

**UNIT I**

**Chapter 1 : Pressure Measurement 1-1 to 1-35**

**Syllabus :** Technical terms used in Hydraulics - fluid, fluid mechanics, hydraulics, hydrostatics, and hydrodynamics-ideal and real fluid, application of hydraulics in Civil Engineering field.

Physical properties of fluid - density, specific volume, specific gravity, surface tension-capillarity. viscosity Newton's law of viscosity.

Various types of pressure - Atmospheric Pressure, Gauge Pressure, Absolute Pressure, Vacuum Pressure, Concept of Pressure Head and its unit, Pascal's law of fluid pressure and its uses.

Conversion of pressure head of one liquid in terms of other liquid.

Measurement of Pressure by different methods (By Piezometer, simple manometers and Borden pressure Gauge)

Measurement of difference of pressure by differential U tube manometers and inverted U tube manometers.

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**UNIT II**

**Chapter 2 : Hydrostatics 2-1 to 2-36**

**Syllabus :** Variation of pressure with depth, Pressure diagram – concept and use. Total hydrostatic pressure and centre of pressure on immersed surfaces and on tank walls. Determination of total pressure and centre of pressure on vertical, inclined and horizontal immersed surfaces. Determination of total pressure and centre of pressure on sides and bottom of water tanks, sides and bottom of tanks containing two liquids, vertical surface in contact with liquid on either side

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**UNIT III**

**Chapter 3 : Fluid Flow Parameters 3-1 to 3-28**

**Syllabus :** Types of flow – Gravity and pressure flow, Laminar-Turbulent-Uniform-Non-uniform-Steady-Unsteady flow. Reynold's number., Discharge and its unit, continuity equation of flow, Energy of flowing liquid : potential, kinetic and pressure energy. Bernoulli's theorem : statement, assumptions, equation and modified Bernoulli's theorem.

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**UNIT IV**

**Chapter 4 : Flow Through Pipes 4-1 to 4-52**

**Syllabus :** Major head loss in pipe : Frictional loss and its computation by Darcy Weisbach equation  $h_f = \frac{fLV^2}{2gD}$ . Minor losses in pipe : loss at entrance, exit, sudden contraction, sudden enlargement and fittings. Flow through pipes in series, pipes in parallel and Dupit's equation for equivalent pipe. Hydraulic gradient line and total energy line. Water hammer in pipes : causes and Remedial measures. Use of Moody's Diagram and Nomograms. Discharge measuring device for pipe flow : Venturimeter-construction and working. Discharge measuring for a tank : using Orifice, Hydraulic Coefficients of Orifice.

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**UNIT V**

**Chapter 5 : Flow Through Open Channel 5-1 to 5-41**

**Syllabus :** Geometrical properties of channel section : Wetted area, wetted perimeter, hydraulic radius for rectangular and trapezoidal channel section. Determination of discharge by Chezy's equation and Manning's equation. Conditions for most economical rectangular and trapezoidal channel section.

**Discharge measuring devices :** Triangular and rectangular Notches.

**Velocity measurement devices :** current meter, floats and Pitot tube Specific energy diagram, Froude's Number, and Hydraulic jump.

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### UNIT VI

#### Chapter 6 : Hydraulic Pumps 6-1 to 6-16

**Syllabus** : Concept of pump, Types of pump centrifugal, reciprocating pumps, submersible pumps. Centrifugal pump : Component parts and working. Reciprocating pump : single acting and double acting. Component parts and working. Suction head, delivery head static head Manometric head. Compute power of centrifugal pump. Selection and choice of pump.

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