Bonus Equations

$t = \frac{V_f - V_i}{a}$ or $t = \frac{V_f - V_i}{g}$ where g is –9.8 m/s^2

$v = v_i + gt$ where g is –9.8 m/s^2 or $v = v_i - gt$ where g is –9.8 m/s^2

Centripetal force: $F_c = \frac{mv^2}{r}$

Conservation of momentum: $v_1 = m_2 v_2 / m_1$

PE=mgh where g= 9.8 m/s^2

More Boyle's Law: $\frac{P_1}{P_2} = \frac{V_2}{V_1}$

Equations for Midterm

Chapter 2:

velocity:

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

acceleration:

$$a = \frac{v_f - v_i}{t}$$

Acceleration due to gravity (or *g*) is equal to –9.80 m/s^2.

$d = v_{ave} \bullet t$ $\quad$ $v_f = v_i + a\,t$

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

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

Force:

F = m a

Force due to gravity:

$$F = \frac{G m_1 m_2}{d^2}$$

Chapter 3

Work

W = force × distance or $W = F \times d$ or

$W = F_{par} \times d$

W = mgh wher e m is mass in kg, g is 9.8 m/s^2 and h is the height of the object.

Power

$$\text{power} = \frac{\text{work}}{\text{time}} \text{ or } P = \frac{W}{t}$$

Energy

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

Momentum

p= m v

where p is momentum, m is mass in kg, and v is velocity in m/s

Chapter 4

Temperature

$$F = \frac{9}{5}C + 32 \text{ and } C = \frac{5}{9}(F - 32) \text{ and}$$

K= C+ 273

heating and cooling

when temperature is changing

$$E = m \times SH \times \Delta T$$

specific heat of water = $\frac{4.184 \text{ kJ}}{\text{kg °C}}$

phase change solid to liquid

Energy = m x L_f

heat of fusion (L_f) for H_2O is 333 kJ/kg at 0°C

phase change liquid to gas

Energy = m x L_f

heat of vaporization for H_2O is 2260 kJ/kg at 100°C

Density

$$Density = \frac{Mass}{Volume} \text{ or } D = \frac{M}{V}$$

Pressure

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

Combined ideal gas law

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$ and PV=nRT *remember T in Kelvin*

Chapter 5

Coulombs Law

$$F = K\frac{Q_1 Q_2}{R^2} = 9x10^9 \frac{Q_1 Q_2}{R^2}$$

Ohm's Law

$$I = \frac{V}{R} \text{ or } V = I \cdot R$$

I is current in amps(A)

V is voltage in volts (V)

R is resistance in ohms (Ω)

power

P=I V P is in Watts (W)

Transformers

$$\frac{N_1}{N_2} = \frac{V_1}{V_2} = \frac{I_2}{I_1}$$

Chapter 6

v= f λ The speed of sound is 3 x 10^8 m/s

Where v is speed, f is frequency and lambda is wavelength.

T=1/f where T is the period.