

Formula sheet exam TTT4234 Space Technology I, Wednesday December 5th, 2012

Useful and not so useful formulas and constants (not all are necessary for solving the problems):

The speed of light = $3 \cdot 10^8 \text{ m/s}$

Gravitational acceleration at sea level = 9.81 m/s^2

$\mu = 3.986 \cdot 10^5 \text{ km}^3/\text{s}^2$

Force: $F = m \cdot a$

$$F = \Delta p / \Delta t$$

$$F = GMm/r^2$$

$$F = mv^2/r$$

$$F = mr\omega^2$$

$$G = 6.67 \cdot 10^{-11} \text{ Nm}^2/\text{kg}^2$$

$$M_E = 5.98 \cdot 10^{24} \text{ kg}$$

$$R_E = 6378 \text{ km}$$

$$X \text{ in deciBel (dB): } X_{\text{dB}} = 10 \log_{10}(X_{\text{lin}})$$

The semi major axis in an ellipsoid = $\frac{1}{2} (R_a + R_p)$

$$e = (R_a - R_p) / (R_a + R_p) = c/a$$

$$\Delta v = v_{\text{eff}} \cdot \ln (M_{\text{initial}}/M_{\text{final}})$$

$$I_{\text{sp}} = F / (g_0 \cdot dm/dt)$$

$$v_{\text{eff}} = g_0 \cdot I_{\text{sp}}$$

$$\text{Boltzmann's constant } k = 1.38 \times 10^{-23} \text{ J/K}$$