

**BIRZEIT UNIVERSITY**

**Department of Mechanical Engineering**

**Fluid Mechanics I – ENME335**

**Suggested problems pipe flow**

**Instructors: Dr. Afif Hasan Summer session 2018/2019**

**Problem 1 (P. 6. 33)**

For the configuration shown in Fig. P6.33, the fluid is ethyl alcohol at 20°C, and the tanks are very wide. Find the flow rate which occurs in m3/h. Is the flow laminar?



**Problem 2 (P6.68)**

Water at 20°C is to be pumped through 2000 ft of pipe from reservoir 1 to 2 at a rate of 3 ft3/s, as shown in Fig. P6.68. If the pipe is cast iron of diameter 6 in and the pump

is 75 percent efficient, what horsepower pump is needed?



**Problem 3 (P6.91)**

Heat exchangers often consist of many triangular passages. Typical is Fig. P6.91, with *L* = 60 cm and an isosceles-triangle cross section of side length *a* = 2 cm and included angle β = 80°. If the average velocity is *V* = 2 m/s and the fluid is SAE 10 oil at 20°C, estimate the pressure drop.



**Problem 4 (P6.105)**

The system in Fig. P6.105 consists of 1200 m of 5 cm cast-iron-pipe, two 45° and four 90° flanged long-radius elbows, a fully open flanged globe valve, and a sharp exit into a reservoir. If the elevation at point 1 is 400 m, what gage pressure is required at point 1 to deliver 0.005 m3/s of water at 20°C into the reservoir?

