KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Food Engg. & Tech.) 2019 Admission

III Semester-Final Examination-February 2021

Cien 2103	Fluid Mechanics (2+1)	Marks: 50
		Time: 2 hours

I **Fill in the blanks**   (10x1=10)
1. Fluids which obeys Newton's Law of Viscosity are _____.
2. The difference of pressure between two points in a pipe are measured using _____.
3. The line given by the sum of pressure head and datum head of a flowing fluid in a pipe is _____
4. Dynamic viscosity divided by density is _____.
5. Venturimeter is used for measurement of _____.

Define the following
6. Reynolds Number
7. Stream lines.

State whether True or False
8. Continuity equation is associated with principle of conservation of mass.
9. The component of total force in the direction of motion is called drag.
10. Entrance loss caused in pipes is a major loss in pipe lines.

II **Write Short notes on ANY FIVE of the following**   (5x2=10)
1. Differentiate simple manometers and differential manometers
2. Newton's law of Viscosity
3. Cavitation
4. Pitot Tube
5. Kinetic energy correction factor
6. Dimensional Homogeneity
7. Priming of Pumps

III **W Answer ANY FIVE of the following.**   (5x4=20)
1. Distinguish between:
    a) Steady flow and Unsteady flow.
    b) Laminar flow and Turbulent flow.
2. Define absolute pressure, vacuum pressure and gauge pressure. Also give the relationship between vacuum pressure and gauge pressure with absolute pressure.
3. Assumptions made in derivation of Bernoulli's equation.
4. Write note on geometric similarity and kinematic similarity.
5. A 0.03 pipe carries water at a velocity of 24.4 m/s. At point A and B measurements of pressure and elevation were respectively 361 kN/m² and 288 kN/m² and 30.5 m and 33.5m. For steady flow, find the head loss between A and B.
6. Derive expression for specific speed of centrifugal pump.
7. Derive the expression to determine meta centric height by experimental method

IV **Write an essay on ANY ONE of the following**   (1x10=10)
1. Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m when one end of the pipe is connected to a tank and other end of the pipe is open to the

atmosphere. The pipe is horizontal and the height of water in the tank is 4 m above the centre of the pipe. Consider all losses and take $f = 0.036$.

2. The pressure difference Δp in a pipe of diameter D and length l due to the turbulent flow depends on the velocity V, viscosity μ, density ρ and average height k of roughness projection on pipe surface. Using Buckingham's π-theorem, obtain the expression for Δp.

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