Name **Period** **Date**

Semester 2 Final Equations

Unit 9 Plan: ***The Big Mo (Momentum)***

momentum: $p = mv$

Impulse-momentum theorem: (Impulse = **change** in momentum)

$$F\Delta t = \Delta p = \Delta mv = m\Delta v$$

Impulse = $F\Delta t$

Change in momentum: $\Delta p = \Delta mv = m\Delta v$

Conservation of Momentum: (momentum **before** = momentum **after**.....in a **closed, isolated** system)

for *elastic*: $m_A\mathbf{v}_A + m_B\mathbf{v}_B = m_A\mathbf{v'}_A + m_B\mathbf{v'}_B$

for *inelastic*: $m_A\mathbf{v}_A + m_B\mathbf{v}_B = (m_A+m_B)\,\mathbf{v'}$

Unit 10 Plan: ***Work*** and ***Energy***

Work = Force x distance (W = F d) for force at an angle **W = F d cos θ** **Power = work/time P = W/t**

$$MA = \frac{F_r}{F_e} \qquad IMA = \frac{d_e}{d_r} \qquad efficiency = \frac{W_o}{W_i} * 100\%$$

Work-Energy theorem: $F\Delta d = \Delta E$
(work done = **change** in energy)

kinetic energy (KE): $KE = \frac{1}{2}mv^2$ **gravitational potential energy (PE)**: $PE = mgh$

Conservation of Energy: **$KE_i + PE_i = KE_f + PE_f$**

Unit 11 Plan: ***Electrostatics***

Elementary charge (one electron (e)) = 1.60 x 10^{-19}C
1 coulomb (C) = 6.25 x 10^{18}e

Coulomb's law $F = K\frac{q_A q_B}{r^2}$
Where K (the electrostatic constant) = ***9.0 x 10^9 N m^2/C^2***

Unit 12 Plan: ***Electric Fields***

Elementary charge (one electron (e)) = **1.60 x 10^{-19}C** 1 coulomb (C) = 6.25 x 10^{18}e

Coulomb's law Where K (the electrostatic constant) = ***9.0 x 10^9 N m^2/C^2*** $F = \frac{KQq}{r^2}$ $E = \frac{F}{q} = \frac{KQ}{r^2}$

capacitance (c) $\boldsymbol{C = \frac{q}{\Delta V}}$ $\Delta V = \frac{\Delta PE}{q} = \frac{Fd}{q} = Ed$

Unit 13 Plan: ***Current Electricity***

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$$I = \frac{V}{R} \qquad R = \frac{V}{I} \qquad V = IR \qquad Power(P) = IV = I^2R = \frac{energy}{time}$$

Unit 14 Plan: ***Series and Parallel Circuits***

	Series	***Parallel***
Equivalent Resistance	$R_T = R_1 + R_2 + R_3 + ...$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + ...$
Current	$\boldsymbol{I_T = I_1 = I_2 = I_3 = ...}$	$I_T = I_1 + I_2 + I_3 + ...$
Voltage	$V_T = V_1 + V_2 + V_3 + ...$	$\boldsymbol{V_T = V_1 = V_2 = V_3 = ...}$
Circuit	All devices must be "on-line" and <u>depend</u> on the others	Each device works <u>independently</u> of the others

Unit 15 Plan: ***Waves and Sound***

$$f = \frac{1}{T} \qquad T = \frac{1}{f} \qquad v = \lambda f$$

$$\text{relative sound intensity (dB)} = 10\log\left(\frac{I}{I_0}\right) \qquad \text{intensity(I)} = \frac{\text{power}}{\text{area}}$$

Unit 16 Plan: ***Fundamentals of Light***

$$E = \frac{P}{4\Pi r^2} \qquad I = \frac{P}{4\Pi} \qquad c = \lambda f$$

$$c = 3.00x10^{8}\ m/s$$

$$E = \frac{I}{r^2}$$

Unit 17 Plan: ***Reflection and Refraction***

$$c = \lambda f \qquad c = 3.00\,x10^8\,m/s \qquad \theta_r = \theta_i \qquad n = \frac{c}{v} \qquad \frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

$$m = \frac{h_i}{h_o} = \frac{-d_i}{d_o} \qquad \sin\theta_c = \frac{n_2}{n_1} \qquad n_1 \sin\theta_1 = n_2 \sin\theta_2$$