Code No: R21014   **R10**   SET - 1

II B. Tech I Semester Supplementary Examinations, Dec - 2015
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain micro manometers.

    b) Define any four physical properties of fluids.

2. a) A rectangular plate 2mX3m is immersed in water in such a way that its greatest and least depths are 6m and 4m respectively from the water surface. Calculate the total pressure on the plate.

    b) Define total pressure and derive the expression for the same for a case of an inclined immersed surface.

3. a) What are stream function and velocity potential functions. For which type of flows they exist. Also give the relations between them.

    b) Water is flowing through a pipe of 100 mm diameter with an average velocity of 10 m/s. Determine the rate of discharge of the water in lps. Also determine the velocity of water at the other end of the pipe if the diameter of the pipe is gradually changed to 200mm.

4. a) A 45^0 reducing bend is connected in a pipe line the diameters at the inlet and outlet of the bend being 40 cm and 20 cm respectively. Find the force exerted by water on the bend if the intensity of pressure at inlet of bend is 21.58 N/cm^2. The rate of flow of water is 500lps.

    b) What are Navier-Stokes equations?

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5. a) Explain separation of boundary layer.

   b) Obtain the value of δ^*/δ and Θ/δ for velocity distribution $v/V = 2(y/\delta) - (y/\delta)^2$.

6. An oil of viscosity 0.1 N.s/m^2 and relative density 0.9 is flowing through a circular pipe of diameter 50 mm and of length 300 m. The rate of flow of fluid through the pipe is 3.5 lps. Find the pressure drop in a length of 300m and also the shear stress at the pipe wall.

7. a) List out various minor losses. Also give the corresponding formulae.

   b) An old water supply distribution pipe of 250 mm diameter of a city is to be replaced by two parallel pipes of smaller equal diameter having equal lengths and identical friction factor values. Find out the new diameter required.

8. a) A venture meter having a diameter of 75mm at the throat and 150 mm diameter at the enlarged end is installed in a horizontal pipeline 150 mm in diameter carrying an oil of specific gravity 0.9. The difference of pressure head between the enlarged end and the throat recorded by a U-tube is 175 mm of mercury. Determine the discharge through the pipe. Assume c_d of the meter as 0.97.

   b) Why the convergent and divergent sections have different lengths in a venture meter.