



Regulation: R18

Subject Code: 2P4AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, February 2024

HYDRAULICS & HYDRAULIC MACHINERY

Civil Engineering

Maximum Marks: 70

Date: 21.02.2024

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 10 questions. Answer any 5 questions which carries 10M.
 4. Each question carries 10marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal mark (2X10M=20Marks)			CO	Bloom Tx
1.	Define about Specific energy.	[2M]	CO1	L1
2.	Write Chezy's, and Manning's formula	[2M]	CO1	L2
3.	What is the difference between model and prototype	[2M]	CO2	L1
4.	Write about dynamic similarities	[2M]	CO2	L1
5.	State the principle of Angular momentum.	[2M]	CO3	L2
6.	Define Hydraulic efficiency, mechanical efficiency and overall efficiency	[2M]	CO3	L1
7.	What is draft tube?	[2M]	CO4	L1
8.	Discuss about Cavitation	[2M]	CO4	L2
9.	Classify the types of centrifugal pumps	[2M]	CO5	L1
10.	Define load factor and capacity factor	[2M]	CO5	L1

Part-B

Answer all the questions		(5X10M = 50Marks)		
11.	An open channel of trapezoidal section, 2.5 m wide at the base and having sides inclined at 60° 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]	CO1	L4
OR				
12.	Differentiate between uniform and non-uniform flow; laminar and Turbulent flow.	[10M]	CO1	L2
13.	What are different types of dimensionless numbers and explain them State Buckingham's 'pi' theorem.	[10M]	CO2	L3
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]	CO2	L4
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 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	[10M]	CO3	L4

	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.	[10M]	CO3	L3
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]	CO4	L4
	OR			
18.	What are the uses of a draft tube? Describe with neat sketches different types of draft tubes.	[10M]	CO4	L3
19.	Define cavitation. What are the effects of cavitation? Give the necessary precaution against the cavitation.	[10M]	CO5	L2
	OR			
20.	Define the specific speed of the turbine and also derive the expression for the specific speed of the centrifugal pump.	[10M]	CO5	L3