Formula sheet exam TTT4234 Space Technology I, 1. December 2016

Formulas and constants:

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

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

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

$F = m \cdot a = \Delta p / \Delta t$

$F = GMm/r^2$

$F = mv^2/r$

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

$M = 5.98 \cdot 10^{24} kg$

$R_E = 6370 km$ mean value, $R_E = 6378 km$ at the equator

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

The semi major axis in an ellipsoid = ½ (R_a+R_p)

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

$\Delta v = I_{sp} \cdot g_0 \cdot \ln (M_i/M_f)$

$v = \sqrt{\mu(2/r - 1/a)}$

$F_s = 0.7 + 0.3\, e^{-\text{nb. of days}/1000}$

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

The sunlight needs about 8 minutes to travel the distance from the Sun to Earth.

$T^2 = 4\pi^2 a^3/\mu$

$R = 2.44 * \lambda * h/D$

$S/N = (EIRP/L_0) * (G_r / N_0 B) * 1/L_a$

$G = \eta \times 4\pi A / \lambda^2$

$\theta = k\lambda/D$, $k = 70$

$L_0 = (4\pi d/\lambda)^2$

$E_k = mv^2/2$