CE376 HYDROMECHANICS
HOMEWORK-I
DUE DATE: 12.03.2020

Q1) Two reservoirs are connected by 3 pipes in series. Pipe characteristics and reservoir levels are given as inputs. Fort he entrance loss coefficient is Kent=0.2 and for the exit it is Kexit=1. Compute the discharge rate Q into the lower reservoir. Take the fluid kinematic viscosity as 10^{-6} m^2/s. Consider all the major and minor head losses in the sistem.
For pipe contraction calculate minor loss coefficient by $K_{cont}=(1-1/C_C)^2$, $C_C=0.62+0.38(A_2/A_1)^3$
For pipe expansion calculate minor loss coefficient by $K_{exp}=(1-(A_1/A_2))^2$
Given pipe characteristics:

D_1=20 cm	D_2=15 cm	D_3=30 cm
ε_1=0.02 cm	ε_2=0.015 cm	ε_3=0.03 cm
L_1=48 m.	L_2=14 m.	L_3=21 m.

Total head at reservoir A H_A=122 m.
Total head at reservoir B H_B=43 m.

Solve the problem(may use help of an excell-makro code to solve this problem) considering all the input parameters and output the results of friction factors in each pipe and discharge rate. To calculate the friction parameter f for the pipes, solve the iterative formula of Colebrook-White(or use Moody Chart) as;

$$\frac{1}{\sqrt{f}} = -2\log\left(\frac{2.51}{Re\sqrt{f}} + \frac{\varepsilon}{3.7D}\right)$$