Thermodynamics – Idzerda

A long, cylindrical tank is placed on a flat bed that can slide without friction on rails. The mass of the empty tanker is M=180 kg. Initially, the tank is filled with an ideal gas of mass m = 120 kg at a pressure of P_0=150 atm at an ambient temperature of T_0 = 300 K. Then, one end of the tank is heated to 335 K while the other end maintains a temperature of 300 K.

a) Determine the pressure in the tank.

b) Determine the new position of the center of mass of the tank after the system reaches equilibrium.