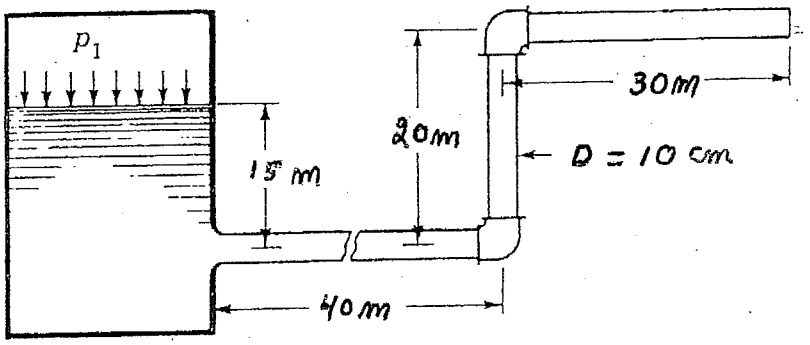
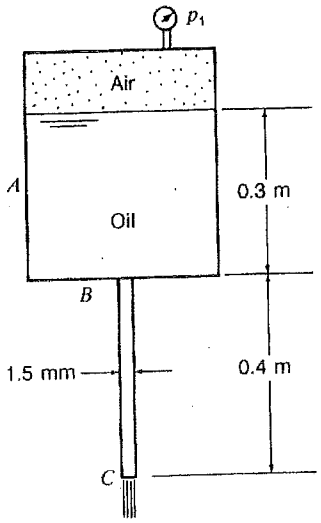
Pipe Problems

1. Water ($\nu = 1.14x10^{-6} m^2/s$) flows at $\dot{q} = 0.05 m^3/s$ in the 10 cm diameter pipe whose roughness is e=0.046mm. If the air in the tank is $p_1 - p_a = 200kPa$, what is the work rate of the pump?



2. A pressure $p_1 - p_a = 136kPa$ forces fluid through the 1.5mm diameter tube with a velocity of 0.5m/s. The density of the fluid is $\rho = 1150kg/m^3$. What is the viscosity of the fluid?



3. The pump delivers 20kW to cause a flow rate of 140 L/s of water. What is the pressure p_2 in the air in the top of tank 2.

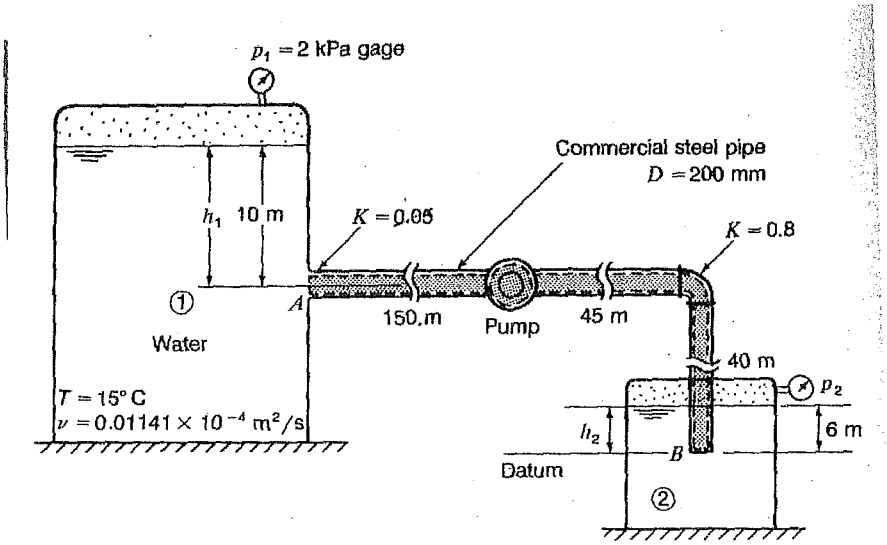


Figure 8.24

4) The flow rate through the system is $\dot{q} = 0.4 m^3/s$. What is the power out of the turbine?