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DEPARTMENT OF MECHANICAL ENGINEERING

SECOND YEAR (SY)

SCHEME: I **SEMESTER: IV**

NAME OF SUBJECT: FLUID MECHANICS AND MACHINERY

Subject Code: 22445

UNIT WISE MULTIPLE CHOICE QUESTIONS BANK

Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	**Program Code:- ME**
Scheme:-I	**Semester:- 4**
Course:- Fluid Mechanics and Machinery	**Course Code:- 22445**

01 – Properties of Fluid and Fluid Pressure	**Marks:-08**

Content of Chapter:-

1.1 Properties of Fluids: Density, Specific gravity, Specific volume, Specific Weight, Dynamic viscosity, Kinematic viscosity, Surface tension, Capillarity, Vapour, Pressure, Compressibility

1.2 Fluid Pressure and Pressure Measurement: Fluid pressure, Pressure head. Pressure intensity, Concept of absolute vacuum, gauge pressure, atmospheric pressure, absolute pressure; Simple and differential manometers, bourdon pressure gauge; Total pressure, center of pressure on- regular surface immersed in given liquid in horizontal, vertical and inclined positions.

1. Fluid is a substance that

(a) cannot be subjected to shear forces
(b) always expands until it fills any container
(c) has the same shear stress at a point regardless of its motion
(d) cannot remain at rest under action of any shear force
(e) flows.

Answer: - Option d
Explanation: - Definition

2. Fluid is a substance which offers no resistance to change of

(a) pressure
(b) flow
(c) shape
(d) volume
(e) temperature.

Answer: - Option c
Explanation: - Incompressibility

3 Practical fluids

(a) are viscous
(b) possess surface tension
(c) are compressible
(d) possess all the above properties
(e) possess none of the above properties

Answer: - Option d

Explanation: - Definition

4. In a static fluid
(a) resistance to shear stress is small
(b) fluid pressure is zero
(c) linear deformation is small
(d) only normal stresses can exist
(e) viscosity is nil.
Answer: - Option d
Explanation: - Definition

5. A fluid is said to be ideal, if it is
(a) incompressible
(b) inviscous
(c) viscous and incompressible
(d) inviscous and compressible
(e) inviscous and incompressible.
Answer: - Option e

6. An ideal flow of any fluid must fulfill the following
(a) Newton's law of motion
(b) Newton's law of viscosity
(c) Pascal' law
(d) Continuity equation
(e) Boundary layer theory
Answer: - Option d

7. If no resistance is encountered by displacement, such a substance is known as
(a) fluid
(b) water
(c) gas
(d) perfect solid
(e) ideal fluid.
Answer: - Option e
Explanation: -

8. The volumetric change of the fluid caused by a resistance is known as
(a) volumetric strain
(b) volumetric index
(c) compressibility
(d) adhesion
(e) cohesion
Answer:-Option c
Explanation:-

9. Liquids
(a) cannot be compressed
(b) occupy definite volume
(c) are not affected by change in pressure and temperature
(d) are not viscous

(e) none of the above.
Answer: - Option e

10. Density of water is maximum at
(a) 0°C
(b) 0°K
(c) 4°C
(d) 100°C
(e) 20°C.
Answer: Option c

11. The value of mass density in for water at 0°C is
(a) 1
(b) 1000
(c) 100
(d) 101.9
(e) 91
Answer: - Option d

12. Property of a fluid by which its own molecules are attracted is called
(a) adhesion
(b) cohesion
(c) viscosity
(d) compressibility
(e) surface tension.
Ans: b

13. Mercury does not wet glass. This is due to property of liquid known as
(a) adhesion
(b) cohesion
(c) surface tension
(d) viscosity
(e) compressibility.
Ans: c

14. The property of a fluid which enables it to resist tensile stress is known as
(a) compressibility
(b) surface tension
(c) cohesion
(d) adhesion
(e) viscosity.
Answer: - c

15. Property of a fluid by which molecules of different kinds of fluids are attracted to each other is called
(a) adhesion
(b) cohesion
(c) viscosity
(d) compressibility

(e) surface tension.
Answer: - a

16. The specific weight of water is 1000 kg/m^3
(a) at normal pressure of 760 mm
(b) at 4°C temperature
(c) at mean sea level
(d) all the above
(e) none of the above.
Answer: -: d

17. Specific weight of water in S.I. units is equal to
(a) 1000 N/m^3
(b) 10000 N/m^3
(c) 9.81 x10^3 N/m^3
(d) 9.81 x10^{6}N/m^3
(e) 9.81 N/m^3.
Answer: - c

18. When the flow parameters at any given instant remain same at every point, then flow is said to be
(a) quasi static
(b) steady state
(c) laminar
(d) uniform
(e) static.
Ans: d

19. Which of the following is dimensionless
(a) specific weight
(b) specific volume
(c) specific speed
(d) specific gravity
(e) specific viscosity.
Ans: d

20. The normal stress in a fluid will be constant in all directions at a point only if
(a) it is incompressible
(b) it has uniform viscosity
(c) it has zero viscosity
(d) it is frictionless
(e) it is at rest.
Ans: e

21. The pressure at a point in a fluid will not be same in all the directions when the fluid is
(a) moving
(b) viscous

(c) viscous and static
(d) inviscous and moving
(e) viscous and moving.
Ans: e

22. An object having 10 kg mass weighs 9.81kg on a spring balance. The value of 'g' at this place is
(a) 10m/sec^2
(b) 9.81 m/sec^2
(c) 10.2/m sec
(d) 9.75 m/sec^2
(e) 9 m/sec .
Ans: a

23. The tendency of a liquid surface to contract is due to the following property
(a) cohesion
(b) adhesion
(c) viscosity
(d) surface tension
(e) elasticity.
Ans: d

24. The surface tension of mercury at normal temperature compared to that of water is
(a) more
(b) less
(c) same
(d) more or less depending on size of glass tube
(e) none of the above.
Ans: a

25. A perfect gas
(a) has constant viscosity
(b) has zero viscosity
(c) is in compressible
(d) is of theoretical interest
(e) none of the above.
Ans: e

26. For very great pressures, viscosity of moss gases and liquids
(a) remains same
(b) increases
(c) decreases
(d) shows erratic behavior
(e) none of the above.
Ans: d

27. A fluid in equilibrium can't sustain
(a) tensile stress

(b) compressive stress
(c) shear stress
(d) bending stress
(e) all of the above.
Ans: c

28. Viscosity of water in comparison to mercury is
(a) higher
(b) lower
(c) same
(d) higher/lower depending on temperature
(e) unpredictable.
Ans: a

29. The bulk modulus of elasticity with increase in pressure
(a) increases
(b) decreases
(c) remains constant
(d) increases first up to certain limit and then decreases
(e) unpredictable.
Ans: a

30. The bulk modulus of elasticity
(a) has the dimensions of 1/pressure
(b) increases with pressure
(c) is large when fluid is more compressible
(d) is independent of pressure and viscosity
(e) is directly proportional to flow.
Ans: b

31. A balloon lifting in air follows the following principle
(a) law of gravitation
(b) Archimedes principle
(c) principle of buoyancy
(d) all of the above
(e) continuity equation.
Ans: d

32. The value of the coefficient of compressibility for water at ordinary pressure and temperature in kg/cm is equal to
(a) 1000
(b) 2100
(c) 2700
(d) 10,000
(e) 21,000.
Ans: e

33. The increase of temperature results in
(a) increase in viscosity of gas
(b) increase in viscosity of liquid
(c) decrease in viscosity of gas
(d) decrease in viscosity of liquid
(e) (a) and (d) above.
Ans: d

34. Surface tension has the units of
(a) newtons/m
(b) newtons/m
(c) new tons/m
(d) newtons
(e) newton m.
Ans: c

35. Surface tension
(a) acts in the plane of the interface normal to any line in the surface
(b) is also known as capillarity
(c) is a function of the curvature of the interface
(d) decreases with fall in temperature
(e) has no units.
Ans: a

36. The stress strain relation of the Newton on fluid is
(a) linear
(b) parabolic
(c) hyperbolic
(d) inverse type
(e) none of the above.
Ans: a

37. A liquid compressed in cylinder has a volume of 0.04 m^3 at 50 kg/cm^2 and a volume of 0.039 m^3 at 150 kg/cm^2. The
bulk modulus of elasticity of liquid is
(a) 400 kg/cm^2
(b) 4000 kg/cm^2
(c) 40 x 105 kg/cm^2
(d) 40 x 106 kg/cm^2
(e) none of the above.
Ans: b

38. The units of viscosity are
(a) $metres^2$ per sec
(b) kg sec/metre
(c) newtonsec per $metre^2$
(d) newtonsec per meter
(e) none of the above.
Ans: b

39. Kinematic viscosity is dependent upon
(a) pressure
(b) distance
(c) level
(d) flow
(e) density.
Ans: e

40. Units of surface tension are
(a) energy/unit area
(b) distance
(c) both of the above
(d) it has no units
(e) none of the above.
Ans: c

41. Which of the following meters is not associated with viscosity?
(a) Red wood
(b) Say bolt
(c) Engler
(d) Orsat
(e) none of the above.
Ans: d

42. Choose the correct relationship
(a) specific gravity = gravity x density
(b) dynamic viscosity = kinematic viscosity x density
(c) gravity = specific gravity x density
(d) kinematic viscosity = dynamic viscosity x density
(e) hydrostatic force = surface tension x gravity.
Ans: b

43. Dimensions of surface tension are
(a) $MIL°T^2$
(b) $MIL°T^x$
(c) $MIL\ r^2$
(d) MIL^2T^2
(e) MIL°t.
Ans: a

44. For manometer, a better liquid combination is one having
(a) higher surface tension
(b) lower surface tension
(c) surface tension is no criterion
(d) high density and viscosity
(e) low density and viscosity.
Ans: a

45. If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be following cm of water
(a) 51 cm
(b) 50 cm
(c) 52 cm
(d) 52.2 cm
(e) 51.7 cm.
Ans: a

46. Choose the wrong statement.
Alcohol is used in manometer, because
(a) its vapour pressure is low
(b) it provides suitable meniscus for the inclined tube
(c) its density is less
(d) it provides longer length for a given pressure difference
(e) it provides accurate readings.
Ans: a

47. The property of fluid by virtue of which it offers resistance to shear is called
(a) surface tension
(b) adhesion
(c) cohesion
(d) viscosity
(e) all of the above.
Ans: d

48. Choose the wrong statement
(a) fluids are capable of flowing
(b) fluids conform to the shape of the containing vessels
(c) when in equilibrium, fluids cannot sustain tangential forces
(d) when in equilibrium, fluids can sustain shear forces
(e) fluids have some degree of comprehensibility and offer little resistance to form.
Ans: d

49. The density of water is 1000 kg/m3 at
(a) 0°C
(b) 0°K
(c) 4°C (d) 20°C
(e) all temperature.
Ans: c

50. Free surface of a liquid tends to contract to the smallest possible area due to force of
(a) surface tension
(b) viscosity
(c) friction
(d) cohesion
(e) adhesion.
Ans: a

51. A bucket of water is hanging from a spring balance. An iron piece is suspended into water without touching sides of
bucket from another support. The spring balance reading will
(a) increase
(b) decrease
(c) remain same
(d) increase/decrease depending on depth of immersion
(e) unpredictable.
Ans: c

52. Falling drops of water become spheres due to the property of
(a) adhesion
(b) cohesion
(c) surface tension
(d) viscosity
(e) compressibility.
Ans: c

53. A liquid would wet the solid, if adhesion forces as compared to cohesion forces are
(a) less
(b) more
(c) equal
(d) less at low temperature and more at high temperature
(e) there is no such criterion.
Ans: b

54. If cohesion between molecules of a fluid is greater than adhesion between fluid and glass, then the free level of fluid in a dipped glass tube will be
(a) higher than the surface of liquid
(b) the same as the surface of liquid
(c) lower than the surface of liquid
(d) unpredictable
(e) none of the above.
Ans: c

55. The point in the immersed body through which the resultant pressure of the liquid may be taken to act is known as
(a) meta center
(b) center of pressure
(c) center of buoyancy
(d) center of gravity
(e) none of the above.
Ans: b

56. The total pressure on the surface of a vertical sluice gate 2 m x 1 m with its top 2 m surface being 0.5 m below the
water level will be
(a) 500 kg
(b) 1000 kg
(c) 1500 kg

(d) 2000 kg
(e) 4000 kg.
Ans: d

57. The resultant upward pressure of a fluid on a floating body is equal to the weight of the fluid displaced by the body. This definition is according to

(a) Buoyancy
(b) Equilibrium of a floating body
(c) Archimedes' principle
(d) Bernoulli's theorem
(e) Metacentric principle.

Ans: c

58. The resultant upward pressure of the fluid on an immersed body is called

(a) upthrust
(b) buoyancy
(c) center of pressure
(d) all the above are correct
(e) none of above is correct.

Ans: b

59 Hydrometer is used to determine

(a) specific gravity of liquids
(b) specific gravity of solids
(c) specific gravity of gases
(d) relative humidity
(e) density.

Ans: a

60. The total energy of each particle at various places in the case of perfect incompressible fluid flowing in continuous stream

(d) keeps on increasing
(b) keeps on decreasing
(c) remains constant
(d) may increase/decrease
(e) unpredictable.

Ans: c

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Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	**Program Code:- ME**
Scheme:-I	**Semester:- 4**
Course:- Fluid Mechanics and Machinery	**Course Code:- 22445**

02 – Fluid flow	**Marks:-12**
Content of Chapter:- 2.1 Types of fluid flows-. Rotational. Irrotational, One, two and three dimensional flow. 2.2 Continuity equation, Bernoulli's theorem. 2.3 Venturimeter — Construction, principle of working, coefficient of discharge. Derivation for discharge through venturimeter. 2.4 Orifice meter — Construction, Principle of working, hydraulic coefficients. Derivation for discharge through Orifice meter 2.5 Pitot tube — Construction, Principle of Working	

1. When the flow parameters at any given instant remain same at every point, then flow is said to be
(a) quasi static
(b) steady state
(c) laminar
(d) uniform
(e) static.
Ans: d

2. A one dimensional flow is one which
(a) is uniform flow
(b) is steady uniform flow
(c) takes place in straight lines
(d) involves zero transverse component of flow
(e) takes place in one dimension.
Ans: d

3. To avoid an interruption in the flow of a syphon, an air vessel is provided
(a) at the inlet
(b) at the outlet
(c) at the summit
(d) ay nay point between inlet and outlet
(e) none of the above.

Ans: c

4. The continuity equation is connected with
(a) viscous/unviscous fluids
(b) compressibility of fluids
(c) conservation of mass
(d) steady/unsteady flow
(e) open channel/pipe flow.
Ans: c

5. Piezometer is used to measure
(a) pressure in pipe, channels etc.
(b) atmospheric pressure
(c) very low pressures
(d) difference of pressure between two points
(e) flow.
Ans: c

6. Which of the following instruments is used to measure flow on the application of Bernoulli's theorem
(a) Venturimeter
(b) Orifice plate
(c) nozzle
(d) pitot tube
(e) all of the above.
Ans: e

7. For measuring flow by a venturimeter, if should be installed in
(a) vertical line
(b) horizontal line
(c) inclined line with flow downward
(d) inclined line with upward flow\
(e) in any direction and in any location.
Ans: e

8. Rotameter is a device used to measure
(a) absolute pressure
(b) velocity of fluid
(c) flow
(d) rotation
(e) velocity of air.
Ans: c

9 Flow of water in a pipe about 3 metres in diameter can be measured by
(a) orifice plate
(b) venturi
(c) rotameter
(d) pitot tube
(e) nozzle

Ans: d

10. True one dimensional flow occurs when
(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline patterns are identical in each plane
(e) velocity, depth, pressure etc. change from point to point in the fluid flow.
Ans: a

11. An ideal flow of any fluid must satisfy
(a) Pascal law
(b) Newton's law of viscosity
(c) boundary layer theory
(d) continuity equation
(e) Bernoulli's theorem.
Ans: d

12. In the case of steady flow of a fluid, the acceleration of any fluid particle is
(a) constant
(b) variable
(c) zero
(d) zero under limiting conditions
(e) never zero.
Ans: c

13. Non uniform flow occurs when
(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline patterns are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: e

14. During the opening of a valve in a pipe line, the flow is
(a) steady
(b) unsteady
(c) uniform
(d) laminar
(e) free vortex type.
Ans: b

15. Uniform flow occurs when
(a) the flow is steady
(b) the flow is streamline
(c) size and shape of the cross section in a particular length remain constant
(d) size and cross section change uniformly along length
(e) flow occurs at constant fate.

Ans: c

16. Gradually varied flow is
(a) steady uniform
(b) non steady non uniform
(c) non steady uniform
(d) steady non uniform
(e) true one dimensional.
Ans: d

17. Steady flow occurs when
(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline patterns are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: b

18. The flow which neglects changes in a transverse direction is known as
(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: a

19. The flow in which each liquid particle has a definite path and their paths do not cross each other is called
(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: e

20. The flow in which conditions do not change with time at any point, is known as
(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: c

21. The flow in which the velocity vector is identical in magnitude and direction at every point, for any given instant, is known as
(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.

Ans: b

22. The flow in which the particles of a fluid attain such velocities that vary from point to point in magnitude and direction as well as from instant to instant, is known as
(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: d

23. Flow occurring in a pipeline when a valve is being opened is
(a) steady
(b) unsteady
(c) laminar
(d) vortex
(e) rotational.
Ans: b

24. General energy equation holds for
(a) steady flow
(b) turbulent flow
(c) laminar flow
(d) nonuniform flow
(e) all of the above.
Ans: d

25. A streamline is defined as the line
(a) parallel to central axis flow
(b) parallel to outer surface of pipe
(c) of equal yelocity in a flow
(d) along which the pressure drop is uniform
(e) which occurs in all flows.
Ans: c

26. Two dimensional flow occurs when
(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline patterns
are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: d

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Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	**Program Code:- ME**
Scheme:-I	**Semester:- 4**
Course:- Fluid Mechanics and Machinery	**Course Code:- 22445**

03 – Flow through pipes	**Marks:-12**
Contents of Chapter:- 3.1 Laws of fluid friction for Laminar and turbulent flow; Darcy's equation and Chezy's equation for frictional losses. 3.2 Minor losses in pipe fittings and valves; Hydraulic gradient line and total energy line. 3.3. Hydraulic power transmission through pipe. 3.4 Water hammer phenomenon inpipes, causes and remedial measures.	

1. To avoid vaporization in the pipe line, the pipe line over the ridge is laid such that it is not more than
(a) 2.4 m above the hydraulic gradient
(b) 6.4 m above the hydraulic gradient
(c) 10.0 m above the hydraulic gradient
(d) 5.0 above the hydraulic gradient
(e) none of the above.
Ans: b

2. The continuity equation is connected with
(a) viscous/unviscous fluids
(b) compressibility of fluids
(c) conservation of mass
(d) steady/unsteady flow
(e) open channel/pipe flow.
Ans: c

3. Barometer is used to measure
(a) pressure in pipes, channels etc.
(b) atmospheric pressure
(c) very low pressure
(d) difference of pressure between two points
(e) rain level.
Ans: b

4. A square surface 3 m x 3 m lies in a vertical line in water pipe its upper edge at water surface. The hydrostatic force on square surface is
(a) 9,000 kg
(b) 13,500 kg
(c) 18,000 kg
(d) 27,000 kg
(e) 30,000 kg.
Ans: b

5 Flow of water in a pipe about 3 metres in diameter can be measured by
(a) orifice plate
(b) venturi
(c) rotameter
(d) pitot tube
(e) nozzle
Ans: d

6. During the opening of a valve in a pipe line, the flow is
(a) steady
(b) unsteady
(c) uniform
(d) laminar
(e) free vortex type.
Ans: b

7. Flow occurring in a pipeline when a valve is being opened is
(a) steady
(b) unsteady
(c) laminar
(d) vortex
(e) rotational.
Ans: b

8. Reynolds number is significant in
(a) supersonics, as with projectile and jet propulsion
(b) full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.
(c) simultaneous motion through two fluids where there is a surface of discontinuity, gravity forces, and wave making effect, as with ship's hulls
(d) all of the above
(e) none of the above.
Ans: b

9. For pipes, laminar flow occurs when Reynolds number is
(a) less than 2000
(b) between 2000 and 4000
(c) more than 4000
(d) less than 4000
(e) none of the above.
Ans: a

10. In order that flow takes place between two points in a pipeline, the differential pressure between these points must be more than
(a) frictional force
(b) viscosity
(c) surface friction
(d) all of the above
(e) none of the above.
Ans: d

11. At the center line of a pipe flowing under pressure where the velocity gradient is zero, the shear stress will be
(a) minimum
(b) maximum
(c) zero
(d) negative value
(e) could be any value.
Ans: e

12. Two pipe systems can be said to be equivalent, when the following quantities are same
(a) friction loss and flow
(b) length and diameter
(c) flow and length
(d) friction factor and diameter
(e) velocity and diameter.
Ans: a

13. For pipes, turbulent flow occurs when Reynolds number is
(a) less than 2000
(b) between 2000 and 4000
(c). more than 4000
(d) less than 4000
(e) none of the above.
Ans: c

14. Which one of the following is a major loss?
a) frictional loss
b) shock loss
c) entry loss
d) exit loss
Answer: a
Explanation: The major loss for the flow through the pipes is due to the frictional resistance between adjacent fluid layers sliding over each other. All other losses are considered to be minor losses.

15. Which property of the fluid accounts for the major losses in pipes?
a) density
b) specific gravity
c) viscosity

d) compressibility
Answer: c
Explanation: The major loss for the flow through the pipes is due to the frictional resistance between adjacent fluid layers sliding over each other. This resistance arises due to the presence of viscous property of the fluid.

16. The frictional resistance for fluids in motion is
a) proportional to the velocity in laminar flow and to the square of the velocity in turbulent flow
b) proportional to the square of the velocity in laminar flow and to the velocity in turbulent flow
c) proportional to the velocity in both laminar flow and turbulent flow
d) proportional to the square of the velocity in both laminar flow and turbulent flow
Answer: a
Explanation: According to the laws of fluid friction, rf / v (for steady streamline flow) and rf / v^2(for turbulent flow), where rf is the frictional resistance and v is the velocity of flow.

17. The frictional resistance for fluids in motion is
a) dependent on the pressure for both laminar and turbulent flows
b) independent of the pressure for both laminar and turbulent flows
c) dependent on the pressure for laminar flow and independent of the pressure for turbulent flow
d) independent of the pressure for laminar flow and dependent on the pressure for turbulent flow
Answer: b
Explanation: According to the laws of fluid friction, the frictional resistance is independent of the pressure for both laminar and turbulent flows.

18. The frictional resistance for fluids in motion is
a) inversely proportional to the square of the surface area of contact
b) inversely proportional to the surface area of contact
c) proportional to the square of the surface area of contact
d) proportional to the surface area of contact
Answer: d
Explanation: According to the laws of fluid friction, the frictional resistance is proportional to the surface area of contact for both laminar and turbulent flows.

19. The frictional resistance for fluids in motion varies
a) slightly with temperature for both laminar and turbulent flows
b) considerably with temperature for both laminar and turbulent flows
c) slightly with temperature for laminar flow and considerably with temperature for turbulent flow
d) considerably with temperature for laminar flow and slightly with temperature for turbulent flow
Answer: d
Explanation: According to the laws of fluid friction, the frictional resistance for fluids in motion varies considerably with temperature for laminar flow and slightly with temperature for turbulent flow.

20. Which one of the following is correct?
a) the frictional resistance depends on the nature of the surface area of contact
b) the frictional resistance is independent of the nature of the surface area of contact
c) the frictional resistance depends on the nature of the surface area of contact for laminar flows but is independent of the nature of the surface area of contact for turbulent flows
d) the frictional resistance is independent of the nature of the surface area of contact for laminar flows but depends on the nature of the surface area of contact for turbulent flows

Answer: d
Explanation: According to the laws of fluid friction, the frictional resistance is independent of the nature of the surface area of contact for laminar flows but depends on the nature of the surface area of contact for turbulent flows.
21. Which one of the following is correct?
a) the frictional resistance is always dependent on the nature of the surface area of contact
b) the frictional resistance is always independent of the nature of the surface area of contact
c) the frictional resistance is dependent on the nature of the surface area of contact when the liquid flows at a velocity less than the critical velocity
d) the frictional resistance is independent of the nature of the surface area of contact when the liquid flows at a velocity less than the critical velocity
Answer: d
Explanation: Frictional resistance is dependent on the nature of the surface area of contact. But, when the liquid flows at a velocity less than the critical velocity, a thin stationary film of the liquid is formed on the supporting surface. Hence, the frictional resistance becomes independent of the nature of the surface of contact.

22. Which one of the following is correct?
a) Darcy-Weisbach's formula is generally used for head loss in flow through both pipes and open channels
b) Chezy's formula is generally used for head loss in flow through both pipes and open channels
c) Darcy-Weisbach's formula is generally used for head loss in flow through both pipes and Chezy's formula for open channels
d) Chezy's formula is generally used for head loss in flow through both pipes and Darcy-Weisbach's formula for open channels
Answer: c
Explanation: Darcy-Weisbach's formula is generally used for head loss in flow through both pipes as it takes into consideration the flow velocity whereas Chezy's formula is used for open channels as it considers the pressure difference.

23. A liquid flows through pipes 1 and 2 with the same flow velocity. If the ratio of their pipe diameters d1 : d2 be 3:2, what will be the ratio of the head loss in the two pipes?
a) 3:2
b) 9:4
c) 2:3
d) 4:9
Answer: c
Explanation: According to Darcy-Weisbach's formula, fluid-mechanics-questions-answers-loss-ead-pipes where hf is the head loss in the pipe, f is the co-efficient of friction, L is the length, D is the diameter and V is the flow velocity. Thus, hf1 : hf2 = D2 : D1 = 2 : 3.

24. A liquid flowss through two similar pipes 1 and 2. If the ratio of their flow velocities v1 : v2 be 2:3, what will be the ratio of the head loss in the two pipes?
a) 3:2
b) 9:4
c) 2:3
d) 4:9
Answer: d
Explanation: According to Darcy-Weisbach's formula, where hf is the head loss in the pipe, f is the co-efficient of friction, L is the length, D is the diameter and V is the flow velocity. Thus, hf1 : hf2 = v1 : v2 = 4 : 9.

25. A liquid flows with the same velocity through two pipes 1 and 2 having the same diameter. If the length of the second pipe be twice that of the first pipe, what should be the ratio of the head loss in the two pipes?
a) 1:2
b) 2:1
c) 1:4
d) 4:1
Answer: a
Explanation: According to Darcy-Weisbach's formula,
where hf is the head loss in the pipe, f is the co-efficient of friction, L is the length, D is the diameter and V is the flow velocity. Thus, hf1 : hf2 = L1 : L2 = 1 : 2.

26. The head loss at the entrance of the pipe is that at it's exit
a) equal to
b) half
c) twice
d) four times
Answer: b
Explanation: According to Darcy-Weisbach's formula, hi = o.5v2 / 2g and ho = v2 / 2g, where hi is the head loss at pipe entrance, ho is the head loss at pipe exit and v is the flow velocity. Thus hi = 0.5ho.

27. On which of the factors does the co-efficient of bend in a pipe depend?
a) angle of bend and radius of curvature of the bend
b) angle of bend and radius of the pipe
c) radius of curvature of the bend and pipe
d) radius of curvature of the bend and pipe and angle of bend
Answer: d
Explanation: The co-efficent of bend in a pipe depends on all the three parameters – radius of curvature of the bend, diameter (radius) of the pipe and angle of bend.

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Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	Program Code:- ME
Scheme:-I	Semester:- 4
Course:- Fluid Mechanics and Machinery	Course Code:- 22445

04 – Impact of Jet	Marks:-08
Content of Chapter:- 4.1 Impact of jet on fixed vertical, moving vertical flat plates. 4.2. Impact of jet on curved vanes with special reference to turbines and Pumps.	

1. Force exerted by a jet on a stationery plate happens in how many cases?
a) 3 cases
b) 2 cases
c) 1 case
d) Nil
Answer: a
Explanation: Force exerted by a jet on a stationery plate happens in three cases. The three cases are classified depending on their position. The three cases are when plate is vertical, plate is inclined and plate is curved with respect to the jet.

2. Force exerted by a jet on a moving plate happens in how many cases?
a) 3 cases
b) 2 cases
c) 1 case
d) Nil
Answer: a
Explanation: Force exerted by a jet on a moving plate happens in three cases. The three cases are classified depending on their position. The three cases are when the plate is vertical, plate is inclined and plate is curved with respect to the jet.

3. In a stationery vertical plate, the jet after striking the plate will move _____
a) In opposite direction
b) Along the plate
c) Perpendicular to the plate
d) Parallel to the plate
Answer: b
Explanation: In a stationery vertical plate, the jet after striking the plate will move along the plate. It moves with respect to the angles that are developed with the plate.

4. At what angle does the jet deflect after striking a stationery vertical plate?
a) 30
b) 60
c) 90
d) 0
Answer: c
Explanation: In a stationery vertical plate, the jet after striking the plate will move along the plate. It moves with respect to the angles that are developed with the plate. Hence, after striking the plate it will get deflected at an angle of 90 degrees.

5. The velocity component after striking the surface will be_____
a) One
b) Zero
c) Infinity
d) Negative
Answer: b
Explanation: In a stationery vertical plate, the jet after striking the plate will move along the plate. It moves with respect to the angles that are developed with the plate. The velocity component after striking the surface will be zero.

6. Which among the following is the formula for Force when it strikes the plate?
a) pav
b) pav
c) pa
d) maE
Answer: a
Explanation: The rate of change of momentum in the direction of the force is given by the formula pav Where p = Density of the fluid flow, a = acceleration of the fluid particle and v= velocity of the fluid flowing.

7. The mass of water per sec striking the plate is_____
a) pav^2
b) pav
c) pa
d) maE
Answer: b
Explanation: The mass of water per sec striking the plate is given by pav. Where p = Density of the fluid flow, a = acceleration of the fluid particle and v = velocity of the fluid flowing. Thus, the correct option is pav.

8. A jet strikes a curved plate at its _____
a) Sides
b) Surface
c) Centre
d) Does not strike
Answer: c

Explanation: A jet strikes a curved plate at its center. Force exerted by a jet on a stationery plate happens in three cases. The three cases are classified depending on their position. The three cases are when plate is vertical, plate is inclined and plate is curved with respect to the jet.

9. During a weak jump, the value of Froude lies in between_____
a) 1 to 2.5
b) 2.5 to 3.5
c) Less than 1
d) Zero
Answer: a
Explanation: Weak jump is a jump that takes place, when the Froude's number lies in between 1to 2.5. The surfaces that result due to weak jump have a very little energy dissipated. Thus, option1 to 2.5 is the correct one.

10. A jet after striking a smooth plate comes out with a _____ velocity.
a) Increased
b) Decreased
c) Same
d) Zero
Answer: c
Explanation: Force exerted by a jet on a stationery plate happens in three cases. The three cases are classified depending on their position. After it strikes a smooth plate, its velocity remains the same.

11. Component of velocity in direction of jet is -VCosθ
a) True
b) False
Answer: a
Explanation: Component of velocity in direction of jet is -VCosθ. The negative sign indicates that the taken velocity at the outlet is opposite to the jet of water coming out from the nozzle. Thus, it is true.

12. Jet propulsion is a method of generating propulsive force by reaction of _____
a) Accelerating mass
b) Volume
c) Mass flow rate
d) Velocity
Answer: a
Explanation: Force exerted by a jet on a stationery plate happens in three cases. The three cases are classified depending on their position. Jet propulsion is a method of generating propulsive force by reaction of accelerating mass.

13. The propulsive force drives the jet in the _____
a) Backward direction
b) Forward direction
c) Perpendicular direction

d) Parallel movement
Answer: b
Explanation: Force exerted by a jet on a moving plate happens in three cases. The three cases are classified depending on their position. The propulsive force drives the jet in the forward direction. A good example is the aircraft or a boat.

14. In a stationery vertical plate, the jet after striking the plate will move _____
a) In opposite direction
b) Along the plate
c) Perpendicular to the plate
d) Parallel to the plate
Answer: b
Explanation: In a stationery vertical plate, the jet after striking the plate will move along the plate.It moves with respect to the angles that are developed with the plate.

15. Principle of fluid mechanics works on the utilization of_____
a) Accelerating mass
b) Volume
c) Work
d) Velocity
Answer: c
Explanation: The Principle of fluid mechanics works on the utilization of useful work. The workingis based on the force exerted by a fluid jet striking the surface and moving over a series of vanes about its axis.

16. The propulsive force drives the jet in the _____
a) Backward direction
b) Forward direction
c) Perpendicular direction
d) Parallel movement
Answer: b
Explanation: Force exerted by a jet on a moving plate happens in three cases. The three cases are classified depending on their position. The propulsive force drives the jet in the forward direction. A good example is the aircraft or a boat.

17. The force analysis on a curved vane is understood using_____
a) Velocity triangles
b) Angle of the plate
c) Vane angles
d) Plate dimensions
Answer: a
Explanation: The force analysis on a curved vane is understood using clearly using the study of velocity triangles. There are two types of velocity triangles, inlet velocity triangle and outlet velocity triangle.

18. Jet propulsion works on the principle of_____
a) Newton's first law
b) Newton's second law

c) Newton's third law
d) Thermodynamic properties
Answer: c
Explanation: Jet propulsion works on the principle of Newton's third law. Newton's third law states that for every action, there is an equal and opposite reaction. Thus, the correct option is Newton's third law.

19. How is absolute velocity at inlet denoted?
a) V
b) V
c) C
d) v
Answer: b
Explanation: In a jet propulsion, V stands for absolute velocity at the inlet. The main application in which this equation is applied is for a jet propulsion in the tank with orifice. Thus, the correct option is 'b'.

20. The relative velocity is obtained by the equation_____
a) u – V
b) V1
c) u*V
d) u/V
Answer: a
Explanation: The relative velocity of the jet is denoted as V. It is the relative velocity at the inlet tothe vane. Relative velocity of inlet to the vane is obtained by subtracting vectorially the velocity of the vane with its absolute velocity.

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Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	**Program Code:- ME**
Scheme:-I	**Semester:- 4**
Course:- Fluid Mechanics and Machinery	**Course Code:- 22445**

05 – Hydraulic turbines	**Marks:-14**
Content of Chapter:- 5.1 Layout and features of hydroelectric power plant, surge tanks and its need. 5.2 Classification of hydraulic turbines and their applications. 5.3 Construction and working principle of Pelton wheel. Francis and Kaplan turbine. 5.4 Draft tubes — types and construction. Concept of cavitation in turbines. Calculation of Work done. Power. efficiency of turbine.	

1. Low specific speed of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: c

2. Any change in load is adjusted by adjusting following parameter on turbine
(a) net head
(b) absolute velocity
(c) blade velocity
(d) flow
(e) relative velocity of flow at inlet.
Ans: d

3. Runaway speed of a hydraulic turbine is
(a) full load speed
(b) the speed at which turbine runner will be damaged
(c) the speed if the turbine runner is allowed to revolve freely without load and with the wicket gates wide open
(d) the speed corresponding to maximum overload permissible
(e) none of the above.
Ans: c

4. The maximum number of jets generally employed in impulse turbine without jet interference is
(a) 4
(b) 6
(c) 8
(d) 12
(e) 16.
Ans: b

5. Medium specific speea of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: b

6. High specific speed of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: a

7. The specific speed of turbine is defined as the speed of a unit
(a) of such a size that it delivers unit discharge at unit head
(b) of such a size that it delivers unit discharge at unit power
(c) of such a size that it requires unit power per unit head
(d) of such a size that it produces unit horse power with unit head
(e) none of the above.
Ans: d

8. Pick up the wrong statement about centrifugal pump
(a) discharge a diameter
(b) head α speed^2
(c) head α diameter
(d) Power α speed^3
(e) none of the above is wrong.
Ans: a

9. A turbine pump is basically a centrifugal pump equipped additionally with
(a) adjustable blades
(b) backward curved blades
(c) vaned diffusion casing
(d) inlet guide blades
(e) totally submerged operation facility.
Ans: c

10. Casting of a centrifugal pump is designed so as to minimize
(a) friction loss
(b) cavitation
(c) static head
(d) loss of kinetic energy
(e) starting time.
Ans: d

11. In reaction turbine, draft tube is used
(a) to transport water downstream without eddies
(b) to convert the kinetic energy to flow energy by a gradual expansion of the flow crosssection
(c) for safety of turbine
(d) to increase flow rate
(e) none of the above.
Ans: b

12. Guide angle as per the aerofoil theory of Kaplan turbine blade design is defined as the angle between
(a) lift and resultant force
(b) drag and resultant force
(c) lift and tangential force
(d) lift and drag
(e) resultant force and tangential force.
Ans: a

13. Francis turbine is best suited for
(a) medium head application from 24 to 180 m
(b) low head installation up to 30 m
(c) high head installation above 180 m
(d) all types of heads
(e) none of the above.
Ans: a

14. Impulse turbine is generally fitted
(a) at the level of tail race
(b) little above the tail race
(c) slightly below the tail race
(d) about 2.5 m above the tail race to avoid cavitation
(e) about 2.5 m below the tail race to avoid cavitation.
Ans: b

15. Francis, Kaplan and propeller turbines fall under the category of
(a) Impulse turbines
(b) Reaction turbines
(c) Axial flow turbines
(d) Mixed flow turbines
(e) Reaction cum impulse turbines.
Ans: b

16. Reaction turbines are used for
(a) low head
(b) high head
(c) high head and low discharge
(d) high head and high discharge
(e) low head and high discharge.
Ans: e

17. The discharge through a reaction turbine with increase in unit speed
(a) increases
(b) decreases
(c) remains unaffected
(d) first increases and then decreases
(e) first decreases and then increases.
Ans: b

18. The angle of taper on draft tube is
(a) greater than 15°
(b) greater than 8°
(c) greater than 5°
(d) less than 8°
(e) less than 3°.
Ans: d

19. Specific speed for reaction turbines ranges from
(a) 0 to 4.5
(b) 10 to 100
(c) 80 to 200
(d) 250 to 300
(e) none of the above.
Ans: b

20. In axial flow fans and turbines, fluid enters and leaves as follows
(a) radially, axially
(b) axially, radially
(c) axially, axially
(d) radially, radially
(e) combination of axial and radial.
Ans: c

21. Which place in hydraulic turbine is most susceptible for cavitation
(a) inlet of draft rube
(b) blade inlet
(c) guide blade
(d) penstock
(e) draft tube exit.
Ans: a

22. Hydraulic energy is converted into another form of energy by hydraulic machines. What form of energy is that?
a) Mechanical Energy
b) Electrical Energy
c) Nuclear Energy
d) Elastic Energy
Answer: a
Explanation: Hydraulic machines firstly convert the energy possessed by water into mechanical energy. Later it can be transformed into electrical energy.

23. Which principle is used in Hydraulic Turbines?
a) Faraday law
b) Newton's second law
c) Charles law
d) Braggs law
Answer: b
Explanation: A Hydraulic Machine uses the principle of momentum which states that a force is generated which is utilized in a turbine.

24. Buckets and blades used in a turbine are used to:
a) Alter the direction of water
b) Switch off the turbine
c) To regulate the wind speed
d) To regenerate the power
Answer: a
Explanation: Turbines use blades and buckets to alter the direction of water. It is used to change the momentum of water. As momentum changes, force is produced to rotate the shaft of a hydraulic machine.

25. _____is the electric power obtained from the energy of the water.
a) Roto dynamic power
b) Thermal power
c) Nuclear power
d) Hydroelectric power
Answer: d
Explanation: The energy from the energy of water is also called hydro power. The electric power so obtained is known as hydroelectric power.

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Question Bank for Multiple Choice Questions

Program: Diploma in Mechanical engineering	**Program Code:- ME**
Scheme:-I	**Semester:- 4**
Course:- Fluid Mechanics and Machinery	**Course Code:- 22445**

06 – Pumps	**Marks:-16**
Content of Chapter:- 6.1 Centrifugal Pumps: Construction, principle of working, priming methods and Cavitation: Types of casings and impellers; Static head Manometric head, Work done, Manometric efficiency, Overall efficiency. Numericals based on above parameters, NPSH, Performance Characteristics of Centrifugal pumps and its trouble shooting, Construction, working and applications of multistage pumps. Working principle and applications of Submersible pumps and Jet pump 6.2 Reciprocating Pump: Construction, working principle and applications of single and double acting reciprocating pumps; Slip, Negative slip, Cavitation and separation. Use of Air Vessels; Indicator diagram with effect of acceleration head and frictional head; Pump selection criteria- head, discharge	

1. Reciprocating pumps are no more to be seen in industrial applications (in comparison to centrifugal pumps) because of
(a) high initial and maintenance cost
(b) lower discharge
(c) lower speed of operation
(d) necessity of air vessel
(e) all of the above.
Ans: a

2. In a centrifugal pump casing, the flow of water leaving the impeller, is
(a) rectilinear flow
(b) radial flow
(c) free vortex motion
(d) forced vortex
(e) none of the above.
Ans: c

3. Head developed by a centrifugal pump depends on
(a) impeller diameter
(b) speed
(c) fluid density
(d) type of casing
(e) (a) and (b) above.
Ans: e

4. For starting an axial flow pump, its delivery valve should be
(a) closed
(b) open
(c) depends on starting condition and flow desired
(d) could be either open or closed
(e) partly open and partly closed.
Ans: b

5. The efficiency of a centrifugal pump is maximum when its blades are
(a) straight
(b) bent forward
(c) bent backward
(d) bent forward first and then backward
(e) bent backward first and then forward.
Ans: c

6. In a centrifugal pump casing, the flow of water leaving the
(a) radial
(b) radial
(c) centrifugal
(d) rectilinear
(e) vortex.
Ans: e

7. Centrifugal pump is started with its delivery valve
(a) kept fully closed
(b) kept fully open
(c) irrespective of any position
(d) kept 50% open
(e) none of the above.
Ans: a

8. Axial flow pump is started with its delivery valve
(a) kept fully closed
(b) kept fully open
(c) irrespective of any position
(d) kept 50% open
(e) none of the above.
Ans: b

9. When a piping system is made up primarily of vertical lift and very little pipe friction, the pump characteristics should be
(a) horizontal
(b) nearly horizontal
(c) steep
(d) first rise and then fall
(e) none of the above.
Ans: c

10. One horsepower is equal to
(a) 102 watts
(b) 75 watts
(c) 550 watts
(d) 735 watts
(e) 33000 watts.
Ans: d

11. Multistage centrifugal pumps are used to obtain
(a) high discharge
(b) high head
(c) pumping of viscous fluids
(d) high head and high discharge
(e) high efficiency.
Ans: b

12. When a piping system is made up primarily of friction head and very little of vertical lift, then pump characteristics should be
(a) horizontal
(b) nearly horizontal
(c) steep
(d) first rise and then fall
(e) none of the above.
Ans: b

13. In a single casing, multistage pump running at constant speed, the capacity rating is to be slightly lowered. It can be done by
(a) designing new impeller
(b) trimming the impeller size to the required size by machining
(c) not possible
(d) some other alterations in the impeller
(e) none of the above.
Ans: b

14. If a pump is handling water and is discharging a certain flow Q at a constant total dynamic head requiring a definite B.H.P., the same pump when handling a liquid of specific gravity 0.75 and viscosity nearly same as of water would discharge
(a) same quantity of liquid
(b) 0.75 Q
(c) Q/0.75
(d) 1.5 Q
(e) none of the above.
Ans: a

15. The horse power required in above case will be
(a) same

(b) 0.75 B.H.P.
(c) B.H.P./0.75
(d) 1.5 B.H.P.
(e) none of the above.
Ans: b

16. Low specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: a

17. The optimum value of vane exit angle for a centrifugal pump impeller is
(a) 1015°
(b) 2025°
(c) 3040°
(d) 5060°
(e) 8090°.
Ans: b

18. In a centrifugal pump, the liquid enters the pump
(a) at the top
(b) at the bottom
(c) at the center
(d) from sides
(e) none of the above.
Ans: c

19. For small discharge at high pressure, following pump is preferred
(a) centrifugal
(b) axial flow
(c) mixed flow
(d) propeller
(e) reciprocating.
Ans: e

20. In centrifugal pumps, maximum efficiency is obtained when the blades are
(a) straight
(b) bent forward
(c) bent backward
(d) radial
(e) given aerofoil section.
Ans: c

21. Motion of a liquid in a volute casing of a centrifugal pump is an example of
(a) rotational flow
(b) radial
(c) forced spiral vortex flow

(d) forced cylindrical vortex flow
(e) spiral vortex flow.
Ans: e

22. For very high discharge at low pressure such as for flood control and irrigation applications, following type of pump is preferred
(a) centrifugal
(b) axial flow
(c) reciprocating
(d) mixed flow
(e) none of the above.
Ans: b

23. Medium specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: b

24. High specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: c

25. Indicator diagram of a reciprocating pump is a graph between
(a) flow vs swept volume
(b) pressure in cylinder vs swept volume
(c) flow vs speed
(d) pressure vs speed
(e) swept volume vs speed.
Ans: b

26. Casting of a centrifugal pump is designed so as to minimize
(a) friction loss
(b) cavitation
(c) static head
(d) loss of kinetic energy
(e) starting time.
Ans: d

27. The flow rate in gear pump
(a) increases with increase in pressure
(b) decreases with increase in pressure
(c) more or less remains constant with increase
in pressure

(d) unpredictable
(e) none of the above.
Ans: c

28. Air vessels in reciprocating pump are used to
(a) smoothen flow
(b) reduce acceleration to minimum
(c) increase pump efficiency
(d) save pump from cavitation
(e) increase pump head.
Ans: b

29. Saving of work done and power by fitting an air vessel to single acting reciprocating pump is of the order of
(a) 39.2%
(b) 49.2%
(c) 68.8%
(d) 84.8%
(e) 91.6%.
Ans: d

30. Saving of work done and power by fitting an air vessel to double acting reciprocating pump is of the order of
(a) 39.2%
(b) 49.2%
(c) 68.8%
(d) 84.8%
(e) 91.6%.
Ans: a

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