



KERALA AGRICULTURAL UNIVERSITY  
B. Tech. (Agrl. Engg.) 2023 Admission  
II Semester Final Examination – July 2024

Iden.1202

Fluid Mechanics and Open channel Hydraulics (2+1)

Marks: 50  
Time: 2 hours

(10x1=10)

I

Fill in the blanks

1. A *fluid* is a substance which deforms continuously under the action of .....forces.
  2. A liquid is.....( compressible/incompressible)
  3. .... number refers to ratio of inertia to viscous force.
  4. ....is the continuity equation for incompressible fluid under the assumption of fluid is ideal and flow is in steady state.
  5. Venturimeter which is device based on ..... equation.
  6. The laminar and turbulent flow can be classified based on ..... number.
  7. Dimensions for Force is .....
  8. The dynamic viscosity in C.G.S units is expressed as .....
  9. In laminar flow loss of pressure head is proportional to .....
- Define the following
10. Pascal's Law.

II

Write short notes on ANY FIVE of the following

1. Write the expression for Newton's Law of Viscosity with usual annotations
2. Write the Bernoulli's equation with usual annotations
3. Define dynamic viscosity and kinematic viscosity with their units
4. State the assumptions to derive the Bernoulli equation
5. Which equation is mostly used to design open channel. Give its equation.
6. Give the dimensions of:
  - (i) Density
  - (ii) Viscosity
  - (iii) Power and
  - (iv) Kinematic viscosity
7. What is HGL and EGL?

(5x2=10)

III

Answer ANY FIVE of the following

1. Discuss Newton's law of viscosity
2. State the assumptions and derive the Bernoulli equation
3. Explain how a pitot-tube is used to measure the point velocity in a fluid.
4. With a neat sketch show all the components of a venturimeter and orifice meter.
5. How do you define the repeating variables? How is this selection made using dimensional analysis?
6. Define the terms: model, prototype, model analysis, hydraulic similitude
7. Explain the stability of floating bodies with respect to metacentre.

(5x4=20)

IV

Write an essay on ANY ONE of the following

(1x10=10)

1. Derive an expression for the total pressure force on a Vertical Plane surface submerged in liquid
2. Using dimensional analysis, show the torque due to friction developed over a disc rotating in a fluid is expressed as

$$T = D^5 N^2 \rho \phi \left[ \frac{\mu}{D^2 N \rho} \right]$$

Where,  $D$  is diameter of disc,  $N$  is speed,  $\mu$  is the viscosity and  $\rho$  is the density of fluid.

\*\*\*\*\*