EX1

November 26, 2023

Download (right-click, save target as ...) this page as a Jupyterlab notebook from: EX-1

---

1 CE 3305 Engineering Fluid Mechanics Spring 2024 Exam 1

LAST NAME, FIRST NAME

R00000000

1.0.1 Purpose :

Demonstrate ability to apply fluid mechanics and problem solving principles covering topics such as: Fluid properties, viscosity, vapor pressure, fluid statics and pressure.

1.0.2 Problem 1

Argon gas is used as a sheilding gas for welding for fabrication of metal objects. A 160-liter tank has an empty weight of 40 kg.

Determine: 1. The total weight of the 160-liter tank of argon at a pressure of 3,500 psia at a temperature of 293^oK.

sketch(s) here

list known quantities

list unknown quantities

governing principles

solution (step-by-step)

[13]:
```
# script (code) here
```

discussion

1.0.3 Problem 2

A fixed mass of water has a bulk modulus of compressibility of $2.2 \times 10^9\ Pa$.

Determine: 1. The pressure increase (p) required to reduce the volume of a mass of water by 2-percent (2 %)

sketch(s) here

list known quantities

list unknown quantities

governing principles

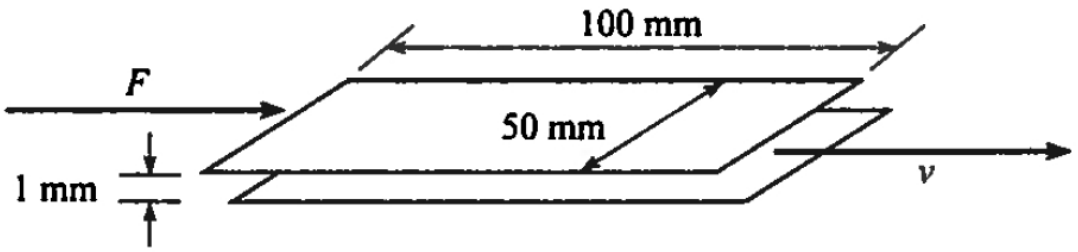
solution (step-by-step)

[14]:
```
# script (code) here
```

discussion

1.0.4 Problem 3

The figure below is a schematic of a sliding plate viscometer used to measure the viscosity of a fluid. The top plate is moving to the right with a constant velocity of 10 meters per second in response to a force of 3 Newtons.



Determine: - The viscosity of the fluid between the plates.

sketch(s) here

list known quantities

list unknown quantities

governing principles

solution (step-by-step)

[15]:
```
# script (code) here
```

discussion

1.0.5 Problem 4

A small spherical drop of water with diameter $d = 4\ mm$ and surface tension ($\sigma = 72.8 \times 10^{-3} \frac{N}{m}$) is depicted in the drawing below.

Determine:

1. The gage pressure of the water in the drop.

sketch(s) here

list known quantities

list unknown quantities

governing principles

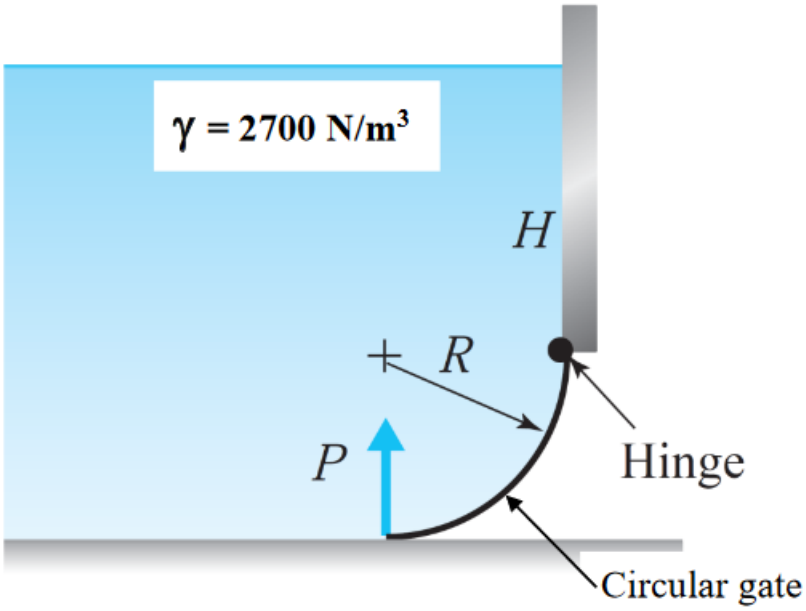
solution (step-by-step)

[16]:
```
# script (code) here
```

discussion

1.0.6 Problem 5

A liquid with specific weight of 2700 N/m^3 is restrained by a circular gate as ahown.



The dimensions of interest are: R = 1.5 m, H = 6 m, Gate width (into the plane of the image) b = 3 m.

Determine:

1. The liquid pressure at the hinge.
2. The liquid pressure at the bottom of the gate
3. The horizontal and vertical force of the liquid acting on the circular gate

sketch(s) here

list known quantities

list unknown quantities

governing principles

solution (step-by-step)

[17]:
```
# script (code) here
```

discussion