

Code: 20CE3403

**II B.Tech - II Semester – Regular / Supplementary Examinations
MAY - 2023**

**HYDRAULICS AND HYDRAULIC MACHINES
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	What is the fundamental difference between pipe flow and flow through open channel? Give the relation between Chezy's constant and manning constant.	K2	CO1	7 M
	b)	Find the velocity of flow and rate of flow of water through a rectangular channel of 6m wide and 3m deep, when it is running full. The channel is having bed slop as 1 in 2000. Take the Chezy's constant C=55.	K3	CO1	7 M
OR					
2		Derive an expression for the discharge through an open channel using Chezy's formula.	K3	CO1	14 M

UNIT-II						
3	Describe the various types of flows in open channels.			K2	CO2	14 M
OR						
4	For the Most economical section of a trapezoidal channel prove that i) Side length = half of top width ii) $m=d/2$			K3	CO2	14 M
UNIT-III						
5	a)	Derive an expression for the work done when a jet of water strikes a moving vertical plate.		K3	CO3	7 M
	b)	A nozzle of 50mm diameter delivers a stream of water at 20 m/s perpendicular to a plate that moves away from the jet at 5m/s. Find i) the force on the plate ii) work done / sec and iii) efficiency of jet		K3	CO3	7 M
OR						
6	a)	A water jet coming out from a nozzle of diameter 0.178m strikes a fixed flat plate with a velocity 20m/sec. Find the force exerted on the plate when the plate is a vertical.		K3	CO3	7 M
	b)	A jet of water from a nozzle is deflected through 60° from its original direction by a curved plate when it enters tangentially		K4	CO3	7 M

		without shock with a velocity of 30m/sec and leaves with a mean velocity of 25 m/sec. If the discharge from the nozzle is 0.8kg/sec, calculate the magnitude and direction of the resultant force on the vane if the vane is stationary.			
UNIT-IV					
7	a)	How can you classify the turbines?	K2	CO4	7 M
	b)	Find out the expression for work done per second by the water on Pelton wheel.	K3	CO4	7 M
OR					
8	a)	Explain working operation of a Francis turbine.	K2	CO4	7 M
	b)	Why a draft tube is used with reaction turbine?	K2	CO4	7 M
UNIT-V					
9		State the main components of a centrifugal pump and describe the function of each with a neat sketch.	K2	CO5	14 M
OR					
10		Derive expression for minimum speed required for the centrifugal pump to start.	K3	CO5	14 M