Code: CE3T6

II B.Tech - I Semester – Regular Examinations - December 2014

FLUID MECHANICS
(CIVIL ENGINEERING)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1. a) Define
        i) Specific Gravity   ii) Viscosity
        iii) Surface Tension   iv) Vapor Pressure   8 M

   b) An inverted differential manometer containing a fluid of specific gravity 0.8 is connected to find the difference of pressures at two points of a pipe containing water. If the manometer reading is 30 cm, find the difference of pressures.   6 M

2. a) For a vertical plane surface submerged in a liquid, derive expressions for   10 M
        i) Total pressure, and
        ii) Center of pressure

   b) Write briefly about the hydrostatic forces acting on submerged bodies.   4 M

3. a) Define:

        i) Stream line   ii) Path line

        iii) Streak lines   iv) Stream Tube   8 M

   b) What are various types of flows? Explain.   6 M

4.   Write about the significance and applications of

        i) Navier Stoke's Equations

        ii) Euler's Equations

        iii) Bernoulli's Equation

        iv) Momentum Equation by aptly stating the

          equations.   14 M

5. a) Define   4 M

        i) Drag

        ii) Lift

   b) A flat plate 3m x 3m moves at 50 kmph in stationary air stream of density 1.25 kg/m^3. If the coefficient of drag and lift are 0.3 and 0.75 respectively, find   10 M

        i) the lift force

        ii) the drag force

        iii) the resultant force

        iv) Angle made by the resultant force with the plate

        v) the power required to keep the plate in motion.

6. a) Write about the significance of Reynolds experiment. 6 M

b) What are laminar and turbulent flows? Describe their characteristics with neat diagrams. 8 M

7. a) Three pipes of lengths 600 m, 700m and 400m and diameters 200 mm, 300 mm and 100 mm are connected in series. Find the diameter of the equivalent pipe, if the 600m length pipe is replaced by 1000 m pipe of 250 mm Diameter. What is the percentage change in the diameter of the equivalent pipe? What is your inference? 10 M

b) Define: 4 M
   i) Total Energy Line
   ii) Hydraulic Gradient Line

8. a) Define an orifice-meter. When do you prefer orifice-meter to venturimeter? 6 M

b) Write about flow over
   i) Rectangular Notch
   ii) Triangular Notch
   iii) Trapezoidal Notch
   iv) Stepped Notch.
   In case of low flows, which type of notch is used? Why? 8 M