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Courses » **Industrial Instrumentation**

Announcements   **Course**   Forum   Progress   Mentor

Unit 5 - Week 4

Week 4 Assignment 4

1)   *2 points*

The pressure and velocity at the throat of a Venturi tube, measuring the flow of a liquid, are related to the upstream pressure and velocity, respectively, as follows:

○ (a) Pressure is lower but velocity is higher.
○ (b) Pressure is higher but velocity is lower.
○ (c) Both pressure and velocity are higher
○ (d) Both pressure and velocity are lower.

Accepted Answers:
(a) Pressure is lower but velocity is higher.

2)   *2 points*

What is the maximum useful range (in terms of % of full-scale output) of differential flow meters?

○ (a) 40 % to 100 %
○ (b) 75 % to 100 %
○ (c) 50 % to 100 %
○ (d) 25 % to 100 %

Accepted Answers:
(d) 25 % to 100 %

3) Turbine flowmeters are most suitable for-   *2 points*

○ (a) Low viscosity, high flow
○ (b) Low viscosity, low flow
○ (c) High viscosity, high flow
○ (d) High viscosity, low flow

Accepted Answers:
(a) Low viscosity, high flow

4)   *2 points*

Water is pumped through a 75 mm diameter pipe with a flow velocity of 760 mm/sec. Find (i) the volume flow rate (m^3/sec) and (ii) mass flow rate (kg/sec).

    ○ (a) (i) 3.3575*1e-3 (ii) 6.715
    ○ (b) (i) 3.3575*1e-3 (ii) 3.3575
    ○ (c) (i) 6.715*1e-3 (ii) 3.3575
    ○ (d) (i) 6.715*1e-3 (ii) 6.715

Accepted Answers:
*(b) (i) 3.3575*1e-3 (ii) 3.3575*

5)   **5 points**

A rotameter uses a cylindrical float of 3.5 cm height, 3.4 cm diameter and density of 3985 kg/m^3. The maximum inside diameter of the metering tube is 6 cm. Determine the maximum flow rate handling capacity (in m^3/sec) of the rotameter if the fluid is water. Assume $C_D = 0.75$.

    ○ (a) 1.403*1e-3
    ○ (b) 4.209*1e-3
    ○ (c) 2.806*1e-3
    ○ (a) 5.612*1e-3

Accepted Answers:
*(c) 2.806*1e-3*

6)   **2 points**

A rotameter is constructed using a float of density 1900 kg/m^3. It is calibrated for metering a gas of density 1.3 kg/m^3 and has a scale ranging from 0.018 m^3/min to 0.18 m^3/min. Now, it is intended to use this meter for metering the same gas within a flow range of 0.036 m^3/min to 0.36 m^3/min. What should be the density (kg/m^3) of the new float? Both the floats can be assumed to have the same volume and shape.

    ○ (a) 1900
    ○ (b) 3800
    ○ (c) 5700
    ○ (d) 7596.1

Accepted Answers:
(d) 7596.1

7)   **2 points**

The flow of cooling water is measured with the help of a horizontal venturimeter with 200 mm inlet and 100 mm throat. A U-tube manometer connected between the inlet and throat of the venturimeter shows a differential pressure of 235 mm of mercury. Calculate the flow rate (in cm^3/sec) if $C_D = 0.975$, specific gravity of mercury is 13.6, density of water is 1 g/cm^3.

    ○ (a) 62603.62
    ○ (b) 31301.81
    ○ (c) 15650.91
    ○ (d) 7825.45

Accepted Answers:
(a) 62603.62

8)   *2 points*

Determine the nominal flow velocity (in cm/sec) at the orifice (diameter: 30 mm) kept in a pipe of 60 mm diameter. Reynolds number R is 10^5. Assume density of water = 1000 kg/m^3 and kinematic viscosity (K) is 10^{-2} cm^2/s.

- ( ) (a) 166.667
- ( ) (b) 333.334
- ( ) (c) 1000
- ( ) (d) 666.667

Accepted Answers:
(d) 666.667

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