



Regulation 18
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)

Subject code: 2P4CB

B.Tech IV Semester Supplementary Examinations, February 2024

Fluid Mechanics and Hydraulic Machines
(Mechanical Engineering)

Maximum Marks: 70

Date: 19.02.2024 Duration: 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)

1	Define the viscosity.	1	Understanding
2	Write short notes on Piezometer	1	Understanding
3	Differentiate between steady and un steady flows	2	Remembering
4	Describe briefly about continuity equation.	2	Remembering
5	Write short notes on Boundary Layer Concepts.	2	Understanding
6	State the Minor losses in pipes.	2	Remembering
7	Mention different types of hydraulic turbines.	3	Remembering
8	Mention the purpose of draft tube in turbine.	3	Application
9	What is the purpose of surge tank?	3	Application
10	Define the term NPSH.	3	Understanding

Part-B

Answer All the following questions. (10M X 5=50Marks)

11	Explain differential manometers with neat sketch. Derive the difference of pressure for U-tube Differential Manometer.	10	3	Application
OR				
12	A Simple U-tube Manometer containing mercury is connected to a pipe in which a fluid of Specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference off mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below.	10	2	Evaluation
13	Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one-third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE.	10	2	Analyzing

	OR			
14	a) Describe different types of flows. b) A 30 cm diameter pipe conveying water branches in to two pipes of diameters 20cm and 15cm. If average velocity in 30cm diameter pipe is 2.5 m/s, find the discharge in this pipe and also determine the velocity of 15cm pipe, if the average velocity in 20cm diameter pipe is 2m/s.	5*2=10	2	Understanding and Applications
15	Derive the expression for Darcy weisbach equation.	10	2	Analyzing
	OR			
16	Explain the separation of boundary layer with neat sketch.	10	2	Understanding
17	A jet of water of diameter 7.5 cm strikes a curved plate at its centre with a velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the direction of the jet. The jet is deflected through an angle of 165° . Assuming the plate is smooth. Find (i) Force exerted on the plate in the direction of jet, (ii) Power of the jet, and (iii) Efficiency of the jet.	10	2	Evaluation
	OR			
18	Reaction turbine works at 450rpm under a head of 120m. Its diameter at inlet is 1.2m and the flow area is 0.4m^2 . The angle made by the absolute and relative velocities at inlet are 20° and 60° respectively with the tangential velocity. Determine 1) volume flow rate, 2) Power developed, 3) Hydraulic efficiency.	10	2	Evaluation
19	Explain about Reciprocating pump with neat sketch.	10	3	Application
	OR			
20	Explain the Working principle of centrifugal pump with a neat sketch.	10	3	Application