

ENGR 207 Assignment 5

Mohamed Hussien El-Deeb (201900052)

Contents

1	Problem 1	3
2	Problem 2	4
3	Problem 3	5
4	Problem 4	6
5	Problem 5	7
6	Problem 6	8

1 Problem 1

<https://docs.google.com/spreadsheets/d/1CzIPJ5D-QBWlSUav1pO0Eagw1V6teXcCctc4o4u9bNA/edit?usp=sharing>

2 Problem 2

[https://colab.research.google.com/drive/1tJ9nPd0Ms2XQzqH3ap3Lk13XZ3JCr2qA?](https://colab.research.google.com/drive/1tJ9nPd0Ms2XQzqH3ap3Lk13XZ3JCr2qA?usp=sharing)
usp=sharing

3 Problem 3

$$Q = 40 \text{ L/s} = 0.04 \frac{\text{m}^3}{\text{s}}$$

$$V_1 = \frac{Q}{A_1} = \frac{Q}{\pi (\frac{D_1}{2})^2} = \frac{Q}{\pi (0.15 \text{ m})^2}$$

$$= 0.5659 \frac{\text{m}}{\text{s}}$$

$$V_2 = \frac{Q}{A_2} = \frac{Q}{\pi (0.1 \text{ m})^2} = 1.273 \frac{\text{m}}{\text{s}}$$

$$\rho + \frac{\rho v^2}{2} = \text{const.}$$

$$\Delta P + \frac{\rho \Delta V^2}{2} = 0$$

$$\Delta P = P_1 - P_2 = \frac{\rho}{2} (V_2^2 - V_1^2)$$

$$\rho_1 - \rho_2 = 2gy(\rho u - \rho)$$

$$y = \frac{\rho}{2g(\rho u - \rho)} [U_e - V_1]$$

$$= \frac{0.8}{2 \times 9.81 \frac{\text{m}}{\text{s}^2} (13.6 - 0.8)} \left((1.273 \frac{\text{m}}{\text{s}})^2 - (0.5659 \frac{\text{m}}{\text{s}})^2 \right)$$

$$\approx 4.15 \text{ mm}$$

4 Problem 4

<https://docs.google.com/spreadsheets/d/1CzIPJ5D-QBWlSUav1pO0Eagw1V6teXcCctc4o4u9bNA/edit?usp=sharing>

5 Problem 5

[https://colab.research.google.com/drive/1tJ9nPd0Ms2XQzqH3ap3Lk13XZ3JCr2qA?](https://colab.research.google.com/drive/1tJ9nPd0Ms2XQzqH3ap3Lk13XZ3JCr2qA?usp=sharing)
usp=sharing

6 Problem 6