R18 Regulation *Subject code:2P4AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, June 2026

HYDRAULICS & HYDRAULIC MACHINERY

(CE)

Maximum Marks: 70 Date: 12.06.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Write about Specific energy.	2M	1	L1
2	Write Chezy's, and Manning's formula.	2M	1	L1
3	What is the difference between model and prototype?	2M	2	L1
4	Write about dynamic similarities.	2M	2	L1
5	State the principle of Angular momentum.	2M	3	L1
6	Explain Hydraulic efficiency, mechanical efficiency and overall efficiency.	2M	3	L1
7	What is Surge tank?	2M	4	L1
8	Write about Cavitation.	2M	4	L1
9	Write about Governing of turbines.	2M	5	L1
10	What are the different Hydropower plants?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	An open channel of trapezoidal section, 2.5m at the base and having sides inclined at 60^0 to the horizontal, has a bed slope of 1 in 500. It is found that when the flow is 1.5 m^3/s the depth of water in the channel is 0.5 m. Assuming the validity of the Manning's formula., Calculate the flow when the depth is 0.7 m.	10M	1	L2
	OR			
12	Differentiate between uniform and non-uniform flow; laminar and Turbulent flow.	10M	1	L2
13	What are different types of dimensionless numbers and explain them State Buckingham's 'pi' theorem	10M	2	L2
	OR			
14	The pressure difference Δp in a pipe of diameter D and length L due to viscous flow depends on the velocity V, viscosity μ and density ρ. Using Buckingham's π-theorem, obtain expression for Δp.	10M	2	L2
15	The internal and external diameter of an outward flow reaction turbine are 2.5m & 3m respectively. The turbine is running at 275 rpm and the rate of flow of	10M	3	L2

	water through the turbine is $7m^3$/sec. the width of runner at inlet and outlet is equal to 300mm. head on turbine is 150m. neglecting the thickness of vanes and taking the discharge radial at outlet, determine 1. Velocity of flow at inlet and outlet 2. Vane angle at inlet and outlet			
	OR			
16	Derive the expression for force exerted by a jet on stationary inclined flat plate and vertical plate.	10M	3	L2
17	Define the term unit power, unit speed and unit discharge with reference to a hydraulic turbine. And also derive the expression for these terms.	10M	4	L2
	OR			
18	What are the uses of a draft tube? Describe with neat sketches different types of draft tubes.	10M	4	L2
19	Define cavitation. What are the effects of cavitation? Give the necessary precaution against the cavitation.	10M	5	L2
	OR			
20	Define the specific speed of the turbine and also derive the expression for the specific speed of the centrifugal pump	10M	5	L2