

1. What is laminar flow characterized by?

- a) Chaotic movement of fluid particles
- b) Random fluctuations in velocity
- c) Smooth and orderly flow
- d) Rapid changes in pressure

Answer: c) Smooth and orderly flow

Explanation: Laminar flow is characterized by smooth and orderly movement of fluid particles in parallel layers with minimal mixing between layers.

2. Who conducted the famous experiment to study fluid flow behavior, leading to the concept of Reynolds number?

- a) Isaac Newton
- b) Albert Einstein
- c) Osborne Reynolds
- d) Leonardo da Vinci

Answer: c) Osborne Reynolds

Explanation: Osborne Reynolds conducted the famous experiment in the 19th century to study the behavior of fluid flow, which led to the concept of Reynolds number.

3. What does the Reynolds number indicate about a flow?

- a) Viscosity of the fluid

- b) Turbulence of the flow
- c) Density of the fluid
- d) Flow regime

Answer: d) Flow regime

Explanation: The Reynolds number indicates the flow regime, whether it is laminar, transitional, or turbulent, based on the ratio of inertial forces to viscous forces.

4. How is shear stress related to the pressure gradient in laminar flow?

- a) They are directly proportional
- b) They are inversely proportional
- c) They are unrelated
- d) Shear stress causes pressure gradient

Answer: a) They are directly proportional

Explanation: In laminar flow, shear stress is directly proportional to the pressure gradient, according to Newton's law of viscosity.

5. What is the typical flow pattern in circular pipes for laminar flow?

- a) Spiral motion
- b) Turbulent eddies
- c) Radial expansion
- d) Axial layers

Answer: d) Axial layers

Explanation: In laminar flow through circular pipes, fluid particles move in orderly layers along the axis of the pipe with minimal mixing between layers.

6. Which equation describes the laminar flow between parallel plates?

- a) Poiseuille's equation
- b) Bernoulli's equation
- c) Hagen-Poiseuille equation
- d) Navier-Stokes equation

Answer: c) Hagen-Poiseuille equation

Explanation: The Hagen-Poiseuille equation describes laminar flow between parallel plates, expressing the flow rate in terms of pressure gradient, viscosity, and dimensions of the system.

7. What factor influences the flow rate in laminar flow through porous media according to Darcy's law?

- a) Viscosity of the fluid
- b) Porosity of the media
- c) Pressure gradient
- d) Permeability of the media

Answer: d) Permeability of the media

Explanation: Darcy's law describes laminar flow through porous media and states that the flow rate is directly proportional to the pressure gradient and the permeability of the media.

8. Which law describes the drag force experienced by a spherical particle moving through a fluid at low Reynolds numbers?

- a) Newton's law of viscosity
- b) Archimedes' principle
- c) Boyle's law
- d) Stokes' law

Answer: d) Stokes' law

Explanation: Stokes' law describes the drag force experienced by a spherical particle moving through a fluid at low Reynolds numbers, where viscous forces dominate.

9. In laminar flow, what happens to the velocity profile across a pipe's cross-section?

- a) It remains constant
- b) It is parabolic
- c) It becomes chaotic
- d) It is inversely proportional to pressure

Answer: b) It is parabolic

Explanation: In laminar flow through a pipe, the velocity profile across the cross-section is typically parabolic, with maximum velocity at the center and minimum velocity at the walls.

10. At what Reynolds number range does laminar flow typically occur in a pipe?

- a) Less than 2000
- b) Between 2000 and 4000
- c) Greater than 4000
- d) Less than 100

Answer: a) Less than 2000

Explanation: Laminar flow typically occurs in a pipe at Reynolds numbers less than 2000, while turbulent flow occurs at higher Reynolds numbers.