

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 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) Define capillarity and surface tension?	[2M]	1	
	b) What is flow-net? Is the flow-net analysis applicable to rotational flow? If not, why?	[2M]	2	
	c) Differentiate between bluff and stream line bodies?	[2M]	3	
	d) Differentiate between radial flow and tangential flow in turbines?	[2M]	4	
	e) When do you connect centrifugal pumps in series?	[2M]	5	

PART-B

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

Q.No.	Questions	Marks	CO	KL
<u>UNIT-I</u>				
2.	a) A Stone weighs 482.6 N in air and 206.4 N in water Compute volume of stone and its specific gravity.	[5M]	1	
	b) Explain the working of Micro manometers with neat sketch.	[5M]	1	
<u>OR</u>				
3.	a) A plate having an area of 0.6 m^2 is sliding down the inclined plane at 30° to the horizontal with a velocity of 0.36 m/s . There is a cushion of fluid 1.8 mm thick between the plane and the plate. Find the viscosity of the fluids if the weight if the plate is 280 N ?	[5M]	1	
	b) Determine the mass density, specific volume and specific weight of a liquid whose specific gravity is 0.85 ?	[5M]	1	
<u>UNIT-II</u>				
4.	a) Explain the types of fluid flows?	[5M]	2	
	b) Derive the Euler's equation of motion along a streamline.	[5M]	2	
<u>OR</u>				
5.	a) Explain Boundary layer separation with a neat sketch. What are the conditions under which separation takes place?	[5M]	2	
	b) Name and explain the different types of hydraulic similarities that must exist between the model and prototype?	[5M]	2	
<u>UNIT-III</u>				
6.	a) Derive an expression of the force exerted by a jet strike the curved plate at one end tangentially when the plate is symmetrical?	[5M]	3	
	b) Derive an expression of the force exerted by a jet strike the curved plate at one end tangentially when the plate is un-symmetrical?	[5M]	3	
<u>OR</u>				

7.		A Pelton wheel generates 8000KW under a net head of 130 m at a speed of 200 rpm. Assuming the coefficient of velocity for the nozzle 0.98, hydraulic efficiency 87%, speed ratio 0.46 and jet diameter to wheel diameter ratio is 1/9. Determine (i) Discharge required (ii) Diameter of the wheel (iii) Diameter and number of jets required (iv) Specific speed; Mechanical efficiency is 75%?	[10M]	3	
UNIT-IV					
8.	a)	Explain with neat sketch the working principle of surge tank? .	[5M]	4	
	b)	Explain with neat sketch the operation of hydraulic lift?	[5M]	4	
OR					
9.	a)	Define: Unit Power, Unit Discharge and Unit Speed?	[5M]	4	
	b)	Classification of the turbine?	[5M]	4	
UNIT-V					
10.	a)	Advantages of centrifugal pump over displacement pump?	[5M]	5	
	b)	List out types of casings and explain vortex casing with neat sketch?	[5M]	5	
OR					
11.	a)	Explain the principle and working of a Centrifugal pump with a neat sketch.	[5M]	5	
	b)	A centrifugal pump delivers water against a net head of 14.5m and design speed of 1000 rpm. The vanes are curved back to an angle of 300 with periphery. The impeller diameter is 300 mm and outlet width 50 mm. Determine the discharge of the pump if the manometric efficiency is 95%.	[5M]	5	
