

16094(D) DEC 2016

**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)