

B. Tech 3rd Semester Examination

Fluid Mechanics (CBS)

ME-302

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt only one question from each unit. Question 9 is compulsory.

UNIT - I

1. Differentiate between:
 - (a) Newtonian and a non-Newtonian fluid (5)
 - (b) Dynamic and Kinematic Viscosity (5)
2. Define meta-center. What is the meta-center height? (10)

UNIT - II

3. Show that $\phi = A \tan^{-1} y/x$ represents a potential flow. Find stream function. (10)
4. Explain how the discharge of air flow can be measured in a pipe line using a Pitot tube? (10)

UNIT - III

5. Derive Navier Stokes equations. (10)
6. Explain laminar flow through circular pipes. (10)

UNIT - IV

7. Explain the phenomenon of separation of boundary layer. (10)
8. The drag force on a sphere moving through a fluid of dynamic viscosity and density depends on the diameter of sphere and the velocity. Derive an expression for the drag force. (10)

UNIT - V

9. Write short notes on the following:
 - (i) Specific gravity.
 - (ii) Capillarity.
 - (iii) Differential manometers.
 - (iv) Stream function.
 - (v) Potential function.
 - (vi) Coefficient of discharge.
 - (vii) Prandtl tube.
 - (viii) V notch.
 - (ix) Airfoil shapes.
 - (x) Pipe losses. (10×2=20)