

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Winter 2022 - 23 Examination**

Semester: 3  
 Subject Code: 203115203  
 Subject Name: Fluid mechanics

Date: 11/10/2022  
 Time: 02:00 pm to 04:30 pm  
 Total Marks: 60

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

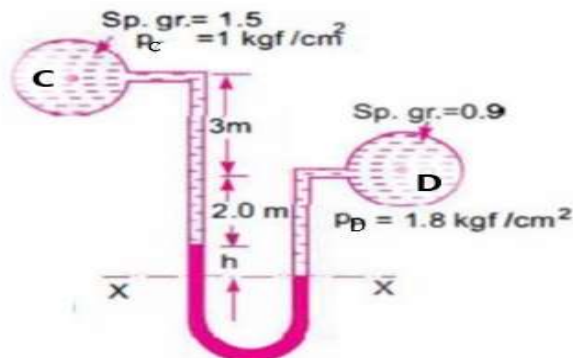
**Q.1 Objective Type Questions****(15)**

1. When is the fluid called laminar?
  - a) Low viscosity
  - b) The density of the fluid is high
  - c) Reynolds number is greater than 2000
  - d) Reynolds number is less than 2000
2. A fluid in which shear stress is not proportional to the rate of shear strain is known as \_\_\_\_\_
3. What is the equation for absolute pressure.
4. Due the variation of venturi meter constant, venturi meter is not suitable for \_\_\_\_\_
5. Define the surface tension.
6. The force per unit length is the unit of \_\_\_\_\_
7. Bernoulli's equation is applied to
  - a) venturi meter
  - b) orifice meter
  - c) pitot tube
  - d) all above
8. Relative density of mercury is \_\_\_\_\_
9. Milk, blood and clay are the example of \_\_\_\_\_ fluid.
10. write down the equation for rectangular notch.
11. A manometer is used to measure
  - a) Atmospheric pressure
  - b) Pressure in pipes and channels
  - c) Pressure in Venturi meter
  - d) Difference of pressures between two points in a pipe
12. Reynold's number is ratio of \_\_\_\_\_
13. A current meter is use to measure \_\_\_\_\_ (velocity)
14. Define the capillarity.
15. The theoretical velocity of jet at vena contracta is (where  $H$  = Head of water at vena contracta)
  - a)  $2gh$
  - b)  $gh$
  - c)  $(2gh)^2$
  - d)  $(2gh)^{0.5}$

**Q.2 Answer the following questions.****(15)**

- A) Explain about velocity potential function.
- B) Explain the types of fluid flow.
- C) Derive the equation for V notch.
- D) Classify the notch and weir.

- Q.3** A) A differential manometer is connected at the to point C and D of to pipe as shown in figure. The pipe C contains a liquid of specific gravity = 1.5 while pipe D contains liquid of specific gravity = 0.9. the pressure at C and D  $1 \text{ kgf/cm}^2$  respectively. Find the difference in mercury level in the differential manometer. **(07)**



B) Derive the continuity equation in three dimension. (08)

**OR**

B) Derive the Euler's equation and write down the assumption. (08)

**Q.4** A) The head of water over an orifice of diameter 100 mm is 10m. the water coming out from orifice is collected in a circular tank of diameter 1.5 m. the rise of water level in this tank 1.0m in 25sec. Also the co-ordinate of a point the jet, measured from vena contracta are 4.3 m horizontal and 0.5m vertical. Find the co-efficient  $C_d$ ,  $C_v$  and  $C_c$ . (07)

**OR**

A) An oil specific gravity 0.8 is flowing through a venturi meter having inlet diameter 20cm and throat diameter 10cm. the oil mercury differential manometer shows a reading of 25 cm. calculate the discharge of oil through the horizontal venturi meter. (assume  $C_d = 0.98$ ) (07)

B) Derive Equation for Total Pressure and Center of Pressure for incline plane Surface Submerged in Liquid. (08)