

# The Islamic University of Gaza



## Faculty of Engineering First Semester (2012/2013)

### Instructor:

Dr. KHALIL ALASTAL

### T.A.:

Eng. YOUSIFE AL-LAHWANI

Eng. BASMA BASHBASH

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Student Name: \_\_\_\_\_

Student No.: \_\_\_\_\_

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## *Fluid Mechanics*

### **FINAL EXAM**

#### **CLOSED BOOK**

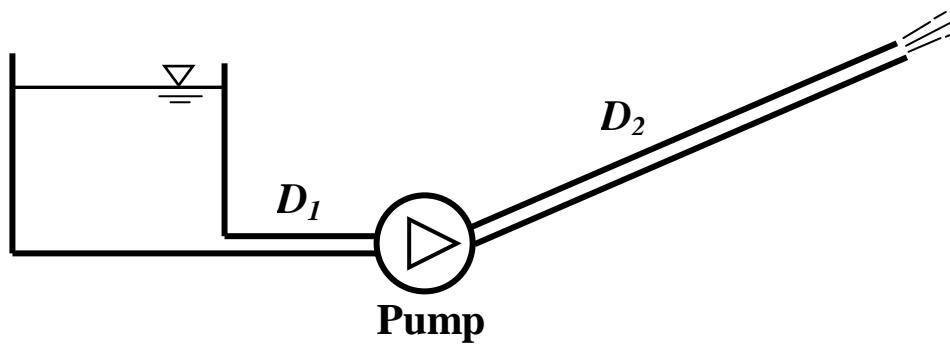
*Allowable Time: 2 hr 15min*

Question No.	Given Mark	Max. Mark	Notes
Q1		6	
Q2		7	
Q3		7	
Q4		10	
Q5		10	
Total		<b>40</b>	

**Question 1**

(6 Marks)

A. Sketch the Hydraulic Gradient Line (*HGL*) and Energy Grade Line (*EGL*) for the shown system (Note that the  $D_1 > D_2$ ).



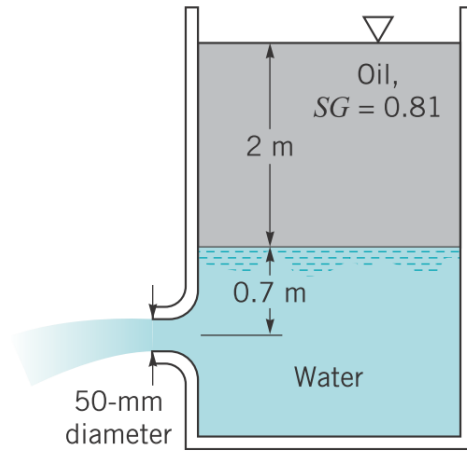
B . Define the stagnation point (demonstrate your answer by a sketch)

**Question 2**

(7 Marks)



If viscous effects (head losses) are neglected and the tank is large,  
**Calculate the theoretical flow rate from the tank.**



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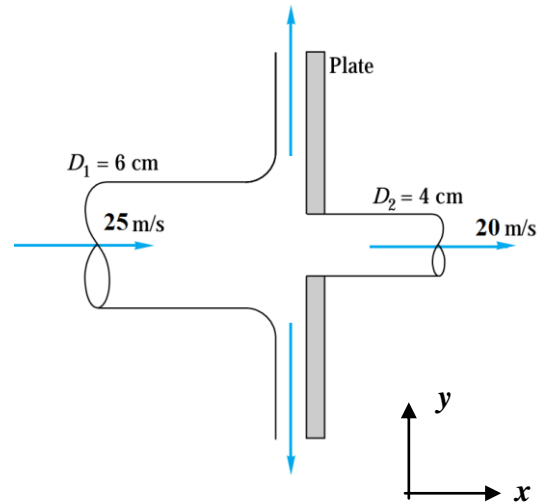
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**Question 3**

(7 Marks)

The 6-cm-diameter water jet in figure shown strikes a plate containing a hole of 4cm diameter. Part of the jet passes through the hole, and part is deflected. **Determine the horizontal force required to hold the plate in place.**



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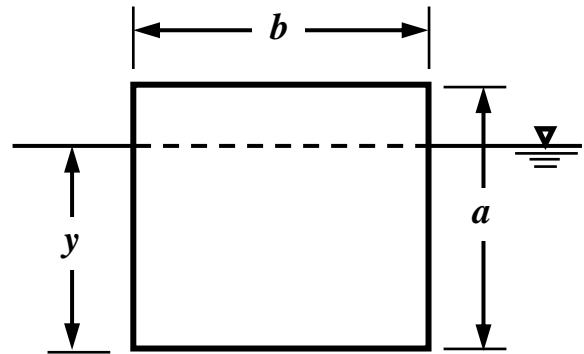
A series of horizontal dotted lines for writing, spanning the width of the page.

**Question 5**

(10 Marks)

A homogeneous wooden block of rectangular cross section, of sides " $a$ " and " $b$ ", and of length " $L$ " has a relative density of " $S$ ".

If the block is to float in water with its longest axis horizontal and the length " $a$ " vertical as shown in the figure; **find the ratio " $b/a$ " to have a stable equilibrium.**



Blank lined area for writing answers.