

B Tech III sem (CIVIL ENGG), Subject: CEPC - 201, Fluid Mechanics-I

Test No. 1, Time allowed: 45 min, Max marks: 15, Dated 24-09-2025

Note: Attempt all questions.

1. A piston 796 mm diameter and 200mm long works in a cylinder of 800 mm diameter. If the annular space is filled with a lubricating oil of viscosity 5 centi Poise , calculate the speed of descent of piston in vertical position. The weight of piston and the axial load are 9.8N. [3 mark]

2. Explain working of a two liquid manometer/ Micro manometer with a neat sketch. [4marks]

3. A cone floating in water with its apex downwards has a diameter 'd' and vertical height 'h' with a specific gravity 'S'. Find its relation for 'h' in the stable equilibrium as given below:

$$h^2 < \frac{1}{4} \left[\left(\frac{d^2 S^{1/3}}{1-S^{1/3}} \right) \right] \quad [4 \text{marks}]$$

4. The velocity components in two dimensional flows are as given below:

$u = y^3/3 - x^2y + 2x$, $v = xy^2 - x^3/3 - 2y$. Obtain expressions for stream function and velocity potential function separately. [4 marks]