PASS
PEER ASSISTED STUDY SESSIONS

MOCK EXAM
FOR PRACTICE ONLY

COURSE: MAAE 2300 **FACILITATOR:** Carlos Martinez-Cairo

It is **most beneficial** to you to write this mock midterm **UNDER EXAM CONDITIONS**. This means:

- Complete the midterm in **1.5** hour(s).
- Work on your own.
- Keep your notes and textbook closed.
- Attempt every question.

After the time limit, go back over your work with a different colour or on a separate piece of paper and try to do the questions you are unsure of. Record your ideas in the margins to remind yourself of what you were thinking when you take it up at PASS.

The purpose of this mock exam is to give you practice answering questions in a timed setting and to help you to gauge which aspects of the course content you know well and which are in need of further development and review. Use this mock exam as a ***learning tool*** in preparing for the actual exam.

Please note:

- Come to the PASS workshop with your mock exam complete. During the workshop you can work with other students to review your work.
- Often, there is not enough time to review the entire exam in the PASS workshop. Decide which questions you most want to review – the Facilitator may ask students to vote on which questions they want to discuss in detail.
- Facilitators do not bring copies of the mock exam to the session. Please print out and complete the exam before you attend.
- **Facilitators do not produce or distribute an answer key for mock exams.** Facilitators help students to work together to compare and assess the answers they have. If you are not able to attend the PASS workshop, you can work alone or with others in the class.

Good Luck writing the Mock Exam!!

Dates and locations of mock exam take-up: October 31st 6:00 - 7:30

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Multiple Choice ……../13

Long answer……../17

Mock Midterm total……/30

The no slip condition means

A) Velocity slows down but doesn't stop as it nears the edge
B) Velocity goes to zero as it approaches the edges of confinement
C) Velocity speeds up as it approaches the edge
D) It doesn't exist, velocity is constant throughout the liquid
E) None of the above

What is the hydrostatic pressure formula in differential form?

A) $-\rho g = dP/dz$
B) $\rho g = dP/dz$
C) $zg = dP/d\rho$
D) $\rho gz = \Delta P$
E) None of the above

What assumptions are made in the hydrostatic pressure equation?

A) The S.G. of the fluid is equal to or greater than water
B) gravity is constant
C) density is constant
D) pressure is constant
E) None of the above

Which one is not a type of manometer?

A) Piezometer
B) mercury barometer
C) u-tube manometer
D) Bourdon tube pressure gauge
E) All of these are manometers

Which section of figure 1 is the boundary layer?

A) A
B) B
C) C
D) D
E) None of the above

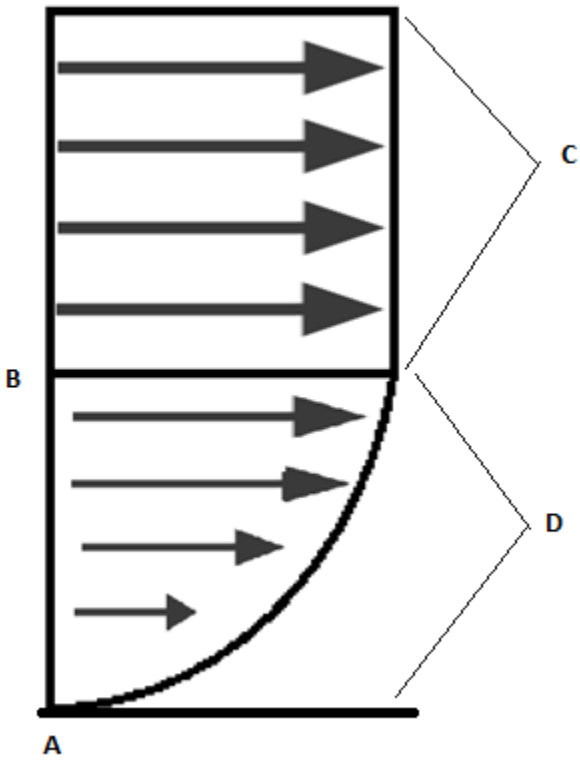

Figure 1

Which section of figure 1 is the free stream?

A) A
B) B
C) C
D) D
E) None of the above

What happens at section A in figure 1?

A) Angular momentum
B) The no slip condition
C) Linear momentum
D) The frictional grip condition
E) None of the above

When is it possible to have negative absolute pressure?

A) It is always possible to have negative absolute pressure
B) When in a vacuum
C) It is not possible
D) Only in a high pressure pipe that loses its pressure rapidly
E) None of the above

What is true about stream tubes?

A) The velocity of the fluid coming into the stream tube is equal to the velocity of the fluid leaving
B) Stream tubes only apply to gases
C) Stream tubes must be circular
D) Fluid cannot cross from one stream tube to another
E) Both B and D

Forces calculated by the linear momentum equation

A) Are the pressure forces
B) Is the force of the fluid acting on the surroundings
C) Is the force of the surroundings acting on the fluid
D) Is the hydrostatic forces
E) None of the above

The barometric equations differ from the hydrostatic equation by

A) Assuming pressure is constant
B) The barometric equations have a varying density
C) The barometric equations only work on liquids
D) Assuming no linear momentum acting on the system
E) The barometric equations are the same as the hydrostatic equations

True or false. Pressure intensity is a vector

A) True
B) False

The definition of continuity is for any fluid

A) Volume that enters a system is equal to the volume that leaves the system
B) Mass that enters the system is equal to the mass that leaves the system
C) $m=\rho AV$
D) $Q=AV$
E) None of the above

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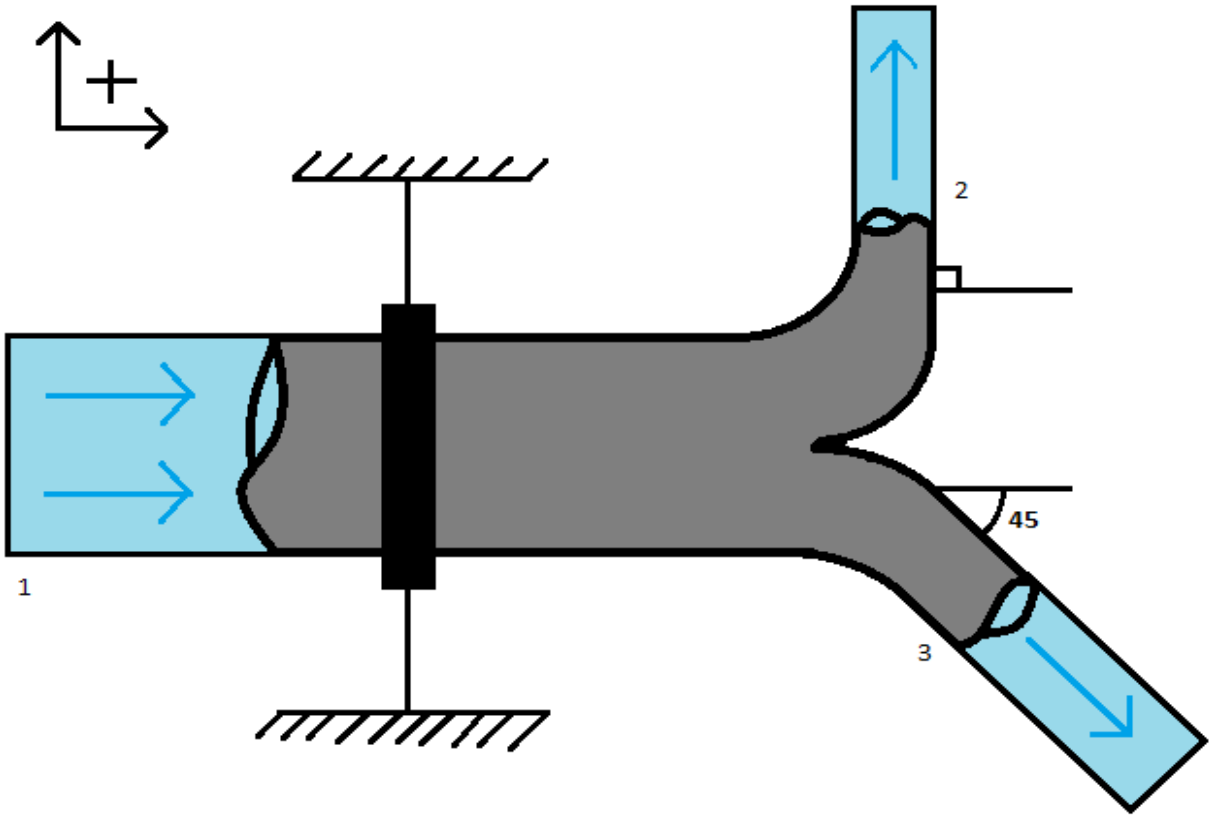
Q 1. Solve for the forces in the collar holding this system in place knowing that R_1=0.2m, V_1=8m/s, Q_2=.3m^3/s, V_2=18m/s, and A_3=0.125m^2

a) Determine the forces in the x direction (3 marks)
b) Determine the forces in the y direction (3 marks)



Q1a

F) 10856 N
G) -10856 N
H) 5228 N
I) -5228 N
J) None of the above

Q1b

A) 2585
B) -2585
C) 8214
D) -8214
E) None of the above

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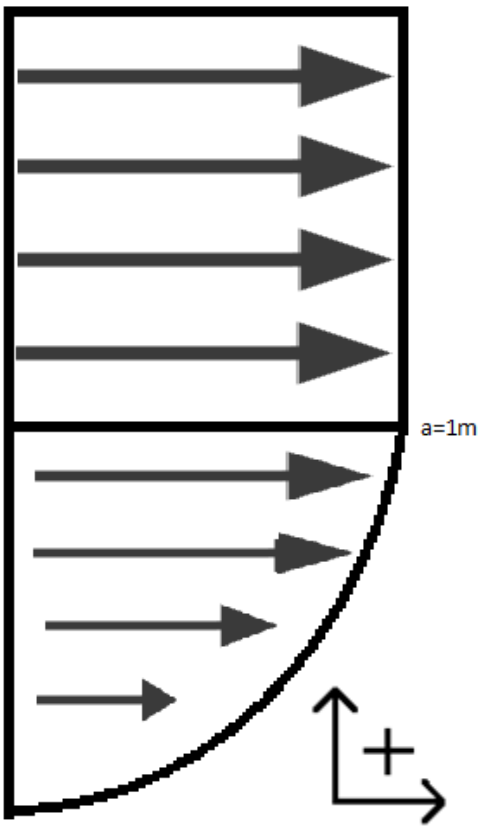
Q2. A river that is 10 meters wide has a flow velocity shown below. V=$\sqrt{y}$ from y=0 to point (a). After point (a) the flow is a consistent 1m/s. If the water is 2 meters deep determine.

A) The equivalent velocity (4 marks)
B) If the equivalent velocity in part A was found to be 1m/s determine the mass flow rate (2 marks)

ρ=1000kg/m^3



Q2a

A) 1.667 m/s
B) 0.833 m/s
C) 0.667 m/s
D) 0.900 m/s
E) None of the above

Q2b

A) 22514 kg/s
B) 23333 kg/s
C) 20000 kg/s
D) 16667 kg/s
E) none of the above

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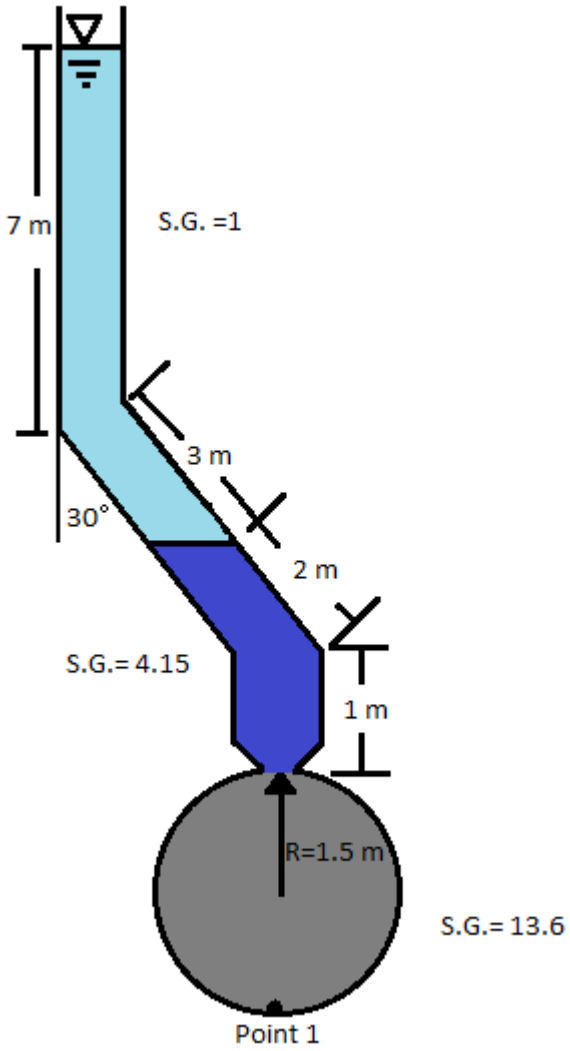
Q3. Determine the gauge pressure at the bottom of the system (point 1). Assume P_{atm} is 101325 Pa

(5 marks)



Q3a

a) 605630 Pa
b) 706955 Pa
c) 620428 Pa
d) 721753 Pa
e) None of the above

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