MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech II Sem Regular End Examination, August 2021
FLUID MECHANICS AND HYDRAULIC MACHINES
(MECH)

Time: 3 Hours.   **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
       2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Differentiate between (i) Absolute and Gauge pressure, (ii) Simple Manometer and Differential Manometer and (iii) Piezometer and Pressure gauges.	7M	CO1	BL2
	b)	An open tank contains water up to a depth of 1.5 m and above it an oil of Sp. gr. 0.8 for a depth of 2 m. Find the pressure intensity (i) at the interface of two liquids and (ii) at the bottom of the tank.	7M	CO1	BL2
2	a)	Show that the rate of increase of pressure in a vertical direction in a fluid at rest is equal to the weight density of the fluid at that point.	7M	CO1	BL1
	b)	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 200 . The weight of the square plate is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil .	7M	CO1	BL3
3	a)	Formulate Euler's equation of motion along a streamline and integrate it to obtain Bernoulli's equation. State all assumptions made.	7M	CO2	BL2
	b)	A 45^0 bend is connected in a pipe line, the diameters at inlet and outlet of the bend being 650 mm and 320 mm respectively. Determine the force exerted by water on the bend if the intensity of pressure at inlet to bend is 9.25 N/cm² and rate of flow of water is 650 liters/s.	7M	CO2	BL4
4	a)	What is a pitot tube? How is it used for measure velocity of flow at any point in a pipe or channel?	7M	CO2	BL2
	b)	With a sketch, explain the boundary layer formation over a flat plate	7M	CO3	BL3
5	a)	Explain what do you understand by Hydraulic Grade Line and Total Energy Line. Discuss its practical significance in analysis of fluid flow problems.	7M	CO3	BL3
	b)	What is the significance of Reynolds's experiment? Explain how Reynolds's experiment is conducted.	7M	CO3	BL4

6 a)	Define unit speed, unit power and specific speed as used in connection with the operation of a hydraulic machine	7M	CO4	BL2
b)	A Pelton wheel has a mean bucket speed of 12 meters per second with a jet of water flowing at the rate of 750 litres/s under a head of 35 meters. The buckets deflect the jet through an angle of 165^0. Calculate the power given by water to the runner and hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.97.	7M	CO4	BL5
7 a)	A 45 m/s velocity jet of water 5.5 cm in diameter strikes perpendicularly a flat smooth plate. Determine the force exerted by the jet on the plate, if the plate is at rest.	7M	CO4	BL4
b)	The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump running at 1200 rom. The vane angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and the velocity if the flow is constant. Determine the work done by the impeller per unit weight of water.	7M	CO5	BL5
8 a)	Explain the working principle of Centrifugal pump with the help of neat diagram.	7M	CO5	BL2
b)	Define indicator diagram. Prove that work done by the pump is proportional to the area of indicator diagram?	7M	CO5	BL5

---oo0oo---