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

II B. Tech I Semester Supplementary Examinations, May - 2019
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) List out different fluid properties along with their units. (2M)

    b) What are the practical applications of boundary layer theory? (2M)

    c) Define different hydraulic coefficients. (2M)

    d) What do you mean by equivalent size of a pipe? (3M)

    e) Explain what dynamic similarity is. (3M)

    f) Give different formulae for Chezy's constant. (2M)

PART -B

2. a) What is a manometer? How are they classified? Explain with sketches (7M)

    b) 10 m^3 of carbon tetrachloride reduces in volume by 0.11 percent when subjected to certain pressure increase. If the bulk modulus of the fluid is 1.145×10^6 N/m^2, the original specific weight is 15,750 N/ m^3, calculate the increase in pressure and the final specific weight. (7M)

3. a) What do you mean by boundary layer separation? What is the effect of pressure gradient on boundary layer separation? (7M)

    b) How will you find drag on a flat plate due to laminar and turbulent boundary layers? (7M)

4. a) Explain the terms stable, unstable and neutral equilibrium with reference to the floating bodies. (7M)

    b) Derive an expression for the discharge over a rectangular weir taking velocity of approach into account. (7M)

5. a) What is a compound pipe? What will be loss of head when pipes are connected in series? (7M)

    b) A horizontal pipe of diameter 400 mm is suddenly contracted to a diameter of 200 mm. The pressure intensities in the large and smaller pipe are given as 14.715 N/cm^2 and 12.753 N/cm^2 respectively. If Cc = 0.62, find the loss of head due to contraction. Also determine the rate of flow of water. (7M)

6. a) Discuss different dimensionless numbers along with their significance. (7M)

    b) Describe different types of flows in open channels. (7M)

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7   a) Derive the conditions for most economical triangular channel section.   (7M)

    b) Prove that for a channel of circular section the depth of flow d= 0.95 D for   (7M)
        maximum discharge where d= depth of flow and D= diameter of circular
        channel.