



## **DEPARTMENT OF MECHANICAL ENGINEERING**

### **Vision:-**

“To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs”.

### **Mission :-**

- To educate, guide, and mentor the students for academic excellence.
- To develop technical skills and discipline among the students as per the requirement of the industry.
- To impart ethics & social values by arranging social activities.

Sub: Fluid Mechanics and Machinery (FMM)(22445)

Dt.

Assignment No. 01

Course Outcome: Use the manometer and Gauge to measure Pressure.

Topic Name: properties of Fluid

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Q.1. Design specific mass, specific weight and specific Gravity?

Q.2. Write Short note on Dynamic viscosity and Kinematic viscosity?

Q.3. Explain Surface Tension phenomenon?

Q.4. Explain Bourdon Tube Pressure gauge with neat sketch?

Q.5. Explain the Differential Manometer with neat sketch?

Q.6. Explain the concept of absolute vacuum, Gauge Pressure, Atmospheric pressure and Absolute pressure?

Q.7. A circular plate of 3m diameter is immersed in water in such a way that its greatest and least depth below the free surface of water are 4 m and 1.5 m respectively. Determine the total pressure and position of centre of pressure?

Q.8. A circular plate 3.5 m diameter is fully immersed in water at an angle of  $45^\circ$  with the vertical. Determine the total pressure and centre of pressure on the plate when its centre is 3 m below the free surface of water.

Date of Submission:

Subject Incharge: Mr. Jaslok Pandey (HOD Mechanical Engineering)



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Assignment No. 02

Course Outcome: use the flow meters to measure the flow.

Topic Name: Fluid Flow

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Q.1. Explain the different types of Flow with examples?

Q.2. Explain with neat sketch, principle of working of Venturimeter?

Q.3. Describe Continuity Equation?

Q.4. Explain the Construction and Working principle of Pitot tube?

Q.5. State the Bernoulli's Theorem.

Q.6. Define Steady, Unsteady, Uniform and non-uniform flow with examples?

Q.7. A 300 mm\*150 mm venturimeter is inserted in a vertical pipe carrying water flowing in upward direction. A differential mercury manometer connected to inlet and throat gives reading of 200 mm. Find the discharge pipe. Take  $C_d=0.98$

Q.8. An oil of specific gravity 0.7 is flowing through venturimeter having inlet diameter 35 cm and throat diameter 20 cm. The oil-mercury differential manometer shows a reading of 30 cm. Calculate discharge of oil through the horizontal venturimeter. Take  $C_d = 0.98$ .

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Assignment No. 03

Course Outcome: Maintain the flow through pipes

Topic Name: Flow through pipes

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Q.1. Explain Hydraulic Gradient Line and Total Energy Line?

Q.2. State the laws of Fluid friction for Laminar Flow?

Q.3. State the laws of Fluid friction for Turbulant Flow?

Q.4. what are the major loss and minor loss. Explain with neat sketch?

Q.5. Describe Chezy's equation for head loss due to friction?

Q.6. Explain the concept of power transmission through pipes?

Q.7. A pipe line 2000 m long carries water having pressure of 50 bar at inlet. The pressure drop over the length of pipe is 1000 KN/m<sup>2</sup>. If the power transmitted through pipe is 110 KW and coefficient of friction is 0.0055, find (i) Diameter of pipe and (ii) Efficiency of transmission.

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Assignment No. 04

Course Outcome: Maintain the jet impact on various types of vanes

Topic Name: Impact of jet

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Q.1. Explain the meaning of impact of jet?

Q.2. Derive an expression for Force exerted by the jet on stationary inclined flat plate in direction of jet?

Q.3. Obtain an expression for impact of jet of a liquid on a fixed curved plate when the jet strikes at the centre of curved plate?

Q.4. Draw the velocity diagram for the symmetrical and moving curved vane when jet strikes at one end with certain velocity at certain angle and leaving the vane from other end. State the meaning of terminologies used in the diagram.

Q.5. A jet of water of diameter 30 mm moving with velocity of 35 m/s, strikes a curved fixed symmetrical plate at the centre. Find the force exerted by jet of water in the direction of jet, if jet is deflected through an angle of  $150^\circ$  at outlet of curved plate. If the vane is moving with the velocity of 20 m/s in the direction of jet, find out the force exerted.

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Assignment No. 05

Course Outcome: Maintain hydraulic Turbine.

Topic Name: Hydraulic Turbine

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Q.1. Classify the Hydraulic turbine?

Q.2. Sketch the layout of hydroelectric power plant and write any four features of it?

Q.3. Explain the types of Draft tube?

Q.4. With labelled sketch explain the working of Kaplan Turbine?

Q.5. Draw the inlet and outlet velocities triangles for bucket in Pelton wheel with the meaning of terms.

Q.6. Explain with neat sketch construction and working of Francis Turbine?

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Assignment No. 06

Course Outcome: Maintain hydraulic Pump.

Topic Name: Centrifugal Pump

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Q.1. Draw and Explain an indicator diagram for single acting Reciprocating pump?

Q.2. Explain the construction and working of single acting reciprocating pump in brief with neat sketch?

Q.3. Define NPSH and Priming in centrifugal pump?

Q.4. Define the term “Multistage Pump”. Explain the construction and working of multistage pump?

Q.5. Define slip and Negative slip in pump.

Q.6. Explain Pump in series and Pump in parallel?

Q.7. A centrifugal pump has the following characteristics: Outer diameter of impeller = 800mm; Width of impeller vanes at outlet = 100mm; Angle of impeller vanes at outlet =  $40^\circ$  ; The impeller runs at 550r.p.m. and delivers  $0.98\text{m}^3$  of water per second under an effective head of 35m. A 500 kW motor is used to drive the pump. Determine :- i) Manometric efficiency ii) Overall efficiency of the pump, and iii) Mechanical efficiency

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