

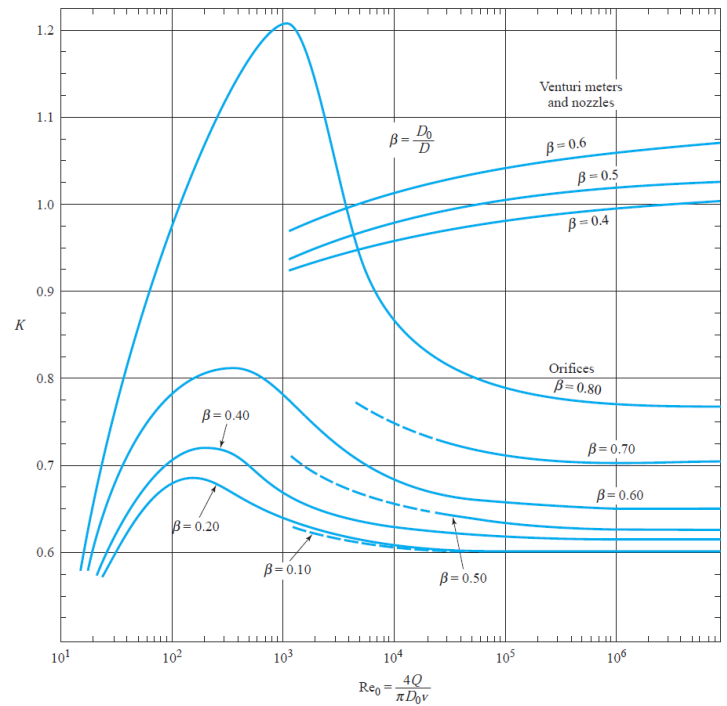
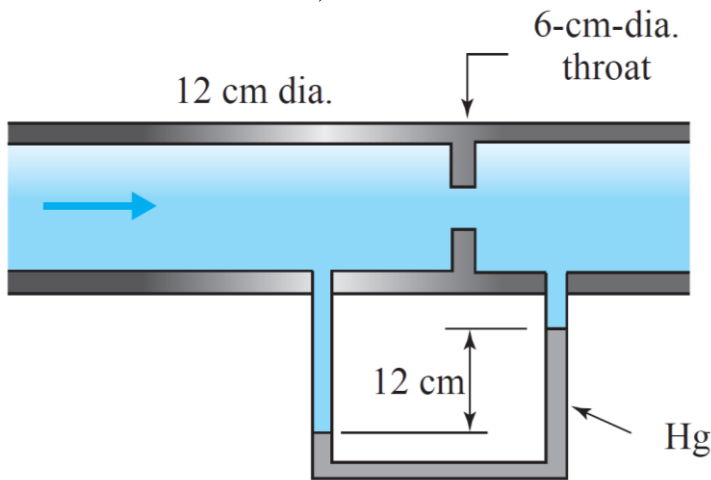
**Florida International University**  
**CWR 3201 Fluid Mechanics, Fall 2018**  
**Instructor: Arturo S. Leon, Ph.D., P.E., D.WRE**  
**TA: Thao Do, CEE Undergraduate**

**Mid-term # 2 (Type B)**

**Student Name and ID:** \_\_\_\_\_ **Date:** 10/26/2018

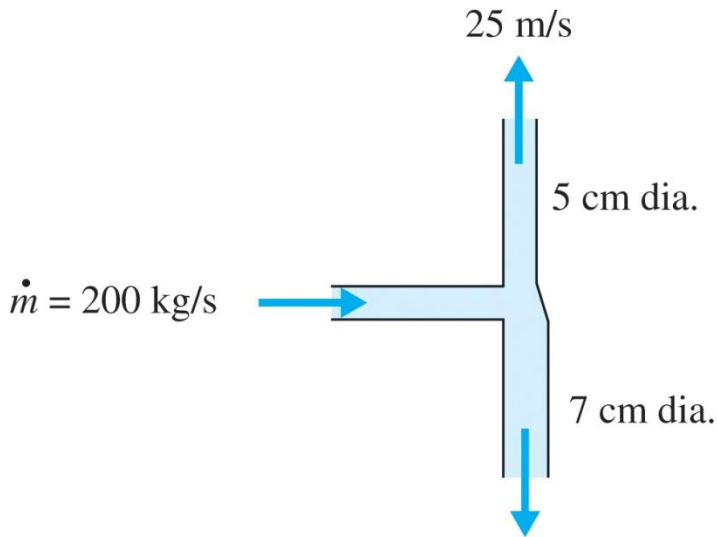
- ✓ You will have 1h 15 minutes to complete the exam. The exam is closed book and closed notes
- ✓ Only one page (front and back) with handwritten equations are allowed (no photocopies or artificially reduced text will be allowed).

1. (25 points) Calculate the flow rate of 40°C water in the pipe shown below (kinematic viscosity at 40°C =  $0.661 \times 10^{-6} \text{ m}^2/\text{s}$ )



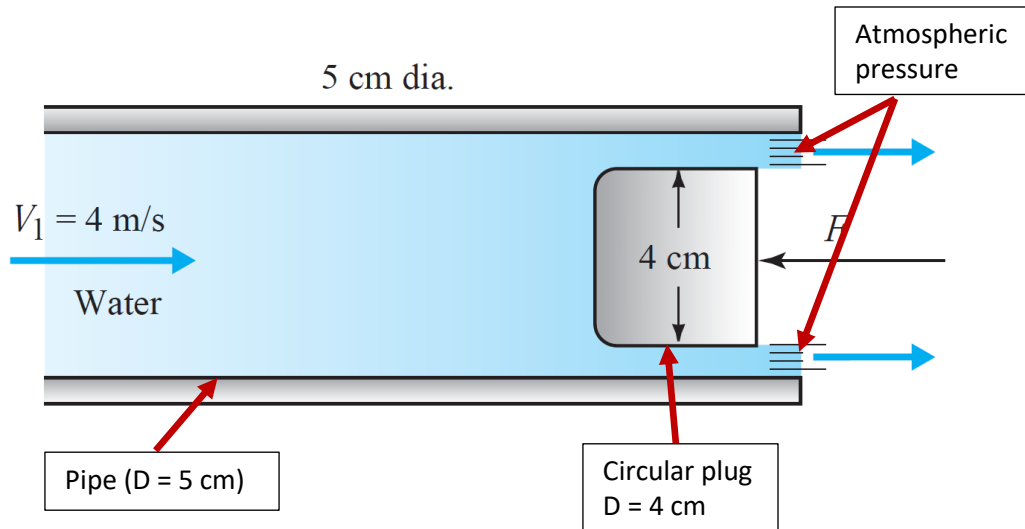


2. **(20 points)** The pipe below transports 200 kg/s of water. The pipe tees into a 5-cm-diameter pipe and a 7-cm-diameter pipe. If the average velocity in the smaller-diameter pipe (5-cm-diameter pipe) is 25 m/s, calculate the flow rate in the larger pipe (7-cm-diameter pipe).





3. (30 points) Assuming uniform velocity profiles, find  $F$  needed to hold the **circular plug** in the pipe shown below. The pipe discharges to the atmosphere right downstream of the plug. Neglect viscous effects.





1. (25 points) Find the velocity  $V_1$  of the water in the vertical pipe shown below. Assume no head losses.

