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

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
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**

~~~~~~

PART –A

1. a) List the applications of surface tension? (3M)
   b) Differentiate between stream function and velocity potential. (4M)
   c) How do you find force acting on a pipe bend? (4M)
   d) Define thickness of the boundary layer for flow over a flat plate. (4M)
   e) List Minor losses and explain briefly. (3M)
   f) Draw a neat sketch of venturimeter and explain its parts. (4M)

PART –B

2. a) List all fluid properties and derive Newton's law of viscosity. (8M)
   b) What are the modes of measuring pressure? How can you convert the pressure in KPa into the liquid columns and vice-versa? (8M)

3. a) What are different types of flows? Explain in detail. (8M)
   b) A circular plate 4 m in diameter is placed in such a way that it top vertex is at 2 m below free water surface and bottom vertex is 5 m below the free water surface. Find out the total pressure acting on the plate. (8M)

4. a) Derive the Bernoulli's equation from Euler's equation. State the assumptions made. (8M)
   b) A pipe line tapers from 1.5 m in diameter at higher end to 1.0 m diameter at lower end in 400 m length at a slope of 1 in 100. The pressure at the higher end is 75 KPa. If the discharge is 60 m^3/minute, find the pressure at lower end. Neglect losses. (8M)

5. a) What is a boundary layer? Differentiate between a laminar and turbulent boundary layer. (8M)
   b) Compare the velocity profiles in a pipe for (i) laminar and (ii) turbulent flow. (8M)

6. a) Write Darcy's equation and explain its significance. (6M)
   b) Two reservoirs with a difference in water surface elevations of 10 m are connected by a pipe line ABC which consists of two pipes of AB and BC joined in series. Pipe AB is 10cm in diameter, 20m long and has a value of f =0.02. Pipe BC is of 16cm diameter, 25m long and has f=0.018. The junctions with the reservoirs and between the pipes are abrupt. Calculate the discharge considering all minor losses. (10M)

7. a) Explain the working of orifice meter with neat sketches. (8M)
   b) A pipe carries a flow of an oil of Relative Density = 0.85. A pitot-static tube is inserted into the pipe to measure the velocity at a point A. If a differential mercury-oil gauge connected to the pitot-static tube indicates a reading of 4cm, calculate the velocity at A Assume the coefficient of the pitot tube as 0.99. (8M)
~~~~~~