



R18 Regulation

Subject code:2P4AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2025

HYDRAULICS & HYDRAULIC MACHINERY (CE)

Maximum Marks: 70

Date: 20.12.2025

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	What is meant by energy dissipation?	2M	1	L1
2	Define gradually varying flow.	2M	1	L1
3	What do you mean by critical depth?	2M	2	L1
4	What do you mean by dimension less numbers?	2M	2	L1
5	What are the applications of radial flow turbine?	2M	3	L1
6	Define the term impacts of jets	2M	3	L1
7	Give the expression for maximum efficiency of a Pelton wheel.	2M	4	L1
8	What is a draft tube?	2M	4	L1
9	Define different efficiency's of centrifugal pump?	2M	5	L1
10	What is surge tank?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Evaluate that for a channel of circular section, the depth of flow, $d=0.81D$ for maximum velocity.	10M	1	L2
OR				
12	Write about types of flow and types of channels.	10M	1	L2
13	Explain the terms :i) Geometric similarity ii) kinematic similarity iii) Dynamic similarity.	10M	2	L2
OR				
14	a) Find the dimensions of the given quantities; Discharge, Force, Specific Weight, angular acceleration, dynamic viscosity, kinematic viscosity.	5M	2	L2
	b) The time period of a pendulum depends upon the length of the pendulum, Acceleration due to gravity. Determine expression for time period using Rayleigh's method	5M		
15	a) Find an expression for the force exerted by a jet of water on a fixed	5M	3	L2

	vertical plate in the direction of jet. b) Water is flowing through a pipe at the end of which a nozzle is fitted. the diameter of the nozzle 100mm and the head of water at the centre of nozzle is 100 m. find the force exerted by the jet of water on a fixed vertical plate. the coefficient of velocity is given as 0.95.	5M		
	OR			
16	a) Derive an expression for efficiency of a series of radial curved vanes when the jet of water striking the vanes. b) A jet of water of diameter 60mm moving with a velocity of 40 m/sec, strikes a curved fixed symmetrical plate at the centre. Determine the force exerted by the jet of water in the direction of the jet, if the jet is deflected by an angle of 160 degrees at the outlet of the curved plate.	5M 5M	3	L2
17	Explain the about following efficiencies: i) Hydraulic efficiency ii) Mechanical efficiency iii) Volumetric efficiency iv) Overall efficiency.	10M	4	L2
	OR			
18	a) A turbine develops 9000 kW when running at a speed of 140 r. p m and under a head of 30 m. Determine the specific speed of the turbine b) Explain the about classification of hydraulic turbines.	5M 5M	4	L2
19	a) The diameters of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against a head of 25m. b) Define priming of centrifugal pump and What is the function of pump?	5M 5M	5	L2
	OR			
20	a) Draw and explain about main parts of centrifugal pump with neat sketch. b) How cavitation occurs in centrifugal pumps and How can you prevent cavitations?	5M 5M	5	L2