Code No: R1621351 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
FLUID MECHANICS AND OPEN CHANNEL HYDRAULICS
(Agricultural 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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Give a detailed classification of manometers. (2M)
   b) Differentiate fluid statics and kinematics. (2M)
   c) Distinguish between orifice and mouth piece. (2M)
   d) List out major and minor losses along with expressions for it. (3M)
   e) Explain Froude number along with its significance. (3M)
   f) Describe the applications of hydraulic jump. (2M)

PART -B

2. a) Explain the phenomenon of capillarity. Obtain an expression for capillary rise of a liquid. (7M)
   b) A 30 cm x 15 cm venturimeter is inserted in vertical pipe carrying water, flowing in the upward direction. A differential mercury-manometer connected to the inlet and throat gives a reading of 30 cm. Find the discharge. Take Cd = 0.98. (7M)

3. a) What is boundary layer? Draw a sketch to explain types of boundary layers on a flat plate. (7M)
   b) Explain the principle and working of Venturimeter with a neat sketch. (7M)

4. a) Explain with neat sketches, different types of mouthpieces. (7M)
   b) What is velocity of approach? Explain how it is determined. (7M)

5. a) Derive an expression for head lost due to friction. (7M)
   b) Describe transmission of power through pipes. (7M)

6. The thrust T of a propeller depends on its diameter D, the fluid density ρ, dynamic viscosity μ, the revolutions per unit time N, and the velocity of advance with V respect to the undisturbed fluid. By means of dimensional analysis, show that the appropriate non-dimensional parameters are: $T = \rho D^2 V^2 f\left(\mu / VD\rho, DN / V\right)$ (14M)
   Derive an expression for the discharge through a channel by Chezy's formula.
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7. a) Describe different surface profiles with neat sketches. (7M)

   b) Determine the dimensions of the most economical trapezoidal earth lined Channel (Manning's n= 0.020) to carry 14 m^3/s at a slope of 4 in 10,000. (7M)