

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations August-2023
HYDRAULIC ENGINEERING
(Civil Engineering)

Time: 3 Hours**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Derive an expression for discharge through the open channel flow by chezy's constant. **CO1 L2 6M**
- b Find the discharge though a circular pipe of diameter 3 m , if the depth of water in the pipe is 1m and the pipe is laid at the slope of 1 in 1000 . Take C=70. **CO1 L3 6M**

OR

- 2 a Explain the term specific energy of a flowing liquid and derive the condition for critical depth. **CO1 L2 6M**
- b Derive the condition for a rectangular channel to be most efficient. **CO1 L2 6M**

UNIT-II

- 3 What are assumptions of gradually varied flow? Derive the Dynamic equation of gradually varied flow. **CO2 L2 12M**

OR

- 4 a Derive an expression for loss of energy due to hydraulic jump. **CO2 L2 6M**
- b A sluice gate discharges water into a horizontal rectangular channel with a velocity of 10 m/s and the depth of flow of 1m. Determine the depth of flow after jump and consequent loss in total head. **CO2 L3 6M**

UNIT-III

- 5 a Derive the equation for force exerted by a jet on stationary inclined flat plate. **CO3 L2 6M**
- b Find the force exerted by a jet of water of diameter 75mm on a stationary flat plate, when the jet strikes the plate normally with velocity of 20m/s. **CO3 L3 6M**

OR

- 6 A nozzle of 50 mm diameter delivers a stream of water at 20m/s perpendicular to a plate that moves away from the jet at 5m/s Find **CO3 L3 12M**
- (i) the force on the plate
- (ii) the work done
- (iii) the efficiency of jet.

UNIT-IV

7 What is centrifugal pump? Explain the parts of centrifugal pump with neat sketch. **CO5 L1 12M**

OR

8 Explain the different types of hydraulic similarities that must exist between a prototype and its model. **CO6 L2 12M**

UNIT-V

9 a What is a turbine and give the classification in detail? Give the various efficiencies. **CO4 L1 6M**

b Explain Radial flow reaction turbine with a neat diagram. **CO3 L2 6M**

OR

10 The three-jet Pelton turbine is required to generate 1000 kW under a net head of 400 m. The blade angle at outlet is 15 degrees and the reduction in the relative velocity while passing over the blade is 5%. If the overall efficiency of the wheel is 80 %, $C_v=0.98$ and speed ratio = 0.46, then find (i) The diameter of jet (ii) Total flow in m^3/sec and the force exerted by a jet on the buckets. If the jet ratio is not less than 10, find the speed of the wheel for a frequency of 50 hertz/sec and the corresponding wheel diameter. **CO4 L3 12M**

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