a Photon  $E = hf$

Energy of Emitted/Absorbed Photon  $\Delta E = hf$

De Broglie Wavelength  $\lambda = \frac{h}{mv}$

Definition of Mass Number  $A = Z + N$

Alpha Particle  $\alpha = {}_2^4\text{He}$

Beta Particle  $\beta = {}_{-1}^0e$

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**WEEK 16: FQ#9 SUPERQUIZ – Know ALL Formulas**