



University of Technology
Department of Electromechanical
Engineering

Note: Answer five questions



Stage and Branch: 2st Energy
Subject : Fluid Mechanics

Time Allowed: 3 hrs

Date : 11/6/2014

Examiner: Lect. Dr. Khalid Faisal sultan

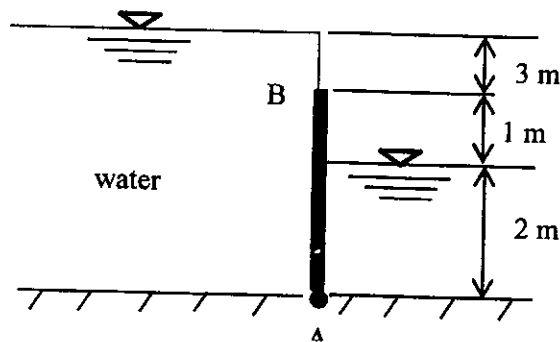
Name:

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Q.1 The gate AB in figure rotates about an axis through A . If the width of the gate is 3m . what ~~tongue~~ ^{torque} applied through A to hold the gate closed. See figure. 1.

Fig.1



[12 M]

Q.2 Find the flow rate for figure the figure (2). Neglect minor losses and friction factor $f=0.04$.

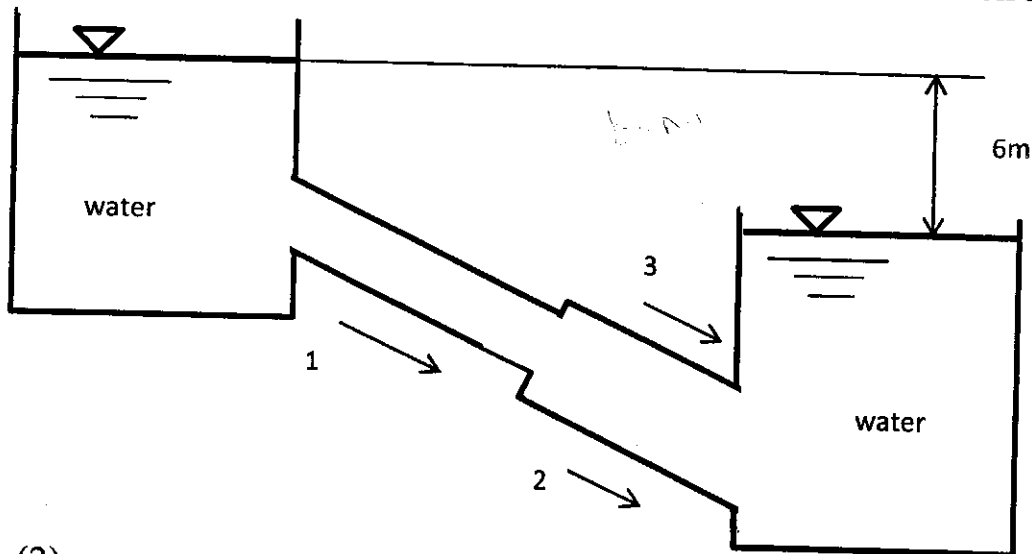


Fig (2).

[12 M]

Q.3 Prove that the theoretical efficiency for propeller is given by:

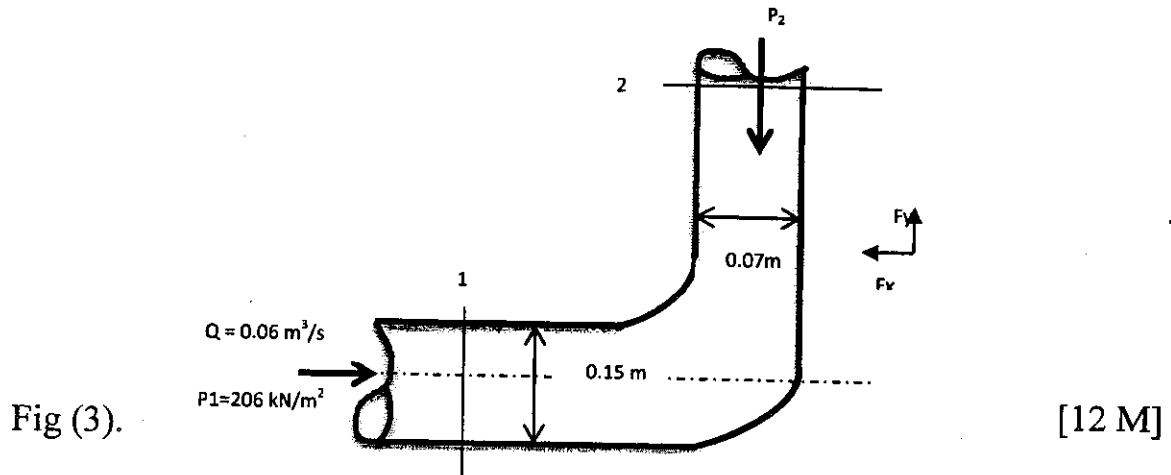
$$\eta_t = \frac{V_1}{V_1 + \frac{\Delta V}{2}}$$

[12 M]

Follow please



- Q.4 A pipe of diameter 0.15m bends through 90° in a horizontal plane and while bending changes its diameter smoothly to 0.07m. the pressure in the large end of the pipe is 206 kN/m^2 gauge. Calculate the magnitude and direction of the resultant horizontal force on the bend when a flow of $0.06 \text{ m}^3/\text{s}$ of water take place through the pipe. Both inlet and outlet pipes are in the same horizontal plane. Energy degradation may be neglected. See fig (3)



- Q.5 Explain Briefly the applications of the Bernoulli equation.

- Q.6 For the Venturi meter and manometer installation shown in fig(4). Derive an expression relating the volume flow rate of flow with manometer reading.

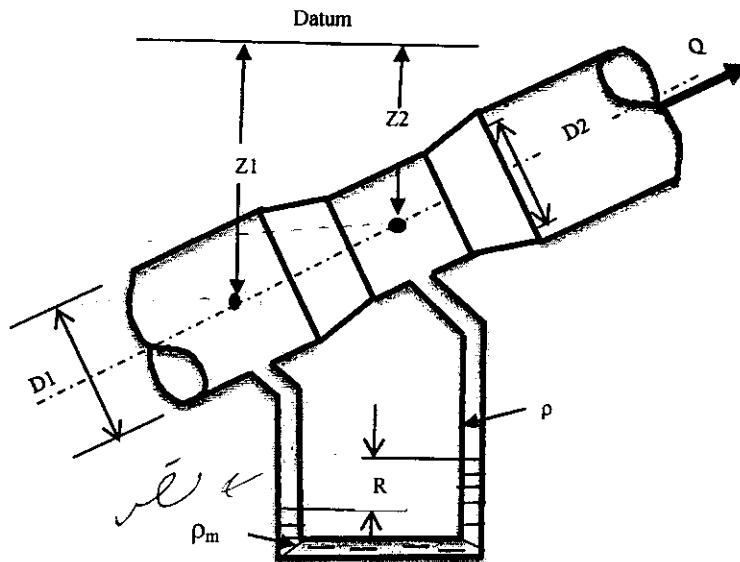


Fig (4).

GOOD LUCK

[12 M]

[Signature]
Lect. Dr.
Khalid Faisal sultan