KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Technology)
II Semester Final Re - Examination – August 2025
2023 & Previous admission

Pafe.1207 **Fluid Mechanics (2+1)** **Marks: 50**
Time: 2 hours

I **State True or False** **(10x1=10)**

1. In equilibrium, the net force acting on the upper plate in the horizontal direction must not be zero, and thus a force equal and opposite to *F* must be acting on the plate.
2. A Path line is a curve that is everywhere tangent to the instantaneous local velocity vector.
3. A solid can resist an applied shear stress by deforming, whereas *a fluid deforms continuously under the influence of a shear stress*, no matter how small.

Fill in the blanks

4. The study of the motion of fluids that can be approximated as incompressible (such as liquids, especially water, and gases at low speeds) is usually referred to as .....
5. In fluids, stress is proportional to .....
6. A ..... is the actual path traveled by an individual fluid particle over some time period.
7. The flow region adjacent to the wall in which the viscous effects (and thus the velocity gradients) are significant is called the .....
8. The densities of liquids are essentially constant, and thus the flow of liquids is typically .....
9. The highly ordered fluid motion characterized by smooth layers of fluid is called .....
10. Mass is ..... property.

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Define a fluid and how it differs between a solid and a gas.
2. What is cavitation? What causes it?
3. Name four physical quantities that are conserved and two quantities that are not conserved during a process.
4. Determine whether the flow of air over the wings of an aircraft and the flow of gases through a jet engine is internal or external.
5. List at least two common examples of fans, of blowers, and of compressors.
6. Give at least two reasons why turbines often have greater efficiencies than do pumps.
7. What is a draft tube, and what is its purpose?

III **Answer ANY FIVE of the following** **(5x4=20)**

1. Someone claims that the absolute pressure in a liquid of constant density doubles when the depth is doubled. Do you agree? Explain.
2. Briefly explain the similarities and differences between the material derivative and the Reynolds transport theorem.
3. Discuss the role of nondimensionalization of the Navier-Stokes equations.
4. What is stagnation pressure? Explain how it can be measured.
5. Is it possible for subcritical flow to undergo a hydraulic jump? Explain.
6. For a turbine, discuss the difference between *brake horsepower* and *water horsepower*, and also define turbine efficiency in terms of these quantities.
7. Define *net positive suction head* and *required net positive suction head*, and explain how these two quantities are used to ensure that cavitation does not occur in a pump.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Discuss the physical significance of the four nondimensional parameters in the nondimensionalized incompressible Navier-Stokes equation.
2. Describe the working principle of a Venturimeter. Derive the expression for coefficient of discharge of Venturimeter. With neat sketch discuss the method used to measure the venture head.

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