

SUMMARY DYNAMICS MODULE N3

SUBJECT	EQUATION	DISCUSSION
Newton's 2nd Law	$\Sigma \bar{F} = m\bar{a}$	The sum of the forces acting on a particle causes a proportional acceleration where the acceleration may be given in any of the forms specified by N1 and N2.
Linear Momentum	$\bar{L} = m\bar{v}$ $\Sigma \bar{F} = d\frac{\bar{L}}{dt} = \frac{d(m\bar{v})}{dt}$	Linear momentum equals (mass) x (velocity). For constant mass, the sum of forces on a particle equals the time rate of change of linear momentum.
Dynamic Equilibrium	$\Sigma \bar{F} - m\bar{a} = 0$	$-m\bar{a}$ is the inertia vector.
Angular Momentum	$\bar{M}_0 = \bar{r} \times m\bar{v}$ $\bar{M} = \begin{vmatrix} \bar{i} & \bar{j} & \bar{k} \\ x & y & z \\ ma_x & ma_y & ma_z \end{vmatrix}$ $\Sigma \bar{M}_0 = \frac{d}{dt} (\bar{H}_0) = \frac{d\bar{H}_0}{dt}$	<p>The moment of the linear momentum about a point is equal to the angular momentum about that point.</p> $\bar{H}_0 = \begin{vmatrix} \bar{i} & \bar{j} & \bar{k} \\ x & y & z \\ mv_x & mv_y & mv_z \end{vmatrix}$
Conservation of Angular Momentum	$\bar{H}_{0_1} = \bar{H}_{0_2}$	For a central force field angular momentum is conserved.

WORDS TO KNOW MAJOR MODULE 3

1. Newton's Second Law of Motion - this law is used (when bodies are accelerated) to relate the motion of the body with the forces acting on the body. The law is, "If the resultant force acting on a particle is not zero, the particle will have an acceleration proportional to the magnitude of the resultant and in the direction of this resultant force."
2. Conservation of Linear Momentum - can be used if the resultant force acting on a particle is zero' therefore, the initial momentum is equivalent to final momentum.
3. Central Force - when the only force acting on a body is toward or away from a fixed point.
4. Taut - something that is tightly stretched, i.e., in tension, such as a rope.
5. Grade = Rise Over Run - (in a percent) usually associated with a small incline or hill (slope).
6. Muzzle Velocity - the velocity at which a bullet leaves the barrel of a gun.