R18 Regulation *Subject code:2P4AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, July 2024

HYDRAULICS & HYDRAULIC MACHINERY
(CE)

Maximum Marks: 70 Date:23.07.2024 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 5 Units. Answer any one full question from each unit which carries 10M.
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)		CO	Bloom Tx
1	What is flow in open channel?	1	L1
2	Define gradually varying flow.	1	L1
3	Define the term dimensional analysis and model analysis	2	L1
4	Explain the terms distorted and undistorted model.	2	L1
5	Define the term impact of jets	3	L1
6	Define velocity triangle	3	L1
7	What are surge tanks?	4	L1
8	Define unit speed	4	L1
9	What is meant by multi stage centrifugal pump?	5	L1
10	Define cavitation.	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	Evaluate that for a channel of circular section, the depth of flow, d=0.81D for maximum velocity. [10M]	1	L2
	OR		
12	a) Evaluate an expression for the discharge through a channel by chezy"s formula. [5M] b) Evaluate the conditions for most economical section of a rectangular channel. [5M]	1	L2
13	a) Write short notes on model and prototype. [5M] b) What is mean by laws of similarity? [5M]	2	L2
	OR		
14	a) Find the dimensions of the given quantities; Discharge, Force, Specific Weight, angular acceleration, dynamic viscosity, kinematic viscosity. [5M] 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]	2	L2

15	a) Evaluate an expression for the force excreted by a jet of water on a flat vertical plate moving in the direction of jet. [5M] b) Explain the procedure to draw inlet and out let triangles. [5M]	3	L2
	OR		
16	a) Derive an expression for efficiency of a series of radial curved vanes when the jet of water striking the vanes. [5M] 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]	3	L2
17	a) What are unit quantities of turbines? [5M] b) Differentiate impulse and reaction turbines. [5M]	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. [5M] b) Explain the about classification of hydraulic turbines. [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. [5M] b) Define priming of centrifugal pump and What is the function of pump? 5M	5	L2
	OR		
20	a) Derive an expression specific speed of a centrifugal pump. [5M] b)A centrifugal pump rotating at 1500 rpm delivers 0.2 m^3/s at ahead of 15m. Calculate the specific speed of the pump and the power input. Assume overall efficiency of the pump is 0.68. If the is pump were to operate at 900 rpm, what would be the head, discharge and power required homogenous conditions? Assume overall efficiency remains unchanged at new rpm. [5M]	5	L2