

COURSE NAME: Fluid Mechanics

COURSE CODE: 10B11CE312

COURSE CREDIT: 04

MAX MARKS:15

MAX TIME:1 hr

Note: All questions are compulsory. Carrying of Mobile phone during examination will be treated as case of unfair means.

Notation has its usual meaning. Assume suitable data if required.

Q1. Answer the following in brief.

[1*4=4]

- (a) Define the term Viscosity. Explain Newton's Law of Viscosity.
- (b) Explain absolute, gage and vacuum pressure.
- (c) Enumerate the different assumptions used in deriving the expression for capillary rise in a glass tube.
- (d) What is the principle of manometer? Differentiate between simple manometer and differential manometer.

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

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

Where, γ is specific weight of fluid. Derive the general equation for pressure at a point in a liquid in terms of pressure head h . Also write the assumption involved in the derivation. [2]

Q3. What is meant by stability of a floating body? Explain the stability of a floating body with reference to its meta centre. Give neat sketch. [2.5]

Q4. A triangular gate which has a base of 1.5 m and an altitude of 2 m lies in a vertical plane. The vertex of the gate is 1 m below the surface of tank which contains oil of specific gravity 0.8. Find the force exerted by the oil on the gate and position of centre of pressure. [2]

Q5. A cylinder of diameter 0.1 m rotates in an annular sleeve having internal diameter 0.102 m at 100 rpm. The cylinder is 0.2 m long. If the viscosity of lubricant between the two cylinders is 1.0 poise, find the torque needed to drive the cylinder against the viscous resistance. [2]

Q6. A tank is filled with oil having specific gravity 0.8 to a certain height h . The tank is attached with a U tube manometer as shown in figure. The manometric liquid has specific gravity =13.6. Find the value of h . [2.5]

