QP Code: 10441QP

Seat No.	

Total No. of Pages: 2

Winter Examination Oct/Nov 2023

Subject Name: B.Tech. CBCS_63341/73200/77772 - Fluid Mech-I_09.01.2024_10.30 AM To 01.00 PM

Subject Code: 73200

Day and Date: - Tuesday, 09-01-2024 **Total Marks: 70**

Time: - 10:30 am to 01:00 pm

Instructions.:

1) Figures to the right indicate full marks
2) Assume suitable data wherever necessary and mention it boldly

Special Instruction.:

Q.No.4 & Q.No.8 are compulsory Solve any 2 from each section out of remaining.

Q.1. **Attempt all Questions.** **[10]**

a)Define the following properties & mention their practical examples-Viscosity & vapour pressure.

b) Using Newton's law of viscosity.Find the dynamic viscosity of oil when cubical block weighing 4.5N and having 40cm edge is allowed to slide sown an inclined plane surface making an angle of 30 degree with the horizontal on which there is a uniform layer of oil 0.005 cm thick.The expected steady state of velocity of the block is 12.5cm/s.

Q.2. **Attemp all Questions.** **[10]**

a)Vertical rectangular gate 1.5mX1.5m is subjected to water pressure on one side, the water surface being at top of gate. The gate is hinged at bottom and is held by a horizontal chain at the top calculate the tension in chain.

b)Determine metacentric height by analytical and experimental method.

Q.3. **Attempt all Questions.** **[10]**

a)A stream function is given by $\psi=4XY$.Whether the flow is possible? Find potential function φ ,velocity and acceleration at (1,2).

b) Derive the continuity Equation in 3-D Cartesian form.

Q.4. **write short notes on any THREE** **[15]**

a)Reynold's Experiment with neat sketch

b)stability of floating and submerged objects.

c)Total pressure on curved surface submerged in fluid.

d) Flow net-construction and uses.

Q.5. **Attempt all Questions.** **[10]**

a)Explain following measuring devices with neat sketch- i)Orificemeter ii)Pitot Tube

b)A circular tank of diameter 4m contains water upto a height of 6m.The tank is provided with an orifice of diameter 0.75m at the bottom.the diameter taken by water-i)to fall from 6m to 2m and ii)to completely emptying the tank .Take Cd =0.6

Q.6. **a) Differentiate Laminar flow and Turbulent Flow with respect to losses & velocity distribution.** **[10]**

b)A lubricating oil of viscosity of 1 poise and specific gravity 0.9 is Pumped through a 35mm diameter pipe. If the pressure drop per meter length is 20 kN/m2,Determine-

1. Flow rate

2. Reynolds number flow.

3. Power required per 50m, length of pipe to maintain flow.

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Q.7. **Attempt all Quesions.** **[10]**

a) Two pipes of diameter 50mm & 100mm, each of length 100m are connected in parallel between two reservoirs which have a difference of level of 10m. Take f=0.32 for both pipes & also diameter of single pipe 100m long which would give the same discharge, if it were substituted for the original two pipes.

b)Enlist different losses in pipes? Explain any two in detail.

Q.8. **Attempt any THREE-** **[15]**

a)Prandtle's mixing length theory

b)Moody's chart

c)Separation of boundary layer

d) Water Hammer

e)Bernaulli's Theorem-It's Limitations & Applications.