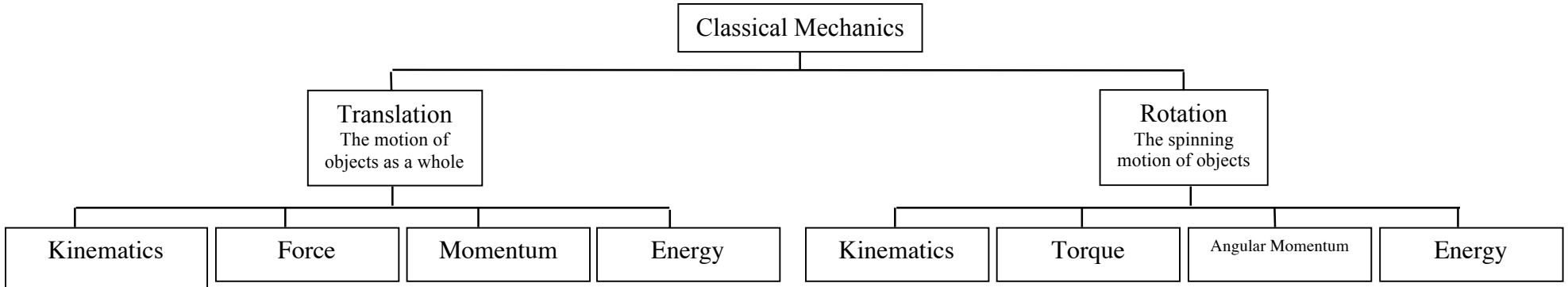


Laws:
none

Definitions:
Position $\vec{r}$
Displacement $d\vec{r}$
Velocity $\vec{v} \equiv \frac{d\vec{r}}{dt}$
Acceleration
$\vec{a} \equiv \frac{d\vec{v}}{dt}$

Useful Relations:
Kinematic Equations
$x = x_o + v_o t + \frac{1}{2} a t^2$
$v = v_o + at$
$v^2 = v_o^2 + 2a(x - x_o)$
$x - x_o = \frac{1}{2}(v + v_o)t$
Tangential Speed
$v_t = \frac{2\pi r}{T}$
Centripetal Acceleration
$a_c = \frac{v^2}{r}$

Dot Product $\vec{A} \bullet \vec{B} \equiv AB\cos\theta = A_x B_x + A_y B_y + A_z B_z$

Cross Product $\vec{A} \times \vec{B} \equiv AB\sin\theta\hat{n}$
$\vec{A} \times \vec{B} = \left(A_y B_z - A_z B_y\right)\hat{i} + \left(A_z B_x - A_x B_z\right)\hat{j} + \left(A_x B_y - A_y B_x\right)$

Acceleration due to gravity g = 9.80 m/s$^2$

Earth - mass: 5.98 x $10^{24}$ kg radius: 6.38 x $10^6$ m

Moon - mass: 7.36 x $10^{22}$ kg radius: 1.74 x $10^6$ m

Sun - mass: 1.99 x $10^{30}$ kg radius: 6.96 x $10^8$ m

Earth - moon distance: 3.82 x $10^8$ m

Sun - Earth distance: 1.50 x $10^{11}$ m