

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech. II Semester Supplementary Examinations, June/July – 2024

HYDRAULICS AND HYDRAULIC MACHINES

(CIVIL ENGINEERING)

Time: 3 Hours**Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. List any five dimensionless numbers.	CO1	L1	2M
2. What is meant by kinematic similarity?	CO1	L2	3M
3. Draw different types of draft tube.	CO2	L1	2M
4. What is the significance of a surge tank?	CO2	L2	3M
5. What is meant by cavitation?	CO3	L1	2M
6. Differentiate between utilization factor and capacity factor.	CO3	L2	3M
7. Write the relationship between Chezy's constant and Manning's constant.	CO4	L1	2M
8. Draw a typical specific energy curve and mark salient points.	CO4	L2	3M
9. Write the dynamic equation for a gradually varied flow.	CO5	L1	2M
10. Differentiate between positive surge and negative surge.	CO5	L2	3M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Find the expression for the power P , developed by a pump when P depends upon the head H , the discharge Q and specific weight w of the fluid.
- OR**
- B) In 1 in 40 model of a spillway, the velocity and discharge are 2 m/s and 2.5 m³/s. Find the corresponding velocity and discharge in the prototype.
12. A) A jet of water of diameter 10 cm strikes a flat plate normally with a velocity of 15 m/s. The plate is moving with a velocity of 6 m/s in the direction of the jet and away from the jet. Find the force exerted by the jet on the plate and work done by the jet on the plate per second.
- OR**
- B) A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 r.p.m. The net head on the Pelton wheel is 700 m. If the side clearance angle is 15° and discharge through nozzle is 0.1 m³/s, find Power available at the nozzle and Hydraulic efficiency of the turbine.
13. A) With a neat sketch explain the various parts of a centrifugal pump and its working principle.
- OR**
- B) Explain various components and working of hydro-power plants. Also list various types of hydro-power plants

14. A) Find the slope of the bed of a rectangular channel of width 5 m when depth of water is 2 m and rate of flow is given as $20 \text{ m}^3/\text{s}$. Take Chezy's constant, $C = 50$. CO4 L3 10M
- OR**
- B) The specific energy for a 5 m wide rectangular channel is to be 4 Nm/N. If the rate of flow of water through the channel is $20 \text{ m}^3/\text{s}$, determine the alternate depths of flow. CO4 L3 10M
15. A) Explain in detail about the direct step method used to find the surface profile of a gradually varied flow. CO5 L2 10M
- OR**
- 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 after the jump and consequent loss in total head. CO5 L3 10M