



## Experiment Details

Department Name	Mechanical
Class	S.Y B.Tech
Semester	Ist
Subject Name	Fluid Mechanics
Experiment No.	01
Experiment Name	Verification of the Bernoulli's Theorem.

## Version History

Sr. No.	Version Number	Created By	Approved By	Date
1	v1.0	Akash Salunkhe	Prof. Rohit Ghulanavar	28/10/2020



AIM:

To study flow through a variable duct area.

THEORY:

When an incompressible fluid flowing through closed conduit is may be subjected to various forces, which cause change of velocity, acceleration and energies involved. The major forces involved are pressure may changes or due to change of cross section velocity of fluid may change. But through there is change of velocity, pressure also changes accordingly. In other words it velocity energy of fluid is raised, its pressure will drops, i.e. total energy of fluid is constant at any two points in path of flow. The theorem is known as Bernoulli's theorem. Hence when applied to study irrigational flow of incompressible fluids.  $P + \frac{\rho V^2}{2} + \rho gZ = C$   $P$  = pressure  $V$  = velocity at point.  $Z$  = potential head from datum.

PRE TEST:

- 1) In which of the following types of flows is the Bernoulli's theorem strictly applicable:
  - a) Streamlined and Rotational
  - b) Turbulent and Rotational
  - c) Turbulent and Irrotational
  - d) Streamlined and Irrotational - Ans
- 2) Water is flowing through a pipe under constant pressure. At some place the pipe becomes narrow. The pressure of water at this place
  - a) Remains unchanged
  - b) Increases
  - c) Decreases - Ans
  - d) Depends on several factors.
- 3) The equation of continuity for fluid flow can be derived from the conservation of
  - a) energy
  - b) mass -Ans
  - c) angular momentum
  - d) pressure



- 4) Streamline and equipotential lines in a flow field
  - a) are parallel to each other
  - b) are identical to each other
  - c) are perpendicular to each other – Ans
  - d) intersect at acute angles
- 5) A Newtonian fluid is defined as the fluid which
  - a) Obeys Hooks Law
  - b) Is incompressible
  - c) Obeys Newton's Law of Viscosity - Ans
  - d) Is compressible

PROCEDURE:

- 1) Select the value of the Volume Flow Rate from choices available.
- 2) Note the readings of velocities and pressure heads at section 1, section 2 and section 3.
- 3) Calculate the value of total head at these 3 sections and enter them at space provided.
- 4) Analyze the value of 'C' calculated from inlet readings and outlet readings.

POST TEST:

- 1) If the Reynolds number is less than 2000, the flow in a pipe is
  - a) Turbulent
  - b) Laminar - Ans
  - c) Transition
  - d) None of the above
- 2) Bernoulli's Theorem is based on the conservation of
  - a) Momentum
  - b) Energy and Momentum
  - c) Mass
  - d) Energy – Ans
- 3) The continuity equation is the result of application of the following law to the flow field
  - a) First law of thermodynamics
  - b) Conservation of energy
  - c) Newton's second law of motion
  - d) Conservation of mass - Ans
- 4) Property of fluid that describes its internal resistance is known as



- a) Viscosity - Ans
  - b) Friction
  - c) Resistance
  - d) Internal energy
- 5) Stress strain relationship for Newtonian Fluid is
- a) Parabolic
  - b) Hyperbolic
  - c) Linear - Ans
  - d) Logarithmic

#### REFERENCES:

Fluid Mechanics by R.K Bansal.

<https://youtu.be/3IKYQ7BYU2g>