

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2018 - 19 Examination**

**Semester: 3**  
**Subject Code: 03103202**  
**Subject Name: Fluid Flow Operation**

**Date: 27/05/2019**  
**Time: 02:00 pm to 04:30 pm**  
**Total Marks: 60**

**Instructions:**

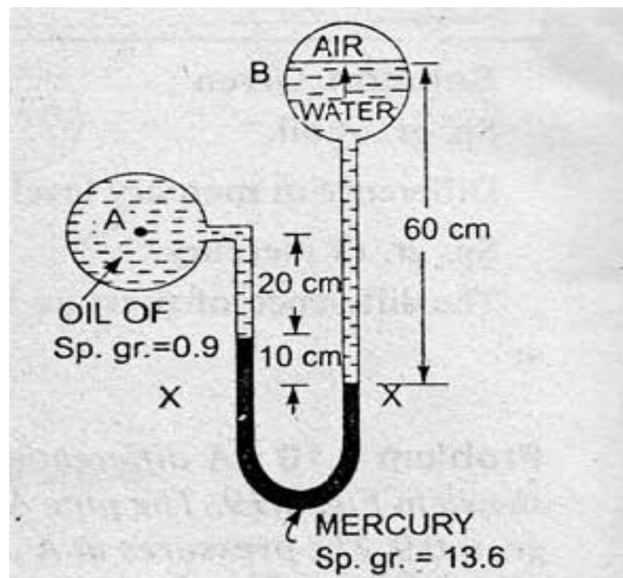
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions - (Each of one mark)****(15)**

1. What happens to the viscosity of fluid when temperature of the fluid increases?
  - a. Increases
  - b. Decreases
  - c. Remains constant
  - d. none of these
2. The terminal velocity of a small sphere settling in a viscous fluid varies as the (stokes regime)
  - a. first power of its diameter.
  - b. inverse of the fluid viscosity.
  - c. inverse square of the diameter.
  - d. square of the difference in specific weights of solid & fluid.
3. Velocity at the point of contact between the solid and liquid is zero. **(True/False)**
4. Name the momentum balance Equation .....
5. Name the equation which is used to calculate the pressure difference in packed bed?
6. Power loss in an orificemeter is \_\_\_\_\_ that in a venturimeter.
7. The fluid in which the shearing stress within it is proportional to the velocity gradient across the sheared section, is called a \_\_\_\_\_ fluid.
8. The Reynolds no. for Turbulent flow is .....
9. The viscosity of ideal fluid zero. **(True/False)**
10. The viscosity of an pseudopalstic fluid
  - a. Increases with shear stress
  - b. Decreases with shear stress
  - c. Remains constant with shear stress
  - d. None of these
11. What is specific weight of fluid having sp.gr. 0.7
  - a. 700 N/ m<sup>3</sup>
  - b. 6867 N/ m<sup>3</sup>
  - c. 6926 N/ m<sup>3</sup>
  - d. 981 N/m<sup>3</sup>
12. ....is the unit of viscosity in SI system.
13. What is the value of sphericity of a sphere?
14. What is the effect of increasing the Reynolds no. on the friction factor in laminar flow?
15. What is the unit of dynamic viscosity?

**Q.2 Answer the following questions. (Attempt any three)****(15)**

- A) Give the classification of various types of fluid with example
  - B) Air at 20 °C and 2atm absolute pressure enters a finned tube steam heater through a 50mm tube at an average velocity of 15m/s. it leaves the heater through a 65 mm tube at 90 °C and 1.6atm absolute pressure. what is the average air velocity at the outlet?
  - C) Define following : drag force, terminal velocity, sphericity, Equivalent diameter ,fanning friction factor
  - D) The pump draws oil of specific gravity 0.8 from a storage tank and discharge into an over head tank. The mechanical energy delivered by the pump to the fluid is 50J/Kg. The velocity at the suction and discharge point is 1m/s and 7 m/s. neglect friction loss and assuming kinetic correction factor to be unity. Calculate the pressure developed by the pump.
- Q.3 A)** A differential manometer is connected at the two points A and B as shown in figure given below. At B air pressure is 9.81N/cm<sup>2</sup>, find the pressure at point A? **(07)**



B) Explain the construction and working principle of venturimeter with in neat sketch. (08)

**OR**

B) Explain the construction and working principle of orifice meter with in neat sketch. (08)

Q.4 A) Explain the characteristic curve of centrifugal pump and write the affinity laws (07)

**OR**

A) Draw the neat sketch of centrifugal pump and explain the construction and working principle of centrifugal pump (07)

B) Derive Bernoulli's equation for steady-incompressible fluid flow and state assumptions to be made while deriving equation. (08)