Ashish

COURSE CODE: **10B11 CE312**   MAX. MARKS:35

COURSE NAME: Fluid Mechanics

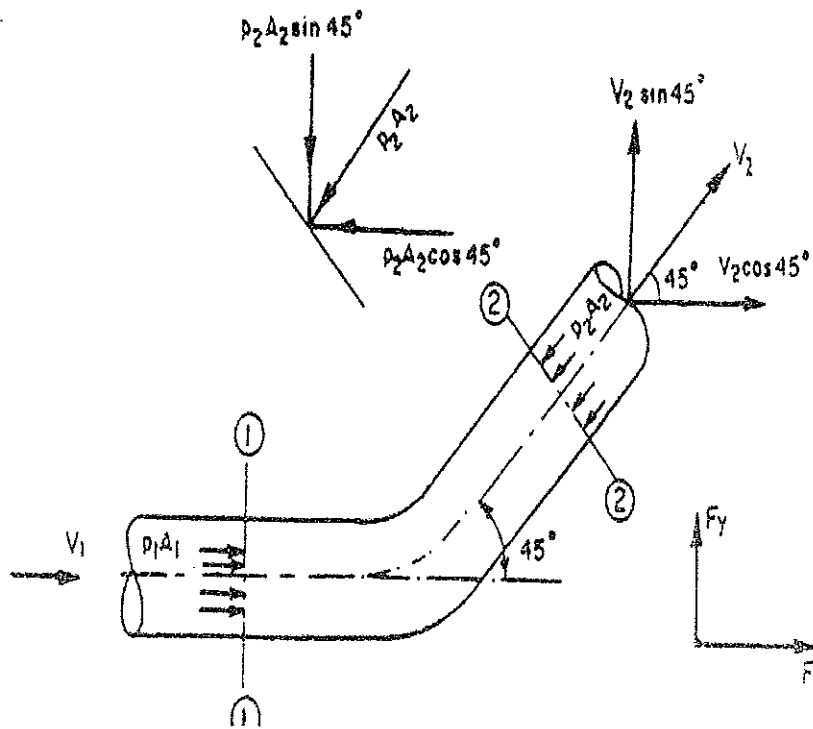COURSE CREDITS: 4   MAX. TIME: Two Hours

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Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. This paper contains two pages. Assume suitable data if required.

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1. **Answer the following in brief:**   [4]

    (a) Why we provide length of divergent cone more than length of convergent cone in the Venturimeter?

    (b) Explain Principle of homogeneity with suitable example.

2. (a) What is a pitot tube? Derive the expression to determine the velocity at any point with the help of pitot tube?   [1+2]

    (b) Find the discharge of oil through a circular pipe having diameter 0.15 m. The difference of mercury level in U tube manometer connected to two tappings of the pitot tube is 150 mm. Take co-efficient of pitot tube as 0.98 and sp gravity of oil 0.8.   [2]

3. (a) Define the term crest, nappe with neat sketch for a rectangular weir.   [1]

    (b) A broad crested weir of 50 m length has 50 cm height of water above its crest. Find the maximum discharge. Take $C_d = 0.60$. Neglect velocity of approach. (b) if the velocity of approach is to be taken into account, find the max discharge when the channel has a cross- sectional area of 50 m^2 on the upstream side.   [4]

4. A 150 mm diameter pipe reduces in diameter abruptly to 100 mm diameter. If the pipe carries water at 30 l/s, calculate the pressure loss across the contraction. Take the co-efficient of contraction as 0.6.   [4]

5. A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter of pipes are 2000 m, 1.0 m and 2000 m and 0.8m respectively. Find the rate of flow in each parallel pipe if total flow is 3 cumec. Value of f = 0.005.   [5]

6. The efficiency η of a fan depends on density ρ, dynamic viscocity μ of the fluid, angular velocity ϖ, diameter D of the rotor and discharge Q. express η in terms of dimensionless parameters.   [6]

7. A 30 cm diameter pipe carries water under a head of 15 m with a velocity of 4 m/sec. if the axis of the pipe turns through 45°, find the magnitude and direction of the resultant force at the bend. (Fig. 1)

[6]

(Fig. 1)