

Fluid Mechanics MCQs



***Multiple Choice Questions and
Answers (Quiz & Tests with
Answer Keys)***

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Choice Questions and Answers
(Quiz & Tests with Answer Keys)
By Arshad Iqbal**

Dynamics

Chapter 2: Fluid Kinematics

Chapter 3: Fluid Mechanics

Chapter 4: Fluid Statistics

Chapter 1

Elementary Fluid Dynamics

MCQ 1: the sum of the pressure head and the elevation head is called

- A. Energy head
- B. hydraulic head
- C. piezo metric head
- D. All of above

MCQ 2: If the flow is steady, incompressible, and in viscid, the energy line is

- A. horizontal
- B. vertical
- C. angular
- D. perpendicular

MCQ 3: Stagnation pressure is also

called

- A. field pressure
- B. pitot pressure
- C. surface pressure
- D. object pressure

MCQ 4: As the diameter of pipe changes, elevation of hydraulic line

- A. remains same
- B. changes
- C. remains constant
- D. None of these

MCQ 5: A line that represents the total head available to the fluid is called

- A. fluid line
- B. Energy line
- C. head line

D. None of these

MCQ 6: The Bernoulli equation cannot be applied across streamlines if the flow is

A. Linear

B. Laminar

C. Rotational

D. None of these

MCQ 7: At stagnation point, all the kinetic energy is converted into

A. velocity

B. pressure

C. speed

D. None of these

MCQ 8: The sum of pressure, elevation, and velocity effects is

A. changing across streamlines

B. constant across streamlines.

C. not constant across streamlines.

D. None of these

MCQ 9: Free Jet equation is

A. $v = \sqrt{2gh}$

B. $v = \sqrt{2/gh}$

C. $v = 1/\sqrt{2gh}$

D. $v = \sqrt{2g}$

MCQ 10: $A_1V_1 = A_2V_2$, this equation is called

A. continuity equation

B. Bernoulli's equation

C. volume equation

D. area equation

MCQ 11: The pressure variation across straight streamlines is

A. hydrostatic

B. not hydrostatic

C. static

D. None of these

MCQ 12: Under the assumptions of the Bernoulli equation, the energy line is

A. horizontal

B. vertical

C. angular

D. perpendicular

MCQ 13: At a stagnation point the fluid velocity is

A. maximum

B. minimum

C. unity

D. zero

MCQ 14: For small Mach numbers, the compressible and incompressible results are

A. different

- B. inverse of each other
- C. nearly same
- D. None of these

MCQ 15: The Pitot-static tube is used to measure

- A. fluid density
- B. fluid speed
- C. fluid viscosity
- D. fluid friction

MCQ 16: In vena contracta effect, the diameter of jet is

- A. greater than diameter of hole
- B. lesser than diameter of hole
- C. equal to diameter of hole
- D. two times the diameter of hole

MCQ 17: For flow below the hydraulic grade line, the pressure is

- A. positive

- B. negative
- C. zero
- D. None of these

MCQ 18: Cavitation occurs when the pressure is reduced to the

- A. vapor pressure
- B. melting pressure
- C. cooling pressure
- D. None of these

MCQ 19: If A_j is area of jet at vena contracta and A_o is area of hole, contraction coefficient C_c is equal to

- A. A_j/A_o
- B. $A_j \times A_o$
- C. A_o/A_j
- D. $1/A_j A_o$

MCQ 20: The kinetic energy per

unit volume of a fluid particle is called

- A. stagnation pressure
- B. dynamic pressure
- C. surface pressure
- D. field pressure

MCQ 21: The flow rate varies across the flow meter as

- A. square root of the pressure difference
- B. integral of the pressure difference
- C. derivative of the pressure difference
- D. log of the pressure difference

MCQ 22: The distance from the pipe to the hydraulic grade line indicates the

- A. pressure at exit of pipe
- B. pressure at inlet of pipe
- C. pressure within the pipe
- D. None of these

MCQ 23: The unit of mass flow rate is

- A. slugs/s
- B. kg/s
- C. Both A and B
- D. None of these

MCQ 24: The exit pressure for an incompressible fluid jet is equal to the

- A. surrounding pressure
- B. inlet pressure
- C. total pressure
- D. None of these

MCQ 25: In the flow field, the

point exist at the surface of object where fluid is brought to rest by object is called

- A. field point
- B. surface point
- C. stagnation point
- D. object point

MCQ 26: The net pressure force on a particle is determined by

- A. pressure gradient
- B. total pressure
- C. pressure curve
- D. None of these

MCQ 27: If the fluid velocity changes along the streamline, the hydraulic grade line will

- A. be horizontal
- B. not be horizontal

C. be integral of velocity

D. None of these

MCQ 28: The hydraulic grade line and energy line are

A. graphical forms of the Bernoulli equation.

B. theoretical forms of the Bernoulli equation.

C. integral forms of the Bernoulli equation.

D. None of these

MCQ 29: The unit of volume flow rate is

A. m^2/s^2

B. m^3/s

C. m^3/s^2

D. m^2/s

MCQ 30: At stagnation point,

static pressure is at its

- A. maximum value
- B. minimum value
- C. medium value
- D. None of these

MCQ 31: Pitot-static tubes measure fluid velocity by converting velocity into

- A. potential energy
- B. Kinetic energy
- C. pressure
- D. None of these

MCQ 32: The hydraulic grade line lies a distance of one velocity head,

- A. below the energy line
- B. above the energy line
- C. coincides the energy line
- D. None of these

MCQ 33: The point of minimum area in jet of flow is called

- A. jet point
- B. vena contracta
- C. expansion point
- D. None of these

MCQ 34: For flow above the hydraulic grade line, the pressure is

- A. positive
- B. negative
- C. zero
- D. None of these

MCQ 35: The static pressure at stagnation point in the flow field is called

- A. stagnation pressure
- B. dynamic pressure
- C. surface pressure

D. field pressure

MCQ 36: The lines that are tangent to the velocity vectors throughout the flow field are called

A. Fluid lines

B. Stream lines

C. tangent lines

D. field lines

MCQ 37: The Bernoulli equation can be written in terms of heights called

A. heads

B. columns

C. lengths

D. None of these

MCQ 38: The sum of the static pressure, hydrostatic pressure, and dynamic pressure is termed as

- A. total pressure
- B. partial pressure
- C. surface pressure
- D. field pressure

Answers:

- 1. C
- 2. A
- 3. B
- 4. B
- 5. B
- 6. C
- 7. B
- 8. B
- 9. A
- 10. A
- 11. A
- 12. A

14. C

15. B

16. B

17. A

18. A

19. A

20. B

21. A

22. C

23. C

24. A

25. C

26. A

27. B

28. A

29. B

30. A

32. A

33. B

34. B

35. A

36. B

37. A

38. A

Chapter 2

Fluid Kinematics

MCQ 1: Euler equation is useful for

- A. viscid flow
- B. in viscid flow
- C. rotational flow
- D. None of these

MCQ 2: The flow in which each particle of fluid follows an irregular path is called

- A. laminar flow
- B. turbulent flow
- C. mixed flow
- D. None of these

MCQ 3: The smooth flow of highly viscous syrup onto a pancake

represents a

- A. deterministic laminar flow
- B. turbulent flow
- C. sinusoidal flow
- D. None of these

MCQ 4: In many ways the relationship between a system and a control volume is similar to the relationship between the

- A. Reynolds and Eulerian flow
- B. Lagrangian and Eulerian flow
- C. Lagrangian and Reynolds flow
- D. None of these

MCQ 5: The flow in which each particle of fluid follows a smooth path is called

- A. laminar flow
- B. turbulent flow

C. mixed flow

D. None of these

MCQ 6: A line that is everywhere tangent to the velocity field is

A. flow line

B. streamline

C. streak line

D. All of above

MCQ 7: The portion of the material derivative represented by the spatial derivatives is termed the

A. detective derivative

B. convective derivative

C. erective derivative

D. None of these

MCQ 8: The flow rate of a parameter across the control surface is written in terms of

- A. surface integral
- B. control integral
- C. flow integral
- D. None of these

MCQ 9: Volume in space through which fluid may flow is called

- A. control volume
- B. control space
- C. indicated volume
- D. None of these

MCQ 10: The lines obtained by taking instantaneous photographs of marked particles that all passed through a given location in the flow field at some earlier time called

- A. path line
- B. streamline

C. streak line

D. flow line

MCQ 11: For steady flow, stream-lines, streak lines, and path lines are

A. same

B. different

C. perpendicular to each other

D. None of these

MCQ 12: The time rate of change of a system property is

A. Reynolds concept

B. Eulerian concept

C. Lagrangian concept

D. All of above

MCQ 13: The line traced out by a given particle as it flows from one point to another is called

- A. path line
- B. streamline
- C. streak line
- D. flow line

MCQ 14: The representation of fluid parameters as functions of the spatial coordinates is termed as

- A. spatial representation
- B. field representation
- C. function representation
- D. None of these

MCQ 15: The Reynolds transport theorem is the integral counterpart of the

- A. velocity derivative
- B. material derivative
- C. acceleration derivative
- D. All of above

MCQ 16: Laminar flow usually occurs at

- A. high speed
- B. low speed
- C. medium speed
- D. zero speed

Answers:

- 1. B
- 2. B
- 3. A
- 4. B
- 5. A
- 6. B
- 7. B
- 8. A
- 9. A
- 10. C

I2. **C**

I3. **A**

I4. **B**

I5. **B**

I6. **B**

Chapter 3

Fluid Mechanics

MCQ 1: The unit of density is

- A. kg/m^3
- B. slug/m^3
- C. Both A and B
- D. None of these

MCQ 2:

- A. Viscosity
- B. Surface tension
- C. specific gravity
- D. molecular tension

MCQ 3: Newtonian fluid shear stress is equal to

- A. $T = (du/dy)$
- B. $T = \mu (du/dy)$
- C. $T = \mu (dy/du)$

D. $T = 2\mu (du/dy)$

MCQ 4: The ratio of absolute viscosity to fluid density is called

- A. kinematic viscosity
- B. dynamic viscosity
- C. specific viscosity
- D. None of these

MCQ 5: A liquid boils when the pressure is reduced to

- A. vapor pressure
- B. internal pressure
- C. stoke pressure
- D. None of these

MCQ 6: The value of gravity in ft/s² is

- A. 9.8
- B. 32.174
- C. 64.24

D. 18.8

MCQ 7: Weight per unit volume is called

- A. specific volume
- B. specific weight
- C. specific gravity
- D. specific mass

MCQ 8: Dimension of dynamic viscosity is

- A. $M L^{-1} T^{-2}$
- B. $M L^{-2} T^{-1}$
- C. $M L^{-1} T^{-1}$
- D. $M L^2 T^{-1}$

MCQ 9: The empirical equation used to describe the effect of temperature on viscosity of liquids is

- A. Andrade's equation
- B. Sutherland equation

C. Jone's equation

D. Poisson's equation

MCQ 10: The reciprocal of density is

A. specific volume

B. specific mass

C. specific density

D. specific viscosity

MCQ 11: The property commonly used to characterize compressibility of fluid is

A. fluid modulus

B. compression modulus

C. bulk modulus

D. None of these

MCQ 12: In the CGS system, unit of kinematic viscosity is

A. poise

- B. stoke
- C. slug
- D. None of these

MCQ 13: Capillary action in small tubes, which involves a liquid

- A. Viscosity
- B. Surface tension
- C. internal pressure
- D. molecular tension

MCQ 14: Andrade's equation of viscosity is

- A. $\mu = e^{B/T}$
- B. $\mu = De^B$
- C. $\mu = De^{B/T}$
- D. $\mu = De^{2B/T}$

MCQ 15: Speed of sound in an ideal gas is equal to

- A. $c = \sqrt{kRT}$

B. $c = \sqrt{kR/T}$

C. $c = \sqrt{k/RT}$

D. $c = \sqrt{2kRT}$

MCQ 16: The ratio of fluid density to the density of water at a certain temperature is called

A. specific volume

B. specific weight

C. specific gravity

D. specific mass

MCQ 17: The prefix peco is used for

A. 10^{-9}

B. 10^{-12}

C. 10^9

D. 10^{15}

MCQ 18: Specific weight is equal to

- A. $\gamma = \rho g$
- B. $\gamma = \rho/g$
- C. $\gamma = 2\rho g$
- D. $\gamma = \rho/2g$

MCQ 19: The slope of the shearing stress versus rate of shearing strain graph is

- A. kinematic viscosity
- B. specific viscosity
- C. apparent viscosity
- D. None of these

MCQ 20: All theoretically derived equations are

- A. dimensionally homogenous
- B. dimensionally non homogenous
- C. dimensionally unstable
- D. None of these

MCQ 21: Dimension of kinematic viscosity is

- A. $L^3 T^{-1}$
- B. $L^2 T^{-1}$
- C. $L^2 T^{-2}$
- D. $ML^2 T^{-1}$

MCQ 22: For non-Newtonian fluids, the apparent viscosity is a function of

- A. shear rate
- B. flow rate
- C. viscous rate
- D. specific rate

MCQ 23: Sutherland equation of viscosity is

- A. $\mu = CT^{(3/2)}/T+S$
- B. $\mu = CT^{(5/2)}/T+S$
- C. $\mu = CT^{(3/2)}/T$

$$D. \mu = CT^{(3/2)}/S$$

MCQ 24: The empirical equation used to describe the effect of temperature on viscosity of gases is

- A. Andrade's equation
- B. Sutherland equation
- C. Jone's equation
- D. Poisson's equation

MCQ 25: Slug is unit of

- A. mass
- B. density
- C. force
- D. viscosity

Answers:

- 1. C
- 2. B
- 3. B
- 4. A

5. A

6. B

7. B

8. C

9. A

10. A

11. C

12. B

13. B

14. C

15. A

16. C

17. B

18. A

19. C

20. A

21. B

23. A

24. B

25. A

Chapter 4

Fluid Statistics

MCQ 1: A fluid with constant density is called

- A. compressible fluid
- B. Incompressible fluid
- C. Both A and B
- D. None of these

MCQ 2: The device used to measure pressure is called

- A. barometer
- B. anemometer
- C. speedometer
- D. thermometer

MCQ 3: The device which involves the use of vertical or inclined liquid columns to measure pressure

is

- A. manometer
- B. anemometer
- C. speedometer
- D. thermometer

MCQ 4: The buoyant force has a magnitude equal to the weight of the fluid displaced by the body and is directed vertically upward. This statement is called

- A. Archimedes principle
- B. Fluid principle
- C. buoyancy principle
- D. None of these

MCQ 5: A fluid contained in a tank that is rotating with a constant angular velocity about an axis will rotate as

- A. rigid body
- B. non rigid body
- C. free body
- D. None of these

MCQ 6: The pressure gage uses a hollow, elastic, and curved tube to measure pressure is

- A. Bourdon tube
- B. U-tube manometer
- C. sphygmomanometer
- D. piezometer tube

MCQ 7: The device that converts the pressure into an electrical output is

- A. Bourdon tube
- B. U-tube manometer
- C. pressure transducer
- D. aneroid barometer

MCQ 8: The pressure at a point in a fluid at rest is

- A. independent of direction
- B. direction dependent
- C. motion dependent
- D. None of these

MCQ 9: A completely submerged body with its center of gravity above its center of buoyancy is in

- A. stable equilibrium position
- B. an unstable equilibrium position
- C. forced equilibrium position
- D. None of these

MCQ 10: Pressure variation in a stationary incompressible fluid is

- A. $P_1 - P_2 = \gamma h$
- B. $P_1 - P_2 = \gamma/h$

C. $P_1 - P_2 = 2\gamma h$

D. $P_1 - P_2 = \gamma h$

MCQ 11: When a stationary body is completely submerged in a fluid or floating so that it is only partially submerged, the resultant fluid force acting on the body is called

- A. Buoyant force
- B. pressure force
- C. free force
- D. floating force

MCQ 12: The device used to measure pressure of blood is

- A. barometer
- B. U-tube manometer
- C. sphygmomanometer
- D. None of these

MCQ 13: The free surface in a rotating liquid is

- A. Flat
- B. parabolic
- C. curved
- D. irregular

MCQ 14: The device used to measure the difference in pressure between two containers or two points in a given system is

- A. anemometer
- B. U-tube manometer
- C. sphygmomanometer
- D. None of these

MCQ 15: If the center of gravity falls below the center of buoyancy, the body is in

- A. stable equilibrium position

- B. an unstable equilibrium position
- C. forced equilibrium position
- D. None of these

MCQ 16: The pressure distribution in a fluid mass that is accelerating along a straight path is

- A. hydrostatic
- B. not hydrostatic
- C. static
- D. None of these

MCQ 17: A negative gauge pressure is referred as

- A. suction pressure
- B. vacuum pressure
- C. absolute pressure
- D. Both A and B

MCQ 18: The fluids that move

with rigid body motion or with rigid-body rotation has

- A. shear stress
- B. no shear stress
- C. negative stress
- D. None of these

MCQ 19: Pressure gradient in a stationary fluid is

- A. $dp/dz = \gamma$
- B. $dp/dz = -\gamma$
- C. $dp/dz = -\rho/\gamma$
- D. $dp/dz = -2\gamma$

MCQ 20: The expression for buoyant force is

- A. $F = \gamma/V$
- B. $F = \gamma/2V$
- C. $F = \gamma V$
- D. $F = 2\gamma V$

MCQ 21: Hydrostatic force on a plane surface is

A. $F = \rho/\gamma hA$

B. $F = \gamma h/A$

C. $F = \gamma hA$

D. $F = \gamma/hA$

Answers:

1. B

2. A

3. A

4. A

5. A

6. A

7. C

8. A

9. B

10. A

11. A

12. C

13. C

14. B

15. A

16. B

17. D

18. B

19. B

20. C

21. C