

GSP-1010 EQUATION LIST FOR THE FIRST EXAM
CONSTANTS AND UNITS

EQUATION

$E = m * c^2$	$E(\text{Joules}) = (\text{kg} * \text{m}^2 / \text{s}^2) \quad c = 3 \times 10^8 \text{ m/s}$
$v = H * D$	$v(\text{m/s}) \quad H = 72 \text{ km/s/Mpc} \quad D(\text{ Mpc})$
$T = 1/H$	$T(\text{yr}) \quad 1\text{pc} = 3.26 \text{ LY} = 3.09 \times 10^{13} \text{ km}$
$D = v * t$	$D(\text{m,ft,mi,km}) \quad v(\text{m/s}) \quad t(\text{s or hr})$
$v = (D_f - D_o) / t$	$v(\text{m/s, ft/s, mi/hr, km/hr})$
$v = (v_o + v_f) / 2$	
$a = (v_f - v_o) / t \quad \text{also} \quad D = \frac{1}{2} a t^2$	$a(\text{m/s}^2)$
$F_{\text{Net}} = m * a$	$F(\text{N})$
$F_{\text{app}} = F_{\text{Net}} + F_{\text{friction}}$	$N = \text{kg} * \text{m/s}^2$
$W = m * g$	$W(\text{N})$
	$g = 9.8 \text{ m/s}^2$
 Linear Momentum = $m * v$	 $(\text{kg} * \text{m/s})$
$F_{\text{Net}} = (m * v_f - m * v_i) / t$ $F_{\text{Net}} * t = \text{Change in } (m * v)$	 $F * t(\text{N} * \text{s})$
 Sum of mv (before) = Sum of mv (after)	 $L(\text{kg} * \text{m}^2 / \text{s})$
$L = m * v * r$	 Torque($\text{lbs} * \text{Ft, m} * \text{N}$)
$\text{Torque} = (L_f - L_o) / t$	 $L(\text{kg} * \text{m}^2 / \text{s})$
 Sum of L (before) = Sum of L (after)	 Energy or Work (J)
$\text{KE} = (\frac{1}{2}) * m * v^2$	 $J = \text{kg} * \text{m}^2 / \text{s}^2$
$W = F * d$ (Note: here $W = \text{work}$)	 $1 \text{ calorie} = 4.186 \text{ J}$
$\text{GPE} = m * g * h$	 $J = \text{Joules}$
 Sum $\text{PE} + \text{KE} + \text{Work (Added)}$ (Before) = Sum $\text{PE} + \text{KE} + \text{Work (Lost)}$ (After)	 $P(\text{Watt})(\text{W})$
$P = \text{Change in Energy} / t$	
$1 \text{ J/s} = 1 \text{ W (Watt)}$	$1 \text{ hp} = 746 \text{ W} = 550 \text{ ft-lb/s}$