



**UNIVERSAL INSTITUTE OF ENGINEERING & TECHNOLOGY
LALRU , MOHALI -140501**

MECHANICAL ENGINEERING

ASSIGNMENT SHEET

Course Name	:	Fluid Machinery
Course Code	:	
Class	:	B. Tech
Branch	:	ME
Year	:	
Course Coordinator	:	

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S. No	Question	Blooms Taxonomy Level
ASSIGNMENT-I UNIT-I, II		
1	Draw and explain in detail the velocity triangles of Pelton turbine.	Understand
2	A hydraulic turbine under a head of 50 metres develops 14520 kW running at 220 rpm. What is the specific speed of the turbine? What types of turbine is this. Find also the normal speed and output if the head on the turbine is reduced to 20 metres.	Understand
3	A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 rpm, The net head on the Pelton wheel is 700 m. If the side clearance angle is 15° and discharge through nozzle is $0.1 \text{ m}^3/\text{s}$ find the power available at the nozzle and hydraulic efficiency of the turbine.	Understand
4	Derive an expression for unit discharge of a turbine	Understand
5	Determine the power given by the jet of water to the runner of a Pelton wheel which is having tangential velocity as 20 m/s. The net head on the turbine is 50 m and discharge through the jet water is $0.03 \text{ m}^3/\text{s}$. The side clearance angle is 15° and take $C_v=0.975$	Understand
6	What is the necessity of a surge tank in turbines. Explain different types of surges with the aid of neat diagrams.	Understand
7	Explain the working of Francis turbine with neat diagram	Understand
8	Derive an expression for specific speed of a turbine	Understand
9	How to govern the impulse turbines? Explain with a neat sketch.	Apply
10	Derive an expression for unit power of a turbine	Understand
ASSIGNMENT – III,IV UNIT III, IV		
1	a) Draw and explain OC curves of turbines under constant head. b) A turbine is to operate under a head 25 m at 200 rpm. The discharge is 9 cumec. If the efficiency is 90% , determine the performance of the turbine under head of 20 m.	Understand
2	a) How to govern the impulse turbines? Explain with a neat sketch. b) A turbine develops 9000 KW when running at 100 rpm. The head on the turbine is 30 m. if the head on the turbine reduced to 18m, determine the speed and power developed by the turbine.	Understand
3	a) Explain the terms; i. Cavitation and ii. Water hammer b) A Kaplan turbine develops 24647.6 KW power at an average head of 39 m. assuming speed ratio of 2, flow ratio of 0.6, diameter of the boss = $0.35 \times$ diameter of the runner and an overall efficiency of 90%. Calculate the	Apply

	diameter, speed and specific speed of the turbine.	
4	Derive an expression specific speed of a centrifugal pump.	Understand
5	Draw and explain characteristic curves for centrifugal pumps.	Understand
6	What will happen when the pumps are connected in series and parallel?	Remember
7	What is Cavitation? Explain how it is detected. What are the effects of Cavitation? Explain how cavitation can be avoided.	Remember
8	a) Determine the number of pumps required to take water from a deep well under a total head of 89 m all the pumps are identical and running at 800 rpm. The specific speed of each pump is given as 25 while the rated capacity of each pump is $0.16 \text{ m}^3/\text{s}$. b) Draw and explain characteristic curves of centrifugal pumps.	Apply
9	a) Derive an expression for work done by the centrifugal pump. b) A single-acting reciprocating pump running at 30 r.p.m., delivers $0.012 \text{ m}^3/\text{s}$ of water. The diameter of the piston is 25 cm and stroke length 50 cm. Determine: i. The theoretical discharge of the pump ii. Co-efficient of discharge, and iii. Slip and percentage slip of the pump.	Apply