

**Unit I**

**Chapter 1 : Flow Over Notches and Weirs 1-1 to 1- 21**

Classification of notches and weirs, flow over sharp crested rectangular weir/notch, Francis formula, ventilation of weirs, flow over triangular weir/notch, flow over trapezoidal weir/notch, Cipolletti weir, effect on discharge due to error in measurement of head, broad crested weir, submerged weir, proportional weir or sutro weir. Hydraulic Jump: Assumptions in the theory of hydraulic jump, application of momentum equation to hydraulic jump in rectangular channel: Conjugate depths and relations between conjugate depths. Energy dissipation in hydraulic jump, classification of hydraulic jump and its applications.

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**Unit II**

**Chapter 2 : Laminar Flow & Hydraulics For High Rise Buildings 2-1 to 2-27**

Laminar flow between parallel plates: plates at rest, one plate moving and other at rest (Couette flow), laminar flow through porous media. Introduction of high-rise building, importance and significance of plumbing design, list of components in high rise plumbing, provisions for pressure, velocity and discharge as per uniform plumbing code-India (UPC-I), water supply fixture unit (WSFU) and peak water demand of plumbing fixtures, drainage fixture unit (DFU), maximum loads for horizontal fixture branches and building drains or sewers.

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**Chapter 3 : Unsteady Flow 3-1 to 3-18**

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**Unit IV**

**Chapter 4 : Impact of Free Jets 4-1 to 4-38**

Impulse momentum equation, force exerted by jet on stationary and moving flat plate (normal & inclined to the jet), flat plates mounted on periphery of a wheel, force exerted by jet on symmetrical stationary curved vane at centre, on unsymmetrical stationary curved vane tangentially at one of the tips. Force exerted by jet on symmetrical moving curved vane at the centre, symmetrical curved vanes mounted on periphery of a wheel, force exerted by jet on unsymmetrical moving curved vane tangentially at one of the tips, torque exerted on a wheel with radial curved vanes.

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**Unit V**

**Chapter 5 : Hydraulic Turbines 5-1 to 5-82**

Elements of hydroelectric power plants, heads and efficiencies and classification of turbines, Pelton wheel turbine : component parts and its working, work done and efficiencies, working proportions, design, multiple jet Pelton wheel (introduction). Francis turbine: component parts and its working, work done and efficiencies, working proportions, design, draft tube theory, cavitation in hydraulic turbines, governing of turbines. Performance of turbine, prediction of performance in terms of unit quantities and specific quantities, specific speed, characteristic curves, model testing of turbines, selection of turbines.

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**Unit VI**

**Chapter 6 : Centrifugal Pumps 6-1 to 6-56**

Component parts, working, types of centrifugal pumps, work done by impeller, head of pump, losses and efficiencies, minimum starting speed, loss of head due to increased or reduced flow, diameters of impeller and pipes, pumps in series and parallel, suction lift, net positive suction head, cavitations in centrifugal pump, introduction to submersible pumps. Performance centrifugal pump : characteristic curves, specific speed, model testing.

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