Revision Class Tutorial

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Problems from: Munson et al., Fundamentals of Fluid Mechanics, 9th Edition, SI Version, International Adaptation, 2021, Wiley & Sons.

Chapter 2: Fluid Statics

Problem 2.3.5:

An unknown immiscible liquid seeps into the bottom of an open oil tank. Some measurements indicate that the depth of the unknown liquid is 1.5 m and the depth of the oil (specific weight, $\gamma_{\text{oil}} = 8.5\ \text{kN/m}^3$) floating on top is 5.0 m. A pressure gage connected to the bottom of the tank reads $65\ \text{kPa}$.What is the specific gravity of the unknown fluid?

Chapter 8: Viscous Flow in Pipes

Problem 8.4.8:

Water flows at a rate of 38 liters per minute in a new horizontal 0.02 m diameter galvanized iron pipe. Determine the pressure gradient, $\Delta p/\ell$, along the pipe.

Problem 8.4.13:

A 0.9 m diameter duct is used to carry ventilating air into a vehicular tunnel at a rate of 255 m^3/min. Tests show that the pressure drop is 0.038 m of water per 457 m of duct. What is the value of the friction factor for this duct and the approximate size of the equivalent roughness, ε, of the surface of the duct? [Hint: use the Bernoulli equation.]

Chapter 10: Open-Channel Flow

Problem 10.4.32:

Water flows 1 m deep in a 2-m-wide finished concrete channel. Determine the slope if the flowrate is 3 m^3/s.

Problem 10.7.1:

Water flows upstream of a hydraulic jump with a depth of 0.5 m and a velocity of 6 m/s. Determine the depth of the water downstream of the jump.

Problem 10.7.6:

A rectangular flume is 0.5 m wide and water flows at a rate of 1 m^3/s and a depth of 0.5 m. Find the depth after a hydraulic jump and the power loss in the jump.