Code No: RT21016 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, May/June - 2016
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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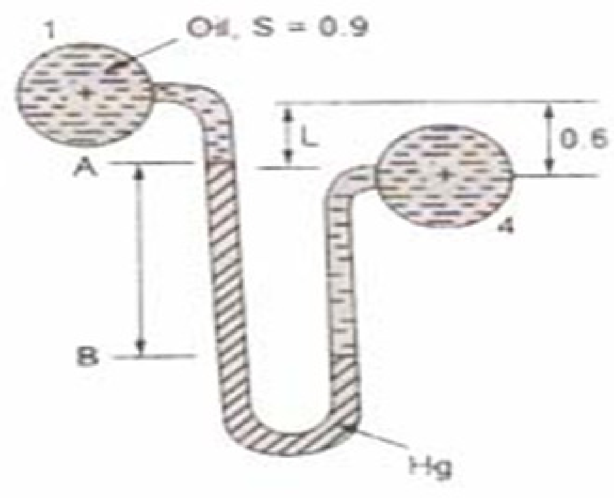
PART-A

1. a) Air has a specific mass of 1.22kg/m find the specific volume & specific mass.
   b) The x component of velocity in a two-dimensional incompressible flow is given by $u= ax^3+by^2$. Find the y component v if at y = 0, v = 0 for all values of x.
   c) How the Bernoulli's equation is justified for the difference in pressure at the inlet and exit of a turbine.
   d) What are the methods suggested to control the boundary layer.
   e) What is Von Karmann's universal constant in turbulent flows.
   f) Is there any chance of occurrence of cavitation in turbulent flows.

(3M+4M+3M+4M+4M+4M)

PART-B

2. For the manometer shown in in figure, determine the length AB. The pressure at point 1 and point 4 are 30 kPa and 120 kPa. (16M)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3. An annular plate 3 m external diameter and 1.5m internal diameter is immersed in water with its greatest and depths below water surface as 3.6 m and 1.2 m respectively. Determine the total pressure and the position of the centre of pressure on one face of the plate. (16M)

4. What is navier stoke's equation. Derive and integrate the Euler's equation of motion to attain the energy equation. What attributes are assumed. (16M)

5. Air flows over a flat plate1 m long at a velocity of 6 m/s. determine
   (a) the boundary layer thickness at the end of the plate,
   (b) shear stress at the middle of the plate,
   (c) total drag per unit length on the sides of the plate. Take ρ=1.226 kg/m^3(0.125mls/m^3) and υ=0.15×10^{-4}m^2/s(0.15 stokes) for air. (16M)

6. A total of 12 litres per second of oils is pumped through two pipes in parallel, one 10cm in diameter and the other 12cm in diameter, both pipes being 1000 metres long. The specific gravity of the oils is 0.97 and the kinematic viscosity 9 cm^2 per second. Calculate the flow rate through each pipe and the horse-power of the pump. (16M)

7. A tank has two undentical orifices, one vertically above the other and 1 m apart, in one of its vertical sides. The water surface is 1.22 m above the higher orifice and is maintained at a constant level. It is found that the jets intercept each other at a horizontal distance of 2.65 m from the vena-contracta. Determine the c_υ for the orifices. (16M)

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