



NAVVRACHANA UNIVERSITY

School: School of Engineering and Technology
Program/s: B.Tech Mechanical
Year: 4th **Semester:** 7th
Examination: End semester Examination
Examination year: November – 2023

Course Code: THE 701 **Course Name:** Fluid Machines
Date: 21/11/2023
Time: 13:00 pm to 15:00 pm

Total Marks: 40
Total Pages: 01

Instructions:

- Write each answer on a new page.
- Use of a calculator is permitted/not permitted

Q. No.	Details	Marks	COs	BTL
Q1	<p>Attempt the following (Each of 08 Marks)</p> <p>A. Derive a general expression for the angle of swing when the jet strikes a hinge plate. Draw a neat sketch for the explanation.</p> <p>B. Obtain an expression for the work done per second by water on the runner and the maximum efficiency of the Pelton wheel giving the relation between the jet speed and the speed of the bucket. Draw a neat sketch for the explanation.</p>	16	CO3 CO4 CO5 CO6	BT1 BT2 BT3 BT4
Q2	<p>A 150 mm diameter jet of water issuing from a nozzle strikes the buckets of a Pelton wheel and the jet is deflected through an angle of 170 degrees by buckets. The head available at the nozzle is 400 m. Assuming the coefficient of velocity as 0.97, speed ratio 0.46 and 15% relative velocity loss while water passes over buckets find the forces exerted by the jet on the buckets in the tangential direction and the power developed. Draw the velocity diagram.</p>	10	CO3 CO4 CO5 CO6	BT1 BT2 BT3 BT4
Q3	<p>Attempt the following (each of 07 marks)</p> <p>A. A hydraulic crane is lifting a load of 11.772 kN through a height of 12 m with a speed of 0.3 m/s once in every two minutes. The crane is working under a pressure of 4905 kN/m² of water and has a efficiency of 65%. The crane is fed from an accumulator to which water is supplied by a pump. Determine (i) Capacity of cylinder of the jigger (ii) Capacity of accumulator and (iii) Minimum power required to drive the pump.</p> <p>B. With a neat sketch explain the working and construction of (i) Hydraulic Coupling and (ii) Hydraulic Torque Converter.</p>	14	CO1 CO2	BT 1, BT 2

*****End of Question Paper*****