PRN:		Course Code :	MET2504

Third Year **B. Tech** End Semester Examination Winter 2023

FLUID AND TURBO MACHINERY

Day and Date: wednesday, 06/12/2023 Max Marks: **100**

Time : 10.30am to 1.30PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Classify the water turbines and Explain the components of Pelton turbine with neat sketch	08	2	CO1
	b)	The penstock supplies water from a reservoir to the Pelton wheel with a gross head of 500 m. One third of the gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of the penstock is 2 m^3/s. The angle of deflection of the jet is 165°. Determine the power given by the water to the runner and also hydraulic efficiency of the Pelton wheel. Take speed ratio as 0.45 and coefficient of velocity as 1.0.	08	3	CO1
		OR			
	b)	Draw the inlet and outlet velocity triangles for an impulse turbine and hence derive an expression for hydraulic efficiency of a Pelton wheel	08	3	CO1
Q.2		**Attempt the following**			
	a)	What is draft tube? Why it is used only in reaction turbines. Classify them and hence define draft tube efficiency with an expression for it.	08	2	CO1
	b)	Explain the construction and working of the Kaplan Turbine.	08	2	CO1
		OR			
	b)	Explain the construction and working of the Francis Turbine	08	2	CO1
Q.3		**Attempt any two from the following**			
	a)	A centrifugal pump is to discharge 0.118m^3/s at a speed of 1450 r.p.m against the head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%.Determine the vane angle at the outer periphery of the impeller	08	3	CO2
	b)	With neat sketch explain the construction and working of the centrifugal pump.	08	2	CO2

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	c)	Explain with neat sketch multistage in pumps	08	2	CO2
Q.4		**Attempt any two from the following**			
	a)	Derive expression for minimum work required for two stage reciprocating compressor with intercooler	08	3	CO3
	b)	Explain with neat sketch Roots blower and vane blower	08	2	CO3
	c)	Derive the expression for work done during polytrophic compression by a single stage reciprocating air compressor without clearance volume	08	3	CO3
Q.5		**Attempt any Two of the following**			
	a)	Explain with neat sketch construction, working of axial flow compressor	09	2	CO3
	b)	Write a short note on Centrifugal compressor	09	2	CO3
	c)	Explain the phenomenon of surging, chocking and stalling in Centrifugal compressor	09	2	CO3
Q.6		**Attempt any Two of the following**			
	a)	Give the methods of improving the specific output and thermal efficiency of gas turbine and Explain gas turbine with intercooling arrangement	09	3	CO4
	b)	Explain with the schematic diagram closed cycle gas turbine power plant. State merits and demerits of it.	09	3	CO4
	c)	List the types of aircraft engines and explain Turbo-propeller engine	09	2	CO4

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