B Tech III sem (CIVIL ENGG), Subject: CEPC-201, Fluid Mechanics-I
Test No. 2, Time allowed: 45 min, Max marks: 15, Dated 10-11-2025
Note: Attempt all questions. All carry equal marks

1. A rectangular notch of crest width 0.4m is used to measure flow of water in a rectangular channel 0.6m wide and 0.45m deep. If the water level in the channel is 0.225 m above the weir crest, find the discharge in channel. For the notch assume $C_d = 0.63$ and take velocity of approach into account. [4 marks]
2. Derive discharge formula for an orificemeter using a neat diagram. [4 marks]
3. For the velocity profile $u/U = 3/2\eta - 1/2\eta^2$ where $\eta = y/\delta$, calculate the displacement, momentum and energy thickness in terms of nominal boundary layer thickness δ. [3 marks]
4. Find the form of equation for discharge Q through a sharp edged triangular notch assuming Q depends on the central angle α of the notch, head H, gravitational acceleration g, and on the density ρ, viscosity μ and surface tension σ of the fluid. [4 marks]