



R18 Regulation

Subject code:2P3AD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, February 2024**FLUID MECHANICS**

(Civil Engineering)

Maximum Marks: 70

Date: 23.02.2024 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.
 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	Define the concept of Pascal's law.	CO1	L2
2	Write the relation between specific weight and mass density	CO1	L2
3	Define the terms: Metacenter and metacentric height.	CO2	L1
4	Define buoyancy	CO2	L1
5	Give any two assumptions of Bernoulli's equation	CO3	L2
6	How does a pitot tube works?	CO3	L1
7	Define velocity of approach	CO4	L2
8	Define compound pipe and write its equation.	CO4	L2
9	Define displacement thickness?	CO5	L1
10	What do you understand by the term "Drag & Lift"?	CO5	L2

Part-B

Answer All the following questions.

(5X10M=50Marks)

11	(a) Find the total pressure on one face of the plate and the position of center of pressure when a circular plate 2.5m diameter is immersed in water, its greatest and least depth below the free surface being 3m and 1m respectively. [5] (b) Prove that the relationship between surface tension (σ) and pressure (p) inside a droplet of liquid in excess of outside pressure is given by $p = 4\sigma / d$ [5]	CO1	L4 L3
OR			
12	A hydraulic press has a ram of 30 cm diameter and a plunger of 4.5 cm diameter. Find the weight lifted by the hydraulic press when the force applied at the plunger is 500N [10]		L4
13	Explain stable, unstable and Neutral equilibrium of floating body and submerged body [10]	CO2	L3
OR			
14	Derive continuity equation in 3-D flow. [10]	CO2	L3
15	What are the applications of Venturi meter? Explain the working principle of venturi meter. Also Derive discharge of venturi meter. [10]	CO3	L3
OR			

16	What are the different types of notches? Explain Rectangular, trapezoidal and Stepped notches [10]	CO3	L3
17	(a) Demonstrate Reynold's experiment with a neat sketch. [5] (b) A fluid of viscosity 0.7 N-s/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2 , Estimate the average velocity and Reynolds number of the flow. [5]	CO4	L3 L4
	OR		
18	Explain the phenomenon of water hammer. Obtain an expression for rise of pressure when the flowing water in a pipe is brought to rest by closing the valve gradually. [10]	CO4	L4
19	(a) Differentiate local co-efficient of drag and average co-efficient of drag. [5] (b) What are the conditions for separation of boundary layer? [5]	CO5	L3 L3
	OR		
20	Find the ratios of displacement thickness to momentum thickness and momentum thickness to energy thickness for velocity distribution in the boundary layer given by $u/U=2(y/\delta)-(y/\delta)^2$. Where u =Velocity in the boundary layer at the distance y , U =Free-stream velocity, δ =Boundary layer thickness. [10]	CO5	L4