



الرقم التعديلي
11

0110624

رقمه الجامعي

الكلية

المادة

Fluids

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المستوى

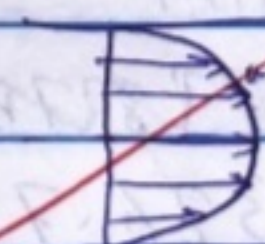
القسم

التاريخ

العلامات

7
6
4

the direction of F



velocity profile

1

a)

b) $\tau = \mu \frac{du}{dy}$

17/20

$$u = u_{max} - u_{max} \left(\frac{2y}{h} \right)^2$$

$$u = u_{max} - u_{max} \frac{4y^2}{h^2}$$

$$\frac{du}{dy} = -8 u_{max} \frac{y}{h^2}$$

$$= (-8)(0.3) \left(\frac{0.5}{(0.5)^2} \right) = -2.4 \text{ s}^{-1}$$

$$\tau = 1.15 \times 10^{-3} (-2.4) = -2.76 \text{ Pa}$$

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Exam

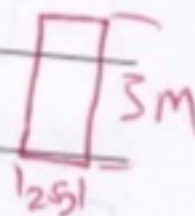
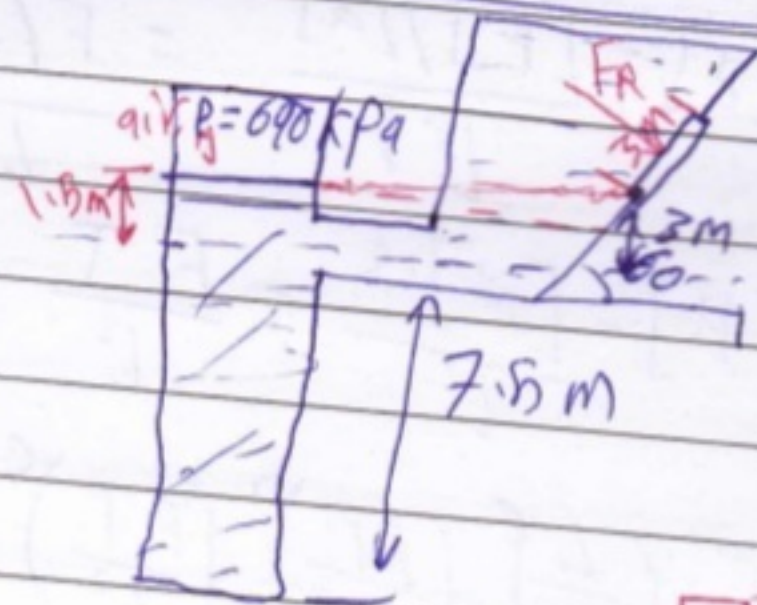
prob. 2

$$h_{eq} = \frac{P_{air}}{\rho g} = \frac{690 \times 10^3}{1000 \times 9.81} = 70.336 \text{ m}$$

$$d = 70.336 + 1.5 - 3 = 68.836 \text{ m}$$

$$y_c = \frac{d}{\sin 60} - 1.5 = 77.984 \text{ m}$$

$$F_R = \rho g y_c \sin \theta A = 1000 \times 9.81 \times 77.984 \times \sin 60 \times 3 \times 2.5 = 4.969 \times 10^6 \text{ N} = 4969 \text{ kN}$$



prob. 3:-

$$A_3 = A_4 = 0.04 \text{ m}^2$$

$$\dot{m}_3 = 56.7 \text{ kg/s}$$

$$V_4 = 0.03 \text{ m/s}$$

$$V_1 = 3 \text{ m/s}$$

find V_2 ??

$$A_1 = 0.02 \text{ m}^2$$



$$- \rho V_1 A_1 + \rho V_2 A_2 + \rho V_3 A_3 - \rho V_4 A_4 = 0$$

$$(-1000)(3)(0.02) + (1000)(V_2)(0.05) + (1000)(56.7) - (1000)(0.03)(0.04) = 0$$

$$V_2 = 0.09 \text{ m/s}$$

and since V_2 is +ve, the flow is out from the device