The Physics Q1-Q4 Equation Sheet

SAVE THIS FOR COLLEGE. **Name:_____**

Unit I) Introductory Unit ***(Chapter 1)***

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $a^2 + b^2 = c^2$ $y = mx + b$ $\sin\Theta = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos\Theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan\Theta = \frac{\text{opposite}}{\text{adjacent}}$

Unit II) Motion in One Dimension ***(Chapter 2)***

$*v = \Delta x/\Delta t$ $a = \frac{v_f - v_i}{\Delta t}$ *(or Δx)* $\Delta y = v_i\Delta t + \frac{1}{2} a\Delta t^2$ $v_f^2 = v_i^2 + 2a\Delta x$ *(or Δy)*

Unit III) Vectors ***(Chapter 3, 1st half)***

$a^2 + b^2 = c^2$ $c^2 = a^2 + b^2 - 2ab\cos C$ $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

Unit IV) Projectile Motion ***(Chapter 3, 2nd half)***

$v_x = \Delta x/\Delta t$ $a_y = \frac{v_{fy} - v_{iy}}{\Delta t}$ $\Delta y = v_{iY}\Delta t + 1/2 a_Y \Delta t^2$ $v^2 = v_x^2 + v_{iy}^2$

Unit V) Newton's Laws and Forces ***(Chapter 4)***

$F = ma$ $F = m(-9.8\ m/s^2 + a)$ $\#\text{ of g's} = \left| \frac{\text{total force experienced}}{\text{one g}} \right|$

Unit VI) Work and Energy ***(Chapter 5)***

$W = F\,d$ $P = \frac{W}{\Delta t}$ $P = \frac{Fd}{\Delta t}$ $PE = mgh$ $KE = \frac{1}{2} mv^2$

1 horespower = 746 Watts

$PE_i + KE_i = PE_f + KE_f$

$mgh_i + \frac{1}{2} mv_i^2 = mgh_f + \frac{1}{2} mv_f^2$

Unit VII) Momentum and Collisions ***(Chapter 6)***

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

explosions: $m_1 v_1 = m_2 v_2$

elastic collisions: $m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$

inelastic collisions: $m_1 v_{1i} + m_2 v_{2i} = (m_1 + m_2) v_f$

Unit VIII) Periodic Motion and Gravity *(part of Chapter 7, pendulums in Chapter 12, & Mrs. G.'s material)*

$v = 2\pi r/T$ $\quad a_c = v^2/r$ $\quad F_c = ma_c$ $\quad F_c = \frac{mv^2}{r}$

$F_g = mg$ $\quad F_g = \frac{Gm_1 m_2}{r^2}$, $G = 6.67 \times 10^{-11}\ \frac{Nm^2}{kg^2}$ $\quad T^2 = \frac{4\pi^2 L}{g}$

mass of the earth : 5.98×10^{24} kg mass of the moon: 7.35×10^{22} kg

radius of the earth: 6.37×10^{6} m radius of the moon: 1.738×10^{6} m

Unit IX) Waves and Sound *(Chapter 12 and Chapter 13)*

$T = \frac{1}{f}$ $\quad v = \frac{\Delta x}{\Delta t}$ $\quad v = f\lambda$ $\quad v = 330\ m/s + 0.6\ ^0C$ $\quad f' = f\ \frac{(v)}{(v \pm v_s)}$

speed of light = 3.0×10^{8} m/s

$^oC = \frac{^oF - 32^oF}{1.8}$ $\quad f_n = n\ \frac{v}{2L}$, n = 1,2,3, . . $\quad f_n = n\ \frac{v}{4L}$, n = 1,3,5, …

Unit X) Mirrors and Lenses *(Chapter 14 and Chapter 15)*

$C = 2f$ $\quad \frac{1}{f} = \frac{1}{p} + \frac{1}{q}$ $\quad m = \frac{h_i}{h_o}$ $\quad m = \frac{-q}{p}$ $\quad \frac{h_i}{h_o} = \frac{-q}{p}$

Unit XI) Current Electricity *(Chapter 19 and Chapter 20)*

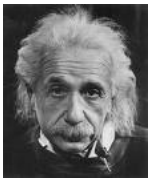
$\Delta V = I R$ $\quad P = \frac{W}{\Delta t}$ $\quad P = I\Delta V$

cost of electricity: $0.101 per kWh

$R_{eq} = R_1 + R_2 + R_3 + \ldots$ $\quad \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$

Resistor Decoding:	Band color	Digit	Multiplier	Tolerance
	Black	0	1	
	Brown	1	10	
	Red	2	100	
	Orange	3	1,000	
	Yellow	4	10,000	
	Green	5	100,000	
	Blue	6	1,000,000	
	Violet	7	10,000,000	
	Gray	8	100,000,000	
	White	9	1000,000,000	
	Gold		0.1	±5%
	Silver		0.001	± 10%

Unit XII) Special Relativity *(not in your book)*



$t = \frac{t_0}{\sqrt{1-\frac{v^2}{c^2}}}$ $\quad L = L_0\sqrt{1-\frac{v^2}{c^2}}$ $\quad m = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}$ $\quad E = mc^2$