1 Problem Class, 28 Nov

1.1 Question 1

An open, cylinder-shaped tank with cross-section area A_1 is filled with water up to a height H_1. At the bottom of the tank, water is draining steadily through a horizontal, cylinder-shaped pipe with cross-section area $H_2^2\pi/4$, where $H_2 \ll H_1$

(a) At the end of the pipe, water is released freely to the atmosphere. Use Bernoulli's equation to find the velocity at which water is released here.

(b) Now an additional, μp_a pressure is applied at the end of the pipe to stop the drainage (i.e. $U_2 = 0$). What is the value of μ, if $H_1 = 0.5$m? (You can use $\rho = 1000$kg m^{-3}, g=9.81m s^{-2}, $p_a = 10^5$Pa.)