TCE-301   1276

Odd Semester Examination, 2017-18

B.TECH. (SEMESTER-III)

FLUID MECHANICS

Time: 03:00 Hours   **Max Marks : 100**

Note: All question carry equal marks. All questions are compulsory. All parts of the question carry equal marks.

1. Attempt **any Four** of the following.   [5X4=20]

    (a) Explain the terms :

        (i)   Dynamic viscosity

        (ii) Kinematic viscosity. Give their dimensions

    (b) Explain types of fluids. Draw neat sketch

    (c) Give the expression for capillary rise

    (d) Define velocity potential function and stream function

    (e) Water is flowing through a pipe of 5 cm diameter under a pressure of 29.43 N/cm² (gauge) and with mean velocity of 2m/s. find the total head or total energy per unit weight of the water at a cross-section, which is 5 m above the datum line.

    (f) A solid cylinder of diameter 4.0 m has a height of 3 m. find the meta-centric height of the cylinder when it is floating in water with its axis vertical. The sp. gr. of the cylinder = 0.6

2. Attempt **any Four** of the following :   [5X4=20]

    (a) Discuss Meta-Centre. Also explain Meta-Centric height

    (b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of sp. gr. 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below.

5. Attempt any two of the following [10X2]

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

(b) What do you mean by energy thickness? Obtain an expression for energy thickness

(c) State Buckingham's π theorem. The efficiency η of a fan depends on density ρ, dynamic viscosity of the fluid μ, angular velocity w, diameter D of the rotor and the discharge Q. Express η in terms of dimensionless parameters

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