



ANURAG GROUP OF INSTITUTIONS

Autonomous

School of Engineering

II – B.Tech – II – Semester – II – Assignment Test 2016 -2017

Subject: Mechanics of Fluids and Hydraulic Machinery

- 1) a) Find the displacement thickness, movement of thickness and energy thickness for the velocity distribution in the boundary layer given by $(u/U) = (y/\delta)$
b) Explain the boundary layer along thin plate and its characteristics with a neat sketch.
- 2) A jet of water moving at 20m/s impinges on a symmetrical curved vane shaped to deflect the jet through 120° (that is the vane angles θ and ϕ are each equal to 30°). If the vane is moving at 5m/s, find the angle of the jet so that there is no shock at inlet. Also determine the absolute velocity of exit in magnitude and direction and the workdone.
- 3) a) What is draft tube? Why it is used in a reaction turbine? Describe with neat sketch two different types of draft tubes.
b) A pelton turbine develops 3000kw under a head of 300m. The overall efficiency of the turbine is 83%. If the speed ratio = 0.46, $C_v = 0.98$ and specific speed is 16.5, then find: i) Diameter of the turbine and ii) Diameter of the jet.
- 4) A Pelton Wheel develops 5520 KW under a head of 240m at an overall efficiency of 80% when revolving at a speed of 200rpm. Find the unit discharge, unit power and unit speed. Assume peripheral coefficient = 0.46. If the head on the same turbine falls during the summer season to 150m, find the discharge, power and speed for this head.
- 5) Draw a neat sketch and explain the working of francis turbine. Derive an expression for efficiency of francis turbine.
- 6) Discuss constant head characteristic curves for Pelton wheel and Francis turbine.