COURSE CODE: **18B11CE412**

MAX. MARKS:15

COURSE NAME: **Fluid Mechanics**

COURSE CREDITS: 3

MAX. TIME: 1 Hr

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

Q1. Answer the following in brief:
[3]

(a) How viscosity of a liquid varies with temperature? Explain the phenomenon.

(b) Differentiate between simple manometer and differential manometer.

(c) Find the surface tension in a soap bubble of 40 mm diameter when the inside pressure is 2.5 N/m² above the atmospheric pressure.

Q2. It has been established universally that pressure intensity P varies in Z direction (vertical) only and its relation is given as:

$$\frac{dP}{dZ} = -\gamma$$

Where γ is specific weight of the fluid. Derive the expression for pressure at a point in a liquid in terms of pressure head h.
[2]

Q3. A simple manometer is used to measure the pressure of oil (sp. Gravity = 0.8) flowing in a pipe line. Its right limb is open to atmosphere and left limb is connected to pipe. The centre of pipe is 9 cm below the level of mercury in the right limb. The difference of mercury level in the two limbs is 15 cm, determine the absolute pressure of oil in the pipe line in N/cm².
[3]

Q4. A piston 10 cm in diameter and 12.5 cm long slides vertically down in a 10.05 cm diameter cylinder. The oil filling the annular spaces has a viscosity of 0.8 poise. Find the speed with which piston slides down if load on the piston is 10 N.
[4]

Q5. A circular plate 3.0 m diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4 m and 1.5 m respectively. Determine the total pressure on one surface of the plate and position of the centre of the pressure.
[3]