

**B. Tech (Mechanical Engineering)**  
**5<sup>th</sup> Semester, Minor-I**  
**Subject: Fluid Machinery (MEC-506)**

Time allowed: 90 Min.

Max. Marks: 30

**Q. 1** A jet strikes tangentially a smooth curved vane moving in the same direction as the jet, and the jet gets reversed in the direction. Show that the maximum efficiency is slightly less than 60 percent. (06)

**Q. 2** A jet of water moving with a velocity of 20 m/s strikes on a curved vane, which is moving with a speed of 10 m/s. The jet makes an angle of  $20^\circ$  with the direction of motion of vane at inlet and leaves at an angle of  $130^\circ$  to the direction of motion of vanes at outlet. **Determine:** The angles of curved vane tips so that water enters and leaves without shock; The work done per N of water entering the vane (06)

**Q. 3 a)** How are hydraulic turbines classified? (03)  
**(b)** Schematically show the various components of a Governing mechanism of Impulse turbine. (03)

**Q. 4** Draw a general layout of a hydraulic power plant using an impulse turbine and **Define the following:**

Gross head; Net head; Hydraulic efficiency; and overall efficiency of the Pelton turbine. (02+04)

**Q. 5** A Pelton turbine wheel is receiving water from a penstock with a gross head of 510 m. One-third of gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of penstock is  $2.2 \text{ m}^3/\text{s}$ . The angle of deflection of the jet is  $165^\circ$ , **Draw velocity triangles and Determine:** (i) The power given by water to the runner; (ii) Hydraulic efficiency of the Pelton wheel. Take  $C_v = 1.0$  and speed ratio = 0.45 (06)