

SUMMARY DYNAMICS MODULE N9

SUBJECT	EQUATION	DISCUSSION
Work	${}_1U_2 = \int_1^2 \bar{F} \cdot d\bar{r}$ ${}_1U_2 = \int_1^2 M d\theta$	<p>Work may be done in translation or rotation.</p> <p>Note: When a body rolls without sliding, the frictional force does no work.</p>
Kinetic Energy	$T = \frac{1}{2} m v_G^2 + \frac{1}{2} I_G \omega^2$ $T = \frac{1}{2} I_0 \omega^2$	<p>In general motion kinetic energy occurs due to translation and rotation.</p> <p>Kinetic energy for non-centroidal rotation.</p>
Energy Equation	$E_1 + {}_1U_2 = E_2 + {}_1L_2$	<p>Note: The potential energy must be calculated for the center of mass.</p>
Momentum	$L_1 + \sum \int_1^2 F dt = L_2$ $H_1 + \sum \int_1^2 M dt = H_2$ $I_0 \omega_1 + \sum \int_1^2 M_0 dt = I_0 \omega_2$	<p>For a rigid body, linear and angular momentum must be considered.</p> <p>For non-centroidal rotation.</p>

## WORDS TO KNOW MAJOR MODULE 9

1. Damper - a device for dissipating energy in a mechanical system by the suppression of vibrations of unfavorable, non-linear characteristics.<sup>11</sup>
2. Kinetic Reaction - a reaction caused by a force acting on a body.