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

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
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) A horizontal venturimeter with inlet diameter 20cm and throat diameter 10cm is used to measure the Flow of oil of Sp. gr. 0.8. The discharge of oil through venturimeter is 60liters/s. Find the reading of the oil-mercury differential manometer. Take Cd=0.98 (8M)
   b) Explain about atmospheric, gauge and vacuum pressure (7M)

2. A tank has a base 3m square from which four side slope outward at 60^0 to the horizontal for a vertical height of 3m they then turn vertically upward for another 3m. The tank is filled with water of full depth of 6m. Find the total pressure and centre pressure on one of the sloping sides of the tank. (15M)

3. a) For a two-dimensional flow, the velocity components are u= $x/(x_2+y_2)$, v=$y/(x_2+y_2)$ determine (7M)
   i. the acceleration components ax and ay;
   ii. the rotation of z.
   b) How the 'circulation' is is defined? (7M)

4. a) Derive Bernoullis equation and state assumptions (8M)
   b) The water is flowing through a pipe having diameters 20cm and 10cm at sections 1 and 2 respectively. The rate of flow through pipe is 35litres/s. The section 1 is 6m above datum and section 2 is 4m above datum. If the pressure at section 1 is 39:24N/cm^2 .Find the intensity of pressure at section 2. (7M)
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5. a) Explain the Mechanics of boundary layer transition (8M)

b) Through a horizontal circular pipe of diameter 100 mm and of length 10m, an oil of dynamic 0.097 poise and relative density 0.9 is flowing. Calculate the difference of pressure at the two ends of the pipe, if 100 Kg, of the oil is collected in a tank in 30 seconds. (7M)

6. A pipe line ABC 180 m long is laid on an upward slope of 1 in 60. The length of portion AB is 90 m and its diameter is 0.15 m. At B the pipe section suddenly enlarges to 0.30 m diameter and remains so for the remainder of its length BC, 90m. A flow of 50 liters per second is pumped into the pipe at its lower end A and is discharged at the upper end C into a closed tank. The pressure at the supply end A is 137.34 kN/m^2. Sketch (a) the total energy line (b) the hydraulic gradient line and also find the pressure at discharge end C. Take f = 0.02 in $hf=flV^2/2gD$ (15M)

7. A pipe of diameter 0.4m and of length 2000m is connected to a reservoir at one end. The other end of the pipe is connected to a junction from which two pipes of lengths 1000m and diameter 300mm run in parallel. These parallel pipes are connected in another reservoir which is having level of water 10m below the water level of the above reservoir. Find the total discharge if f=0.015. Neglect minor losses. (15M)

8. a) Explain why ventilation of suppressed rectangular weir is necessary? (8M)

b) A rectangular weir is 2m long and has a head of 0.675m. Find the discharge taking into account two end contractions. (7M)