



R20 Regulation

Subject code: 3P3AE

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech III Semester Supplementary Examinations, December 2025

### FLUID MECHANICS (CE)

Maximum Marks: 70

Date: 24.12.2025

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 specific volume and specific gravity.	2M	1	L1
2	What do you understand by total pressure and centre of pressure?	2M	1	L1
3	Define path line and streak line.	2M	2	L1
4	Define buoyancy and centre of buoyancy.	2M	2	L1
5	Write on rotational and irrotational flows.	2M	3	L1
6	What are the applications of momentum equation?	2M	3	L1
7	What do you understand by total energy line, hydraulic gradient line?	2M	4	L1
8	Write the terms Pipes in parallel and series.	2M	4	L1
9	Write the concept of boundary layer.	2M	5	L1
10	Write the different methods of preventing the separation of boundary layer.	2M	5	L1

#### Part-B

Answer All the following questions.

(5X10M=50Marks)

		Marks	CO	BTL
11	a) Explain about bourdon tube pressure gauge. b) A simple u- tube manometer containing mercury is connected to a pipe in which a fluid of sp.gr.0.8 and having vacuum pressure is flowing. The other end of manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40cm and the height of the fluid in the left from the centre of pipe is 15cm below.	5M 5M	1	L2
OR				
12	a) What is capillarity? Derive expression for height of capillary rise with help of neat sketch. b) A metal ball weighs 9500N in air and 8000N in water. Find out its volume and specific gravity.	5M 5M	1	L2
13	a) Define stream function and velocity potential. What are their uses? b) Determine whether the following velocity components satisfy the continuity equation. i) $u = cx, v = -cy$ ii) $u = -cx/y, v = c \log xy$	5M 5M	2	L2
OR				

14	Describe briefly the experimental method of determination of the metacentric height of a floating object.	10M	2	L2
15	Derive Bernoulli's equation from Euler's equation of motion and assumptions made in it.	10M	3	L2
	OR			
16	Explain the momentum equation along with its applications.	10M	3	L2
17	How will you determine the loss of head due to friction in pipes by using Darcy formula and Chezy's equation?	10M	4	L2
	OR			
18	Show that the loss of head due to sudden expansion in pipe line is a function of velocity head.	10M	4	L2
19	Derive Von-Karman's momentum integral equation. What is the significance of it?	10M	5	L2
	OR			
20	a) Explain what is meant by drag, lift and Magnus effect. b) A smooth two-dimensional flat plate is exposed to a wind velocity of 100 km per hour. If laminar boundary layer exists upto a value of $Re_x$ equal to $3 \times 10^5$ , find the maximum distance upto which laminar boundary layer persists, and find its maximum thickness. Assume kinematic viscosity of air as $1.49 \times 10^{-5} \text{ m}^2/\text{s}$ .	5M 5M	5	L2