BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)
II - B. Tech II-Semester Supplementary Examinations (BR23), Aug - 2025
HYDRAULICS AND HYDRAULIC MACHINERY (CE)

Time: 3 hours
Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A and Part-B

PART–A (10X2 = 20M)

			Marks	CO	BL
1. a)	List the characteristics of laminar flow.		(2M)	CO1	BL2
b)	Define boundary layer.		(2M)	CO1	BL2
c)	What do you understand by steady flow and unsteady		(2M)	CO2	BL3
d)	Why is a bed slope provided for an open channel.		(2M)	CO2	BL3
e)	What is the difference between G.V.F and R.V.F?		(2M)	CO3	BL3
f)	What is a specific energy curve?		(2M)	CO3	BL4
g)	How are hydraulic turbines classified ?		(2M)	CO4	BL2
h)	What is cavitation? How can it be avoided in reaction turbines ?		(2M)	CO4	BL4
i)	What is priming ? Why is it necessary ?		(2M)	CO5	BL3
j)	Write a short note on NPSH.		(2M)	CO5	BL3

PART–B (5X10 = 50M)

2a.	Explain the deference between laminar and turbulent flow.	5 (M)	CO1	BL2
b.	Explain in detail how the flow is demonstrated using Reynolds's experiment.	5 (M)	CO1	BL3

(OR)

3a.	What Factors Influence the Transition?	5 (M)	CO1	BL4
b.	Water flows in a circular pipe. At one section the diameter is 0.3 m the static pressure is 260 Kpa gauge, the velocity is 3 m/s and the elevation is 10 m above ground level. The elevation at a section downstream is 0 m and the pipe diameter is 0.15 m. Find the gauge pressure at the downstream section. Frictional effect may be neglected. Assume density of water to be 999 kg/m^3.	5 (M)	CO1	BL3

4a.	Classify the Types of Flow in Open Channels.	5 (M)	CO2	BL2
b.	A rectangular channel is to be dug in the rocky portion of a soil. Find its most economical cross-section if it is to convey 12 m^3/s of water with an average velocity of 3 m/s. Take Chezy's constant C = 50.	5 (M)	CO2	BL4

(OR)

5a.	Explain the significance of most efficient section.	5 (M)	CO2	BL3
b.	A triangular gutter, whose sides include an angle of 60°, conveys water at a uniform depth of 250 mm. If the discharge is 0.04 m^3/s , determine the gradient of the trough. Use the Chezy's formula assuming that C = 52.	5 (M)	CO2	BL5

6a.	Draw specific energy curve, and then derive expressions for critical depth and critical velocity.	10(M)	CO3	BL4

<div align="center">(OR)</div>

7a.	Explain the Types of Hydraulic Jump based on Froude Number.	5 (M)	CO3	BL3
b.	A sluice gate discharges water into horizontal rectangular channel with a velocity of 10 m/s and depth of flow of 1 m. Determine the depth of flow of water after the jump and consequent loss in total head.	5 (M)	CO3	BL5

8a.	Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet	5 (M)	CO4	BL4
b.	A jet of water, 75 mm in diameter, issues with a velocity of 30 m/s and impinges on a stationary flat plate which destroys its forward motion. Find the force exerted by the jet on the plate and work done.	5 (M)	CO4	BL4

<div align="center">(OR)</div>

9a.	Explain the comparison between Impulse and Reaction Turbines	5 (M)	CO4	BL3
b.	Describe with sketch, types of draft-tubes.	5 (M)	CO4	BL2

10a	Explain with a neat sketch, the working of a centrifugal pump.	5 (M)	CO5	BL2
b.	Explain the different types of Efficiencies of a Pump.	5 (M)	CO5	BL3

<div align="center">(OR)</div>

11a	Derive an expression for the minimum speed for starting a centrifugal pump.	10(M)	CO5	BL4

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