Code No: RT21351   **R13**   SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 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 **THREE** Questions from **Part-B**

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PART –A

1. a) List out different types of flows and note down the basic differences also.
   b) What do you understand by displacement thickness and momentum thickness?
   c) Explain briefly the terms Buoyancy of flotation
   d) Explain how the Equivalent pipe connection flow problem is analyzed.
   e) Discuss different similarities between models and prototypes
   f) Explain the terms specific energy of a flowing liquid, minimum specific energy.

PART –B

2. a) In a stream of glycerine in motion, at a certain point, the velocity gradient is 20 cm/sec. Calculate the shear stress at that point. For glylcerine take ρ = 1280kg /m^3 and υ = 8 stokes.
   b) A space between two square plates (50 cm × 50 cm) is filled with oil of 1cm thickness. The upper plate moves with constant velocity of 2.5 m/s under a force 10 N. Determine the dynamic and kinematic viscosities of the oil in poise and stokes respectively.

3. a) What are the factors affecting the boundary layer thickness?
   b) In a power plant located near the sea a chimney of 1.2 m diameter and 35 m height has been installed. During a cyclone the wind reaches velocity in the range of 60 kmph. Determine the moment at the base of the chimney.

4. a) Derive an expression for discharge through a Mouthpiece.
   b) A rectangular notch of crest width 40 cm is used to measure the discharge in a rectangular channel of 60 cm wide and 45cm deep. If head over the crest is 20 cm find the discharge. Take Cd=0.62

5. A pipeline of 0.6 m diameter is 1.5 km long. To augment the discharge, another pipeline of the same diameter is introduced parallel to the first in the second half of its length. Find the increase in discharge if f = 0.04 and head at the inlet is 30 m.

6. a) Derive the expressions for Reynolds Number, Mach Number and Froude Number.
   b) State and explain Chezy's formula for uniform flow in open channels. What is momentum energy correction factor?

7. a) Derive the condition for the best side slope of the most economical trapezoidal channel.
   b) Discuss critical, sub critical and super critical flows in open channels.