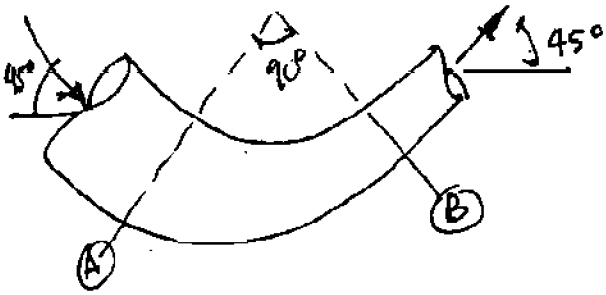
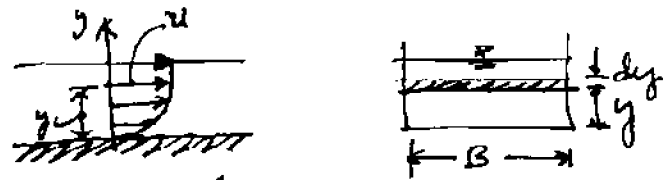
CEE 3500 – TEST 2 SAMPLE 2 – FALL 2005

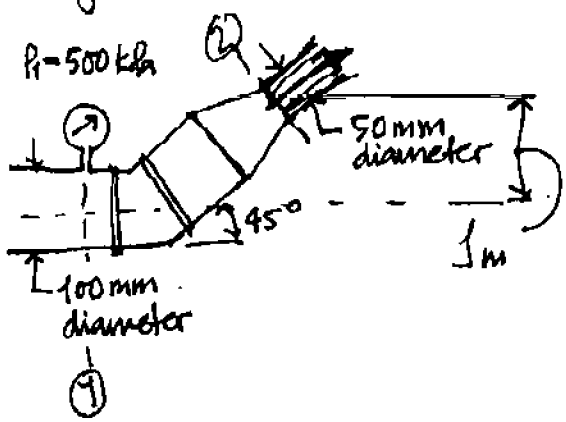
[1]. A vertical reducing bend (see figure) carries 12.6 cfs of oil (S = 0.85) at a pressure of 20.5 psi entering the bend at A. The diameters at A and B are 16 in and 12 in, respectively, and the volume between A and B is 3.75 ft³. Neglecting friction, find the force that the flow exerts on the bend.



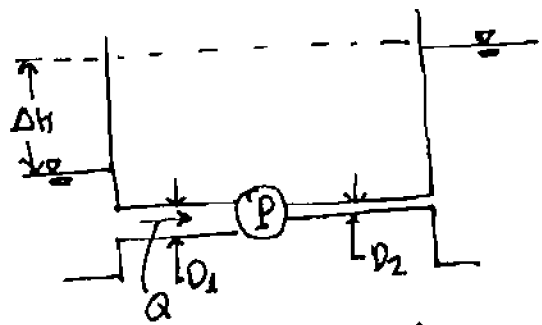

[2]. Turbulent flow in an open channel follows the power-law distribution $u(y) = u_{max}(y/t)^{1/7}$. Determine the momentum correction factor $\beta$.




[3]. A nozzle is attached to a pipe as shown in the figure. Determine the water jet's velocity for the conditions shown in the figure. Assume head loss in the jet is negligible.




[4]. Sketch the energy line (EL) and the hydraulic grade line (HGL) for the following flow system:




[5]. For the system of problem [4] $\Delta H = 100$ ft, $D_1 = 2$ ft, $D_2 = 1$ ft, and $Q = 30$ cfs. Determine the power developed by the pump in horse power. Neglect all losses except discharge losses.