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| PHYSICS 201  Equations Sheet | Translational Motion | Rotational Motion |
| LINEAR | ANGULAR |
| Time | t | T |
| Displacement | x; (x = rθ) | Θ |
| Velocity | v = Δx/Δt; (v = rω) | ω = Δθ/Δt |
| Acceleration | a = Δv/Δt; (a = rα) | α = Δω/Δt |
| Kinematic Equations | v = v0 + at | ω = ω0 + αt |
| x = ½(v + v0)t | θ = ½(ω + ω0)t |
| x = v0t + ½ at2 | θ = ω0t + ½ αt2 |
| v2 = v02 + 2ax | ω2 = ω02 + 2αθ |
| Inertia | *m* = mass | *I* = Rotational inertia; |
| To create | force = F | torque = τ = LA·F |
| Newton's second law of motion | Σ**F** = m**a** | Σ**τ** = I**α** |
| Σ**F** = Δ**p**/Δt | Σ**τ** = Δ**L**/Δt |
| Work | *F·x* | *τ·θ* |
| Kinetic Energy | Translational Kinetic Energy = TKE = ½ mv2 | Rotational Kinetic  Energy = RKE = ½ Iω2 |
| Momentum | **p** = m·**V** | **L** = I·**ω** |
| Conservation of momentum | Σmivi = Σmfvf | ΣIiωi = ΣIfωf |



Power = Work/Time Pressure = Force/Area Pabs = Patm + PG Density =Mass/Volume

Pressure (P) due to depth h of fluid of density ρ; P = ρgh.  
1 atm = 1.013 x 105 N/m2 = 76 cm.Hg = 760 mm.Hg

The density of the air is 1.29 kg/m3; Density of water = 1000 kg/m3 = 1 g/cm3; Acceleration due to gravity = g = 9.8 m/s2.

Frictional force = *Ffr=μkFN* Buoyant force: GPE = mgh

Hooke’s law: Elastic PE = EPE =   
Period of a simple pendulum: Period of oscillating mass on spring:

Impulse-momentum theorem: F x t = mvf - mvi

Periodic wave:   
    
Know how to illustrate a periodic wave as a function of time and distance.

Speed of a wave on a string: The **speed of a wave** depends on the properties of the medium in which the wave travels. For a transverse wave on a string that has a tension *T* and a mass per length, *μ* = *m*/*L*, the wave speed is, (which will be given):   

The nature of sound waves in air: Type, frequency, intensity, and wave form.

, I0 = 10-12 W/m2. (given). Power = E/Time. I = P/area

Conversion factors:  
1 H = 3600 s, 1 Mile = 1608 m, 1 inch = 2.54 cm, 1 foot = 12 inch, 1 m = 3.281 ft.  
1 m = 100 cm, 1 cm = 10 mm, 1 m = 1000 mm, 1 km = 1000 m

Areas:

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| Rectangle | Triangle | Circle |
|  |  |  |

Volume of a cylinder of radius r and height h; V= π r2h; Volume of a sphere = (4/3) π r3.

Pythagorean theorem and Trigonometry:

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| Pythagorean Theorem | *sin* *θ* | *cos* *θ* | *tan* *θ* | Components of a vector: |
|  |  |  |  | Adjacent component = Cos  Opposite component = Sin |

Graphical analysis of motion:

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|  |  |  |  |
| Slope | Velocity | Acceleration | XXXXXXXXXXXXXXX |
| Area | XXXXXXXXXXXXX | Displacement | Change in Velocity |

Addition of velocities: