PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech., Summer 2017 - 18 Examination

Semester: 3   Date: 11/06/2018
Subject Code: 03103202   Time: 2:00 pm to 4:30 pm
Subject Name: Fluid Flow Operation   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. The viscosity of ideal fluid zero. **(True/False)**
2. Velocity at the point of contact between the solid and liquid is zero. **(True/False)**
3. The viscosity of gas ……………..with increase in temperature.
4. ………………………..is the unit of viscosity in SI system.
5. Differential manometer measures the…………….....
6. The terminal velocity of a small sphere settling in a viscous fluid varies as the
    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.
7. What is the effect of temperature on the viscosity liquid
    a. Increases   b. Decreases
    c. Remains constant   d. none of these
8. What is potential flow
    a. Flow of incompressible fluid   b. Flow of non ideal fluid
    c. Flow of irrotational fluid.   d. Flow of an ideal fluid
9. The fluid in which the shearing stress within it is proportional to the velocity gradient across the sheared section, is called a _____ fluid.
10. The length of the tube necessary for the boundary layer to reach the centre of the tube and for fully developed flow to be established is called the _____ length.
11. Power loss in an orificemeter is _____ that in a venturimeter.
12. Name the equation which is used to calculate the pressure difference in packed bed?
13. Name the momentum balance Equation ……………
14. The Reynolds no. for Turbulent flow is …………………
15. Which of the following is not a dimension-less parameter ?
    a. Euler number   b.Specific gravity   c.Fanning friction factor   d. None of these

Q.2 Answer the following questions. (Attempt any three)   **(15)**
    A. Derive the barometric equation for an incompressible fluid
    B. Explain major and minor loss in pipe fittings
    C. What is drag force, terminal velocity, sphericity, Equivalent diameter ,fanning friction factor ?
    D. Air at 20 $^{\circ}$C and 2 atm 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 $^{\circ}$C and 1.6 atm absolute pressure. what is the average air velocity at the outlet

Q.3 A) Give the classification of various types of fluid with example   **(07)**
    B) Derive Bernoulli's equation for steady-incompressible fluid flow and state assumptions made in the derivation.   **(08)**

OR

    B) Explain the construction and working of orifice meter and also draw the Sketch of it. **(08)**

Q.4 A) A differential manometer is connected at the two points A and B as shown in figure given below. **(07)**
At B air pressure is 9.81N/cm², find the pressure at point A?
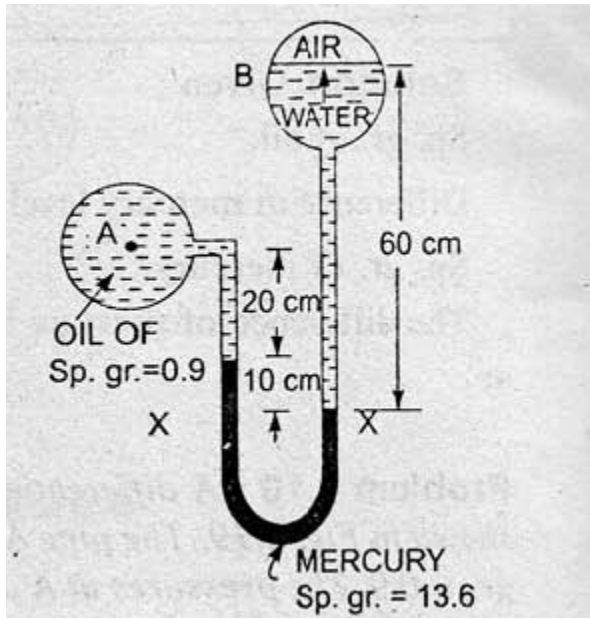
OR

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

B) 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 **(08)**