

## The LNM Institute of Information Technology, Jaipur Department of Mechanical-Mechatronics Engineering

## Fluid Mechanics Mid Term Examination

Time: 90 minutes

Date: 23/02/2018

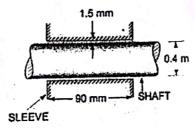
Max. Marks: 40

Instruction: i) All questions are compulsory, ii) Write all steps while answering the problems, iii) No data book is allowed, iv) Assume suitable data whenever necessary.

What is Surface Tension? Which type of instrument used to measure surface 5 M Q.1.

tension? (Explain with neat sketch) 5 M What is contact angle? How to measure contact angle by static method.

The dynamic viscosity of oil, used for lubrication between shaft and sleeve is 6 5 M poise. The shaft is of diameter 0.4 m and rotates at 190 rpm. Calculate the power lost in the bearing for sleeve length of 90 mm. The thickness of oil film is 1.5 mm.



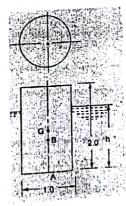
State and prove Pascal's Law. Q. 4.

5 M

Find an expression for the force exerted and centre of pressure for a 10 M completely sub-merged inclined plane surface. Can the same method be applied for finding the resultant force on-a curved surface immersed in the liquid? If not,

Show that a cylindrical buoy of 1 m diameter and 2 m height weighing 7.848 kN 10 M will not float vertically in sea water of density 1030 kg/m3. Find the force necessary in a vertical chain attached at the centre of base of the buoy that will

keep it vertical.





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## FLUID MECHANICS AND MACHINERY **END SEM EXAMINATION**

Time:	180 minutes	Date: 0	4/05/2018		Max. Marl	ks: 60
Instructio						
i. A	ll questions are comp	oulsory, ii. Write all st lowed, iv. Assume suit			ns, iii. No dat	ta
Q. 1. Q. 2. Q. 3.		okes equation uation applicable to on for Bernoulli's			pt of mas	10 05 s 05
Q.A.		Governing of a Turbi	ne'. Describe with	neat sketch	the working	g 05
6.	What is cavitation A centrifugal pun and running at 100 through the impel an angle of 40° a	n? How can it be avon having outer diam 00 rpm works agains ler is constant and et outlet. If the outer is 50 mm, determin	neter equal to two t a total head of 40 equal to 2.5 m/s. To diameter of the	times the im m. The velocities are	ocity of flow e set back at	v: t
	<ul><li>i. Vane angle</li><li>ii. Work done</li><li>iii. Manometr</li></ul>	e at the inlet e by impeller on wat ic efficiency	er per second, and	ı		
0.7.	A Francis turbine	Why is it necessary? with an overall effici- vorking under the h	ency of 75 % is red	quired to pro he periphera	duce 148.25 l velocity =	04 08
	at 150 rpm and the energy. Assuming	e radial velocity of f ne hydraulic losses radial discharge, de	in the turbine are			
	ii. The wheel iii. Diameter o	blade angle vane angle at inlet of the wheel at inlet, the wheel at inlet	and			A
	A conical draft tub of water (vacuum) rate of 25 m <sup>3</sup> /s. I between the inlet a	e having diameter at discharges water at f atmospheric press and outlet of the dra ed in water. Total ler	the outlet with a vure head is 10.3 ft-tubes are negligible.	velocity of 1 m of water gible. Find the	.2 m/s at the and losses	
<b>Y</b>	rpm. Assuming the	velops 8000 kW und the co-efficient of value speed ratio 0.46 and	velocity for the	nozzle 0.98	, hydraulic	
	determine:  The dischar	rge required			9	
	ii. The diamet	er of the wheel er and number of jet	t Latinger			
	iv. The specific	c speed	· 1000			
V	Take mecha	anical efficiency = 7	5 %			

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