

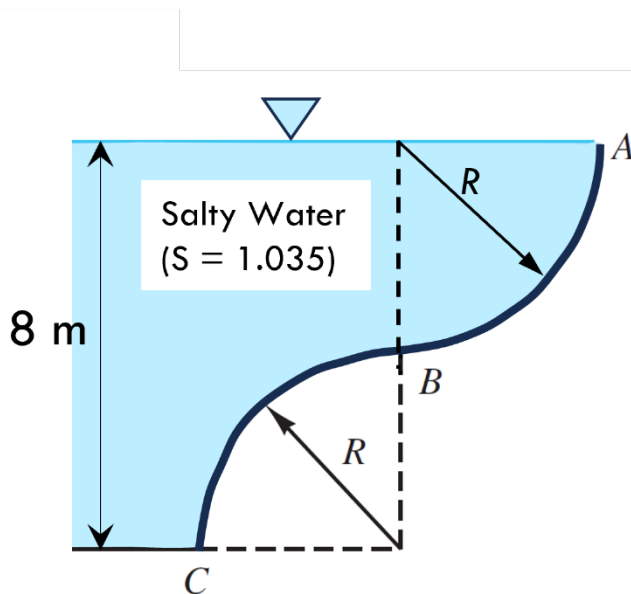
Florida International University
CWR 3201 Fluid Mechanics, Fall 2023
Mid-term # 1

Instructor: Arturo S. Leon, Ph.D., P.E., D.WRE

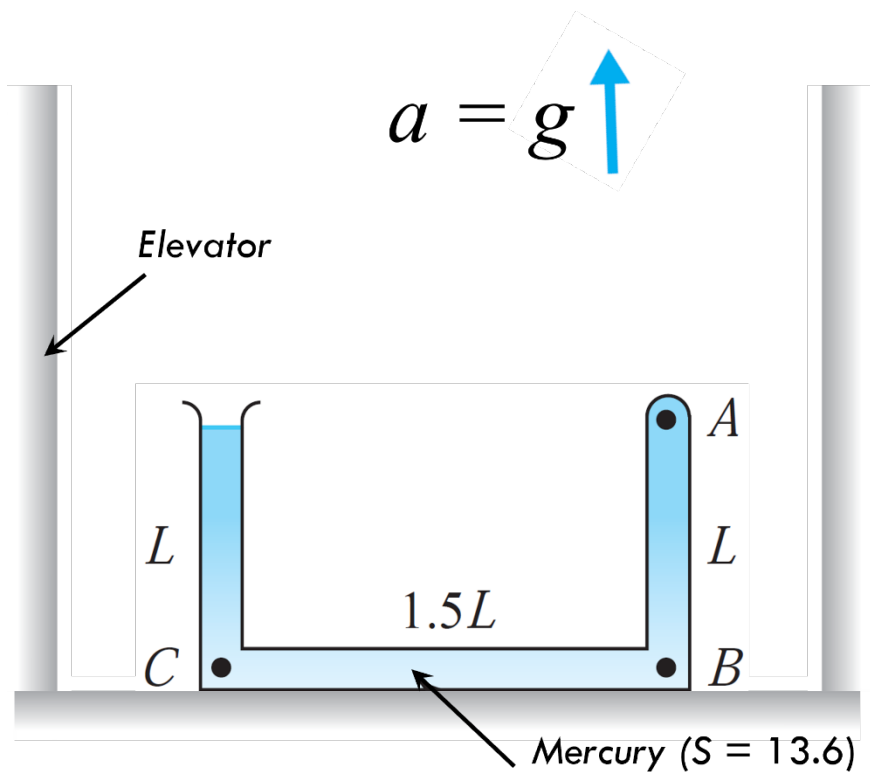
Student Name: _____ **Panther ID:** _____

✓ You will have 1 h 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

1. (40 points). Determine the **horizontal** and **vertical** forces of the liquid (salty water) acting on the curved gate ABC . The radius R is 4 m and the curved gate width, measured perpendicular to the figure below, is 5 m.



2. (30 points) In the figure below, a U-tube contains mercury and is placed inside an elevator. If the elevator is accelerated vertically upward with an acceleration of 9.8 m/s^2 , find the pressures at points A and B ($L = 1 \text{ m}$).



3. (30 points) The pool, depicted in the cross-section below, has been constructed using a combination of concrete and recyclable plastic materials. The total weight of the pool empty is 5000 KN. If the pool is empty, will the groundwater cause the pool to lift out of the ground? Justify your answer with calculations. The groundwater density is 1000 kg/m^3 ($S = 1.0$). The width of the pool, measured perpendicular to the illustration, is 20 meters.

