

# Iona Prep Science Department

Physics Formula Sheet as of Feb 2021

$$v_{av} = d/t$$

$$a = (v_f - v_i)/t$$

$$v_{av} = (v_f + v_i)/2$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$v_f^2 - v_i^2 = 2ad$$

$$\Sigma F = ma$$

$$w = mg$$

$$W = F d$$

$$P = W/t$$

$$KE = \frac{1}{2} m v^2$$

$$PE = mg\Delta h$$

$$p = mv$$

$$I = f\Delta t$$

$$F_c = m v^2 / r$$

$$F_g = G m_1 m_2 / r^2$$

$v_{av}$  = average velocity

$v_i$  = initial velocity

$v_f$  = final velocity

$d$  = distance or displacement

$a$  = acceleration

$t$  = time

$F$  = force

$m$  = mass

$w$  = weight

$g$  = acceleration due to gravity = 9.81 m/s<sup>2</sup>

$G$  = Universal Gravitational Constant  
= 6.67 x10<sup>-11</sup> N m<sup>2</sup> /kg<sup>2</sup>

$W$  = work

$P$  = Power

$p$  = momentum

$I$  = impulse

$F_c$  = centripetal force

$F_g$  = Gravitational Force

Powers of ten

- c (centi) = 10<sup>-2</sup>
- m (milli) = 10<sup>-3</sup>
- $\mu$  (micro) = 10<sup>-6</sup>
- n (nano) = 10<sup>-9</sup>
- k (kilo) = 10<sup>3</sup>
- M (mega) = 10<sup>6</sup>
- G (giga) = 10<sup>9</sup>
- T (tera) = 10<sup>12</sup>

## Second Semester:

angular frequency  $\omega = 2 \pi f$

sound at STP  $v = 331 \text{ m/s}$

Light in vacuum (or air)

$v = 3.00 \times 10^8 \text{ m/s}$

Electrostatic Constant

$k = 8.99 \times 10^9 \text{ N m}^2 / \text{C}^2$

elementary charge (proton or electron) =

$1.6 \times 10^{-19} \text{ C}$

$T = 1/f$

Pendulum:  $T = 2 \pi \sqrt{L/g}$

Spring/mass  $T = 2 \pi \sqrt{m/k}$

$v = f\lambda$

# beats =  $f_2 - f_1$

$F_o = F_s / (1 \pm (v_{\text{source}}/v_{\text{sound}}))$

+ for receding - for approaching

Law of reflection:  $\angle i = \angle r$

$1/D_o + 1/D_i = 1/f$

$S_o/S_i = D_o/D_i$

Refraction:

$n = c/v$

$n_1 \sin \theta_1 = n_2 \sin \theta_2$

$n_1 / n_2 = v_2 / v_1$

Electricity

$F = k q_1 q_2 / r^2$

$E = F/q$

$V = W/q$

$I = q/t$

$P = VI$

$V = IR$

### Series Circuit

$V_T = V_1 + V_2 + V_3 + \dots$

$I_T = I_1 = I_2 = I_3 = \dots$

$R_T = R_1 + R_2 + R_3 + \dots$

### Parallel Circuit

$V_T = V_1 = V_2 = V_3 = \dots$

$I_T = I_1 + I_2 + I_3 + \dots$

$1/R_T = 1/R_1 + 1/R_2 + 1/R_3 + \dots$

T = Period

L = length

g = acceleration due to gravity ( $9.81 \text{ m/s}^2$ )

m = mass

k = spring constant

v = velocity

f = frequency

$F_o$  = frequency observed

$F_s$  = frequency of the source

$\lambda$  = wavelength

n = index of refraction

c = speed of light in a vacuum

$D_o$  = Object Distance

$D_i$  = Image Distance

f = focal length

$S_o$  = Size of the object

$S_i$  = Size of the image

F = force

E = Electric Field Strength

V = Potential Difference

W = work

q = charge

V = Potential Difference

I = Current

R = Resistance

### Index of refraction:

- Air 1.00
- Water 1.33
- Flint Glass 1.66
- Diamond 2.42