



R20 Regulation

Subject code: 3P4CB

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2025

## FLUID MECHANICS AND HYDRAULIC MACHINES (ME)

Maximum Marks: 70

Date: 18.12.2025

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	Define mass density.	2M	1	L1
2	Define viscosity with units.	2M	1	L1
3	Define stream line.	2M	2	L1
4	Define drag and lift.	2M	2	L1
5	Write types of body forces.	2M	3	L1
6	What is mean by total energy line?	2M	3	L1
7	Write the types of vanes.	2M	4	L1
8	What is mean by impulse turbine?	2M	4	L1
9	Define pump.	2M	5	L1
10	Write the application of centrifugal pump.	2M	5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	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.	10M	1	L2
OR				
12	Find the difference of pressure in differential manometer with neat sketch.	10M	1	L2
13	Briefly explain types of fluid flows.	10M	2	L2
OR				
14	Derive continuity equation for three dimensional flows.	10M	2	L2
15	Find the displacement thickness and wall shear stress for the velocity distribution in a boundary layer $(u / U) = (y / \delta)$ where U is the Velocity and $\delta$ is the boundary layer thickness.	10M	3	L2
OR				

16	When sudden contraction is introduced in a horizontal pipe line from 500 mm diameter to 250 mm diameter, the pressure changes from 105 kN/m <sup>2</sup> to 69kN/m <sup>2</sup> . If the co-efficient of contraction is assumed to be 0.65, calculate the water flow rate. Following this if there is sudden enlargement from 250 mm to 500 mm and if the pressure at the 250 mm section is 69 kN/m <sup>2</sup> , what is the pressure at 500 mm enlargement portion?	10M	3	L2
17	A jet of water having a velocity of 35 m/s impinges on a series of vanes moving with a velocity of 20 m/s. the jet makes an angle of 30 <sup>0</sup> to the direction of motion of vanes when entering and leaves at an angle of 120 <sup>0</sup> . Find: i)The angles of vanes tips so that water enters and leaves without shock, ii) The work done per N of water entering the vanes and Efficiency.	10M	4	L2
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 <sup>2</sup> . The angle made by the absolute and relative velocities are 20° and 60° respectively with the tangential velocity. Determine 1).Volume flow rate, 2).Power developed. 3). Hydraulic efficiency.	10M	4	L2
19	How do you Classify the pumps?	10M	5	L2
OR				
20	Draw and explain Reciprocating pump with neat sketch.	10M	5	L2

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