Mod 05

Assume - LOX/LH 2 min

$\dot{m} = 347$ kg/s $r = 6.0$ Parm

a) mass for 2 minute burn (Fuel)

$m_{total} = 347 \times 120\,sec = 41640$ kg total ✓

$\dot{m}_f = \frac{\dot{m}_{tot}}{1+r} = \frac{347}{7} = 49.57$

$m_f = \dot{m}_f (120)$

$\boxed{m_f = 5948.57 \text{ kg}}$

b) $\dot{m}_{ox} = r \times \dot{m}_f = (49.57)(6) = 297.42$

$m_{ox} = \dot{m}_{ox} (120)$

$\boxed{m_{ox} = 35690.4 \text{ kg}}$

c) vol H for 2 min burn

$\rho = m/V$ m_f google

$V = m/\rho = 5948.57 / 0.08375 \text{ kg/m}^3$

$\boxed{V_H = 71027.7 \text{ m}^3}$

d) length of cyl tank for H if inner diam = 1.6

✓ ✓ ✓ ✓

$t_r = \rho_c A_c l_c \dot{m}$

$l_c = \frac{t_r}{\rho_c A_c \dot{m}} = \frac{120\,sec}{0.08375 \frac{kg}{m^3} \frac{1.6^2 \pi}{4} m^2 \cdot 49.57 kg/s}$

$\boxed{l_c = 45.16 \text{ m}}$