HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, JAN - 2023
FLUID MECHANICS & HYDRAULIC MACHINES
(ME Branch)

Time: 3 hours   Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A
Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	If the pressure at appoint below the sea is 137.7 KN/m2 what is the pressure 30m below this point. Specific weight of ocean water is 10.06 KN/m^2.	[2M]	1	
	b)	Define the equation of continuity.	[2M]	2	
	c)	State the term boundary layer.	[2M]	3	
	d)	Define specific speed of a turbine	[2M]	4	
	e)	What is cavitation in centrifugal pump?	[2M]	5	

PART-B
Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Write the types of fluids?	[5M]	1	
	b)	A solid cylinder of diameter 4 meters has a height 3 meters. Find the meta centric height of the cylinder when it is floating in water with its axis vertical. The specific gravity of the cylinder is 0.6.	[5M]	1	
		OR			
3.	a)	Differentiate between piezometer and U-tube Manometer With a neat sketch	[5M]	1	
	b)	An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of shaft is 0.5 m and it rotates at 200 rpm. Calculate the power lost in the oil for a sleeve length of 100 mm. The thickness of the oil film is 1.0 mm.	[5M]	1	
		UNIT-II			
4.	a)	Describe steam function and velocity function?	[5M]	2	
	b)	Derive the derivation of three dimensional continuity equation?	[5M]	2	
		OR			
5.	a)	Explain the significance of dimensionless numbers in dimension analysis?	[5M]	2	
	b)	Find the displacement thickness, the moment thickness and the energy thickness for the velocity distribution in the boundary given by u/U = (y/δ) 0.22 where u is the velocity at a distance y from the plate and u=U at y=δ, where δ = boundary layer thickness.	[5M]	2	
		UNIT-III			
6.	a)	Derive an expression of the force exerted by a jet of water on moving inclined plane in the direction of the jet.	[5M]	3	
	b)	Derive an expression of the force exerted by a jet of water on stationary inclined plane in the direction of the jet.	[5M]	3	
		OR			

7.		Design a Francis turbine .net head =68 m ; speed =750 rpm output power= 330 kW; ηh=94%; ηo=85%; flow ratio ψ=0.15; breadth ratio n=0.1; inner diameter of runner is 0.5 times outer diameter Also assume 6% of circumferential area of the runner to be occupied by the thickness of vanes. Velocity of the flow remains constant and radial at the exit.	[10M]	3	
UNIT-IV					
8.	a)	Explain with neat sketch the operation and utility of hydraulic ram.	[5M]	4	
	b)	Explain with neat sketch the operation of governing of turbine?	[5M]	4	
OR					
9.	a)	Show the specific speed of the turbine equations?	[5M]	4	
	b)	Explain the operating and constant efficiency curves in the turbines?	[5M]	4	
UNIT-V					
10.	a)	Write the working principle of single acting reciprocating pump?	[5M]	5	
	b)	Define (i) NPSH, (ii) negative slip (iii) positive slip and (iv) coefficient of discharge?	[5M]	5	
OR					
11.	a)	Explain the characteristic curves of the centrifugal pump?	[5M]	5	
	b)	Define heads and efficiencies of the centrifugal pumps?	[5M]	5	

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