

- 36.** Reynolds number is significant in
- supersonics, as with projectile and jet propulsion
 - full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.
 - simultaneous motion through two fluids where there is a surface of discontinuity, gravity forces, and wave making effect, as with ship's hulls
 - all of the above
- 37.** A streamline is defined as the line
- parallel to central axis flow
 - parallel to outer surface to pipe
 - of equal velocity in a flow
 - along which the pressure drop is uniform
- 38.** The cipoletti weir functions as if it were a following notch without end contractions
- triangular notch
 - trapezoidal notch
 - rectangular notch
 - parallelogram notch
- 39.** The losses in an open channel vary
- as the velocity
 - as the square of velocity
 - as the cube of velocity
 - inversely with a gradient
- 40.** For an irrotational flow the equation $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2}$ is known as
- Bernouli's equation
 - Cauchy Riemann's equation
 - Euler's equation
 - Laplace equation.
- 41.** Separation of flow occurs due to reduction of pressure gradient to
- zero
 - negligibly low value
 - the extent such that vapour formation starts
 - none of the above
- 42.** A stepped notch is
- a notch of varying shapes along the line of flow
 - semi-elliptical in section
 - a combination of triangular and a circular section
 - a combination of rectangular notches of different sizes
- 43.** The magnitude of water hammer depends on the
- length of pipeline
 - speed at which the valve is closed
 - elastic properties of the liquid flowing through the pipe and pipe material
 - all of the above
- 44.** Mercury is suitable for manometers because it
- has high density
 - it can easily be seen in tube
 - does not stick to tube walls
 - it is generally not used in manometers
- 45.** A critical depth meter is always associated with
- surge
 - water hammer
 - hydraulic jump
 - steep gradient
- 46.** When the water flows over a rectangular suppressed weir, the pressure beneath the nappe is
- very high
 - slightly above atmospheric
 - atmospheric
 - negative
- 47.** The continuity equation of flow is based on the principle of conservation of
- momentum
 - mass
 - energy
 - none of these
- 48.** A simple pilot tube is used to measure
- pressure in a static fluid
 - velocity in a flowing stream
 - total pressure
 - dynamic pressure
- 49.** Head loss in turbulent flow in pipe varies directly as the
- square root of velocity
 - velocity
 - square of velocity
 - cube root of velocity
- 50.** Velocity of fluid particle at the centre of pipe section is
- maximum
 - minimum
 - average
 - r.m.s.
- 51.** Froude number is useful in the calculations of
- water hammer
 - flow through pipes
 - hydraulic jump
 - surface tension
- 52.** Hammer blow in pipe occurs when
- pipe bursts under high fluid pressure
 - excessive leakages occurs in pipe
 - flow of fluid through pipe is gradually brought to rest by the closing of valve
 - flow of fluid through pipe is suddenly brought to rest by the closing of the valve.

5.46 Hydraulics

53. Tranquil flow must always occur
(a) at normal depth (b) above normal depth
(c) below normal depth (d) above critical depth.
54. Stream lines, streak lines and path lines are all identical in the case of
(a) uniform flow (b) non-uniform flow
(c) unsteady flow (d) steady flow
55. Euler equation of motion can be integrated when it is assumed that
(a) fluid is incompressible
(b) Bernoulli's equation is satisfied
(c) continuity equation is satisfied
(d) velocity potential exists and the density is constant
56. Boundary layer separation is caused by
(a) reduction of pressure gradient to zero
(b) an adverse pressure gradient
(c) sudden entrapping of air
(d) rough surface conditions
57. In laminar flow
(a) experimentation is required for the simplest flow cases
(b) Newton's law of viscosity applies
(c) fluid particles move in irregular and haphazard paths
(d) viscosity is unimportant
58. The purpose of surge tank in a pipe line is to
(a) smoothen the flow of water
(b) minimise friction losses in pipe
(c) prevent occurrence of hydraulic jump
(d) relieve pressure due to water hammer
59. An air vessel is provided at the summit in a syphon to
(a) regulate the flow
(b) increase discharge
(c) increase velocity
(d) avoid an interruption in the flow
60. The Ratio inertia forces to surface tension force gives a non-dimensional number called
(a) Weber number (b) Cauchy number
(c) Euler number (d) Froude number
61. Process of diffusion of one liquid into other through a semi-permeable membrane is called
(a) viscosity (b) osmosis
(c) surface tension (d) cohesion
62. Dynamic viscosity of most of the gases with rise in temperature
(a) increases (b) decreases
(c) remains same (d) unpredictable
63. To replace a compound pipe by a new pipe, the pipes will be equivalent when both the pipes have same
(a) length and flow
(b) diameter and flow
(c) loss of head and flow
(d) length and loss of head
64. Free surface of a liquid behaves like a sheet and tends to contract to smallest possible area due to the force of
(a) adhesion (b) cohesion
(c) friction (d) diffusion
65. 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) same as the surface of liquid
(c) lower than the surface of liquid
(d) unpredictable
66. The point in the immerse body through which the resultant pressure of the liquid may be taken to act is known as
(a) metacentre (b) centre of pressure
(c) centre of buoyancy (d) centre of gravity
67. For pipe flows, at constant diameter, head is proportional to
(a) flow (b) $(\text{flow})^2$
(c) $(\text{flow})^3$ (d) $(\text{flow})^{-1}$
68. The difference of pressure between inside and the outside of a liquid drop is
(a) $p = T \times r$ (b) $p = \frac{T}{r}$
(c) $p = \frac{T}{2r}$ (d) $p = \frac{2T}{r}$
69. Capillary rise at 20°C in a clean glass tube of 1 mm bore containing water is approx.
(a) 1 mm (b) 5 mm
(c) 15mm (d) 30mm
70. Unsteady uniform flow is flow through
(a) an expanding tube at an increasing rate
(b) an expanding tube at constant rate
(c) a long pipe at decreasing rate
(d) a long pipe at constant rate
71. A balloon lifting in-air follows the
(a) law of gravitation
(b) Archimedes principle
(c) principle of buoyancy
(d) all of the above

72. Surface tension

- (a) acts in the plane of 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

73. Viscosity of water in comparison to mercury is

- (a) higher
- (b) lower
- (c) same
- (d) unpredictable

74. Hydraulic grade line as compared to the centre line of conduit

- (a) should always above
- (b) should always below
- (c) should always be parallel
- (d) may be above or below

75. Area velocity relation for incompressible fluid is

$$\frac{dA}{A} = -\frac{dV}{V}$$

From this relation it can be concluded that

- (a) if the area increases, velocity increases
- (b) if the area reduces, velocity increases
- (c) there are no critical values
- (d) none of the above

76. Velocity in a 2 cm-diameter pipe is 20 m/s. If the pipe diameter enlarges to 5 cm, velocity in m/s will be

- (a) 50
- (b) 6.4
- (c) 4.8
- (d) 3.2

77. Speed of a submarine can be measured by

- (a) Pitot tube
- (b) Hot wire anemometer
- (c) Pirani gauge
- (d) Inclined manometer

78. Thickness of laminar boundary layer at a distance x from the leading edge over flat plate varies as

- (a) x
- (b) x^2
- (c) $x^{1/2}$
- (d) $x^{4/5}$

79. Thickness of turbulent boundary layer at a distance x from the leading edge over a flat plate varies as

- (a) $x^{4/5}$
- (b) $x^{5/4}$
- (c) $x^{2/5}$
- (d) $x^{5/3}$

80. The shear stress in a turbulent pipe flow

- (a) varies parabolically with radius
- (b) is constant over the pipe radius
- (c) varies according to $\frac{1}{7}$ th power law
- (d) is zero at the centre and increased linearly to the wall

81. The viscosity of a fluid varies with

- (a) temperature
- (b) temperature and pressure
- (c) pressure
- (d) density

82. Portion of the power canal that extends from intake works to power house, is known as

- (a) Lead race
- (b) Main storage
- (c) Diversion canal
- (d) Head race

83. The turbine that cannot be installed in high plant is

- (a) Pelton wheel, horizontal
- (b) Pelton wheel, vertical
- (c) Francis turbine, horizontal
- (d) Kaplan turbine

84. A fluid is a substance that

- (a) is essentially incompressible
- (b) always moves when subjected to a shearing stress
- (c) has a viscosity that always increases with temperature
- (d) has a viscosity that always decreases with temperature

85. A piezometer cannot be used for pressure measurement in pipes when

- (a) pressure difference is low
- (b) velocity is high
- (c) fluid in the pipe is a gas
- (d) fluid is highly viscous

86. The lowest portion of storage basin from where the water is not drawn usually, is

- (a) Bottom storage
- (b) Sub-soil storage
- (c) Spring-reserve
- (d) Dead storage

87. A rotameter should always be installed in

- (a) horizontal position
- (b) vertical position
- (c) inclined at 30° to vertical
- (d) inclined at 45° to vertical

88. The line traced by a single fluid particle as it moves over a period of time is called

- (a) Line of force
- (b) Filament line
- (c) Flow line
- (d) Path line

89. Angle of contact (θ) between mercury and glass tube in case of capillary depression is

- (a) 0°
- (b) 10°
- (c) 90°
- (d) 128°

5.48 Hydraulics

105. For pipe flows, at constant capacity, head is proportional to

- (a) $\frac{1}{d}$
- (b) $\frac{1}{d^2}$
- (c) $\frac{1}{d^4}$
- (d) $\frac{1}{d^5}$

106. The drag coefficient for laminar flow varies as (where Re = Reynolds number)

- (a) Re
- (b) Re^{-1}
- (c) $Re^{1/2}$
- (d) $Re^{-1/2}$

107. The 'magnitude of water hammer depends on

- (a) length of pipe
- (b) elastic properties of pipe material
- (c) rate of stoppage of flow
- (d) all of the above

108. In series-pipe applications

- (a) head loss through each pipe added to obtain the total head loss
- (b) head loss is same through each pipe
- (c) friction factor is assumed for each pipe
- (d) flow increases

109. 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

110. Weir is an opening

- (a) with closed perimeter and of regular form through which water flows
- (b) with prolonged sides having length of 2 to 3 diameters of opening in thick wall
- (c) wall partially full flow
- (d) in hydraulic structure with regulation provision

111. The shear stress in a fluid flowing in a round pipe

- (a) is constant over the cross-section
- (b) is zero at the wall and increases linearly to the centre
- (c) is zero at centre and varies linearly with radius
- (d) varies parabolically across the section

112. For pipe flow, at constant diameter, capacity is proportional to

- (a) $\sqrt{\text{head}}$
- (b) head
- (c) $\text{head}^{3/2}$
- (d) head^2

113. The velocity distribution for flow between two fixed parallel plates

- (a) is constant over the cross-section
- (b) is zero at the plates and increases linearly to the midplane
- (c) varies parabolically across the section
- (d) is zero in middle and increase linearly towards the plates

114. The most economical section of a rectangular channel for maximum discharge is obtained when its depth is equal to

- (a) half the breadth
- (b) twice the breadth
- (c) same as the breadth
- (d) one third the breadth

115. When a fluid flows in concentric circles, it is known as

- (a) free circular motion
- (b) free rotational motion
- (c) free spiral vortex flow
- (d) free cylindrical vortex flow

116. Bernoulli's theorem deals with the conservation of

- (a) mass
- (b) force
- (c) momentum
- (d) energy

117. A low pressure of the order of 10^{-10} torr can be measured in a chamber with

- (a) Manometer
- (b) Bourdon vacuum gauge
- (c) Pirani gauge
- (d) Ionisation chamber

118. It is proposed to model a submarine moving at 10 m/s by taking a 10 : 1 scale model. What velocity, in m/s would be needed in the model study?

- (a) 1
- (b) 10
- (c) 40
- (d) 100

119. The river flow during floods can be classified as

- (a) steady uniform flow
- (b) unsteady uniform flow
- (c) steady non-uniform flow
- (d) unsteady non-uniform flow

120. Separation is caused by

- (a) reduction of pressure to vapour pressure
- (b) reduction of pressure gradient to zero
- (c) an adverse pressure gradient
- (d) the boundary layer thickness reducing to zero

5.50 Hydraulics

- 121.** Wake always occurs
 (a) before a separation point
 (b) after a separation point
 (c) before and after a separation point
 (d) none of these
- 122.** A hydrograph is a plot of
 (a) rainfall intensity against time
 (b) discharge against time
 (c) cumulative rainfall against time
 (d) cumulative run off against time.
- 123.** In a flow field, at the stagnation point
 (a) pressure is zero
 (b) total energy is zero
 (c) pressure head is equal to velocity
 (d) all the velocity head is converted into pressure head.
- 124.** $\sqrt{\frac{\text{Inertia force}}{\text{Force due to compressibility}}}$ is
 (a) Froudes number (b) Mach number
 (c) Weber number (d) Euler number
- 125.** Capillary action is due to the
 (a) viscosity of liquid
 (b) cohesion of liquid particles
 (c) surface tension
 (d) adhesion or liquid particles on the surface
- 126.** The velocity of flow through homogeneous porous media, under constant head is
 (a) inversely proportional to the coefficient of permeability
 (b) inversely proportional to the square of coefficient of permeability
 (c) directly proportional to the coefficient of permeability
 (d) directly proportional to the square of coefficient of permeability
- 127.** In case of shooting flow, the Froude number is
 (a) infinitely high (b) zero
 (c) 1 (d) more than 1
- 128.** Total drag on a body is the sum of
 (a) pressure drag and velocity drag
 (b) friction drag and velocity drag
 (c) friction drag and pressure drag
 (d) pressure drag, velocity drag and friction drag.
- 129.** The turbulent boundary layer thickness varies as
 (a) $\frac{1}{x^{\frac{1}{5}}}$ (b) $x^{\frac{1}{5}}$
 (c) $x^{\frac{1}{2}}$ (d) $x^{\frac{4}{5}}$
- 130.** When pressure p , flow rate Q , diameter D , and density d , a dimensionless group is represented by
 (a) $\frac{pQ^2}{dD^4}$ (b) $\frac{p}{dQ^2D^4}$
 (c) $\frac{pD^4d}{Q^2}$ (d) $\frac{pD^4}{dD^2}$
- 131.** Viscosity is the most important property in the
 (a) travel of a bullet through air
 (b) water jet issuing from a fire air :
 (c) formation of soap bubbles
 (d) flow of castor oil through a tube.
- 132.** A surge tank is provided in the hydropower schemes is
 (a) strengthen the penstocks
 (b) reduce water hammer pressures
 (c) reduce frictional losses in the system
 (d) minimize cost of hydro-power development
- 133.** In a free vortex flow, the tangential velocity is
 (a) directly proportional to the radial distance
 (b) directly proportional to the square of the radial distance
 (c) inversely proportional to the radial distance
 (d) inversely proportional to the square of radial distance
- 134.** The radial component of velocity in a free vortex is
 (a) zero
 (b) directly proportional to radial distance
 (c) inversely proportional to radial distance
 (d) inversely proportional to the square of radial distance
- 135.** The lift on the cylinder caused by the circulation is independent of
 (a) velocity (b) cylinder diameter
 (c) magnitude (d) none of the above
- 136.** The upper surface of the weir over which water flows is known as
 (a) Nappe (b) Crest
 (c) Sill (d) Vein
- 137.** Fire hose nozzle is generally made of
 (a) divergent shape (b) convergent shape
 (c) cylindrical shape (d) parabolic shape.
- 138.** Choking in pipe flow implies
 (a) no flow occurs
 (b) negative flow takes place due to water hammer
 (c) valve in pipeline is closed
 (d) specified mass flow can't occur

- 139.** The pressure in pipes for fluids flowing is proportional to

- (a) $\frac{1}{\text{inside dia of pipe}}$
- (b) $\frac{1}{d^2}$
- (c) $\frac{1}{d^3}$
- (d) $\frac{1}{d^5}$

- 140.** For similarly, in addition to models being geometrically similar to prototype, the following in both cases should also be equal

- (a) ratio of inertial force to force due to viscosity
- (b) ratio of inertial force to force due to gravitation
- (c) ratio of inertial force to force due to surface tension
- (d) all the four ratios of inertial force to force due to viscosity, gravitation, surface tension, and elasticity

- 141.** In laminar flow through a round tube, the discharge varies

- (a) linearly as the viscosity
- (b) inversely as the pressure drop
- (c) linearly as the cube of the diameter
- (d) inversely as the viscosity

- 142.** Friction factor for pipes depends on

- (a) rate of flow
- (b) fluid density
- (c) viscosity
- (d) all of the above

- 143.** A liquid jet from a nozzle exposed to atmosphere traverses along

- (a) straight line
- (b) circular path
- (c) elliptical path
- (d) parabolic path

- 144.** In a forced-vortex motion

- (a) rotation of fluid, moving as a solid, takes place about an axis
- (b) each particle moves in a circular path with a speed varying inversely as the distance from the centre
- (c) velocity decreases with the radius
- (d) velocity remains constant

- 145.** In a open channel with great width hydraulic radius is equal to

- (a) depth of the channel
- (b) half the depth of channel
- (c) one third the depth of channel
- (d) one fourth the depth of channel

- 146.** In the case of flow through parallel pipes

- (a) flow in each pipe is same
- (b) head loss in each pipe is same
- (c) head loss depends upon flow conditions
- (d) total head loss is the sum of head losses in individual pipes

- 147.** In a free vortex motion, tangential velocity of the water particles is proportional to

- (a) r
- (b) r^2
- (c) $\frac{1}{r}$
- (d) $\frac{1}{r^2}$

where, r = distance from the centre.

- 148.** Vertical component of pressure force on a submerged curve surface is equal to

- (a) weight of liquid vertically above the curved surface and extending upon the free surface
- (b) force on a vertical projection of the curved surface
- (c) product of pressure at centroid and surface area
- (d) horizontal component

- 149.** Which of the following will resist shear and its rate of deformation will be zero regardless of loading?

- (a) Ideal fluid
- (b) Newtonian fluid
- (c) Ideal plastic
- (d) Elastic solid

- 150.** An ideal fluid is

- (a) similar to a perfect gas
- (b) frictionless and incompressible
- (c) obeys Newton laws of viscosity
- (d) satisfies continuity equation

- 151.** During the opening of valve in a pipe line, the flow is

- (a) steady
- (b) unsteady
- (c) uniform
- (d) laminar

- 152.** For a laminar flow

- (a) flow occurs in a zig-zag way
- (b) Reynolds number lies between 2000 to 3000 for pipes
- (c) Newton's law of viscosity is important
- (d) pipe losses are major consideration

- 153.** Vertical distribution of velocity in an open channel for laminar flow can be assumed as

- (a) logarithmic
- (b) parabolic
- (c) straight line
- (d) hyperbolic

- 154.** Power transmitted through a pipe is maximum when the loss of head due to friction is

- (a) half of the total head supplied
- (b) one-third of the total head supplied
- (c) one-fourth of the total head supplied
- (d) equal to the total head supplied

- 155.** Hydraulic grade line for any flow system as compared to energy line is

- (a) above
- (b) below
- (c) at same level
- (d) uncertain

5.52 Hydraulics

- 156.** In case the velocity vector at different points along a stream line remains unchanged, then the flow is termed as
(a) Stoke's flow (b) Uniform flow
(c) Rotational flow (d) Irrotational flow
- 157.** The pressure centre is
(a) at the centroid of the submerged area
(b) centroid of the pressure prism
(c) independent of the orientation of the area
(d) a point on the line of action of the resultant force
- 158.** The effect of negative pressure beneath the nappe in case of flow of water over a rectangular suppressed weir is to
(a) decrease the discharge
(b) increase the discharge
(c) increase frictional resistance
(d) reduce frictional resistance
- 159.** The breaking up of a liquid into fine droplets by spraying is called
(a) vaporization (b) atomization
(c) venturi effect (d) osmosis
- 160.** Gradually varied flow is
(a) steady uniform flow
(b) steady non-uniform flow
(c) unsteady uniform flow
(d) unsteady non-uniform flow
- 161.** Laminar flow is
(a) rise of water in plants through roots
(b) movement of blood in the arteries of a human body
(c) flow of oil in measuring instrument
(d) all of the above
- 162.** When a fluid is at rest, the shear stress
(a) maximum
(b) zero
(c) between zero and maximum
(d) unpredictable
- 163.** The locus of elevation that water will rise in a series of pitot tubes is called
(a) hydraulic grade line (b) pressure head
(c) energy grade line (d) Velocity head
- 164.** Steady flow is motion in which the velocity
(a) is independent of time
(b) is zero
(c) varies with head
(d) rate of change is unity
- 165.** A fluid in which resistance to deformation is independent of the shear stress, is known as
(a) Bingham plastic fluid
(b) Pseudo plastic fluid
(c) Dilatant fluid
(d) Newtonian fluid
- 166.** Pressure drag results from
(a) skin-friction
(b) deformation drag
(c) development of a stagnation point
(d) occurrence of a wake
- 167.** For a supersonic flow, velocity
(a) increases with decrease in area of flow
(b) increases with increase in area of flow
(c) does not change with variation in the area of flow
(d) none of the above
- 168.** Model analysis of aeroplanes and projectiles moving at supersonic speed are base on
(a) Reynolds number (b) Weber number
(c) Froude number (d) Mach number
- 169.** Bluffbody surface
(a) is smooth so that friction can be neglected
(b) coincides with streamlines
(c) does not coincide with streamlines
(d) perpendicular to streamlines
- 170.** Centre of pressure on an inclined pane is
(a) at the centroid (b) above the centroid
(c) below the centroid (d) at metacentre
- 171.** Separation of flow occurs when pressure gradient
(a) tends to approach zero
(b) becomes negative
(c) changes abruptly
(d) reduces to a value when vapour formation starts
- 172.** Pressure coefficient is the ratio of pressure force to
(a) inertia force (b) gravity force
(c) viscous force (d) surface tension
- 173.** Mach number greater than unity implies that the flow is
(a) sonic (b) subsonic
(c) supersonic (d) hypersonic
- 174.** A mouthpiece can't be used under very large head because of
(a) creation of vortex at vena contracta
(b) cavitation problem at vena contracta
(c) large variation of discharge
(d) erratic flow

- 175.** The rate of change of linear momentum is equals to
 (a) active force (b) reactive force
 (c) torque (d) work done
- 176.** Energy loss in flow through nozzle as compared to venturimeter is
 (a) same (b) more
 (c) less (d) unpredictable
- 177.** The rate of change of moment of momentum represents the
 (a) force exerted by fluid
 (b) torque applied by the fluid
 (c) work done by the fluid
 (d) power developed by the fluid
- 178.** Two pipe systems can be said to be equivalent, when the quantities same are
 (a) friction loss and flow
 (b) length and diameter
 (c) flow and length
 (d) friction factor and diameter
- 179.** In open channel corresponding to critical depth, the discharge is
 (a) maximum (b) minimum
 (c) zero flow (d) none of these
- 180.** Total pressure on the top of a closed cylindrical vessel completely filled with liquid, is directly proportional to
 (a) radius (b) $(\text{radius})^2$
 (c) $(\text{radius})^3$ (d) $(\text{radius})^4$
- 181.** In pipes larger than 25 mm, carrying water, the laminar flow
 (a) very often exists (b) generally exists
 (c) rarely exists (d) unpredicted
- 182.** Critical velocity is
 (a) maximum attainable velocity
 (b) terminal velocity
 (c) velocity when hydraulic jump occurs
 (d) velocity above which flows ceases to be streamlined
- 183.** The line of action of the buoyant force acts through the
 (a) centroid of the volume of fluid vertically above the body
 (b) centre of the volume of floating body
 (c) centre of gravity of any submerged body
 (d) centroid of the displaced volume of fluid
- 184.** The function of surge tank is to
 (a) relieve from pipe line of excessive pressure produced by water hammer
 (b) smoothen flow
 (c) act as reservoir for emergency conditions
 (d) avoid reverse flow
- 185.** If flow in an open channel is gradually varied, then the flow will be
 (a) steady uniform flow
 (b) unsteady uniform flow
 (c) steady non-uniform flow
 (d) unsteady non-uniform flow
- 186.** A fluid in equilibrium can't sustain
 (a) tensile stress (b) compressive stress
 (c) shear stress (d) bending stress
- 187.** Units of kinematic viscosity are
 (a) m^2/sec (b) $\text{kg. sec}/\text{m}^2$
 (c) newton-sec/ m^2 (d) newton-sec $^3/\text{m}$
- 188.** Gradually varied flow is
 (a) steady uniform
 (b) non-steady non-uniform
 (c) non-steady uniform
 (d) non-steady uniform
- 189.** A one dimensional flow is one which
 (a) is uniform
 (b) is steady uniform
 (c) takes place in straight lines
 (d) involves zero transverse components of flow
- 190.** Kinematic viscosity is equal to
 (a) $\frac{\text{dynamic viscosity}}{\text{density}}$
 (b) $\text{dynamic viscosity} \times \text{density}$
 (c) $\frac{\text{density}}{\text{dynamic viscosity}}$
 (d) $\frac{1}{\text{dynamic viscosity} \times \text{density}}$
- 191.** With increase in pressure the bulk modulus of elasticity
 (a) increases
 (b) decreases
 (c) remains constant
 (d) increases first upto certain limit and then decreases
- 192.** The force of buoyancy is dependent on
 (a) mass of liquid displaced
 (b) viscosity of fluid
 (c) surface tension of fluid
 (d) depth of immersion

5.54 Hydraulics

- 193.** Frictional resistance in a pipe
(a) decreases with density of the fluid
(b) is dependent on the fluid pressure
(c) is independent from surface roughness
(d) increases with square of velocity.
- 194.** A barometer is used to measure
(a) very low pressures
(b) very high pressures
(c) pressure of fluid in a pipe line
(d) atmospheric pressure.
- 195.** Vertical component of pressure force on a submerged curved surface is equal to
(a) its horizontal component
(b) the force on a vertical projection of the curved surface
(c) the product of pressure at centroid and surface area
(d) the weight of liquid vertically above the curved area
- 196.** In turbulent flow
(a) fluid particles move in an orderly, manner
(b) momentum transfer is on a molecular scale only
(c) shear stresses are generally larger than in similar laminar flow
(d) cohesion is more effective than momentum transfer in causing shear stress
- 197.** Mass density of liquid is given by
(a) $\rho = \frac{\text{Mass}}{\text{Volume}}$ (b) $\rho = \text{kg.} \frac{\text{sec}^2}{\text{m}^4}$
(c) $\rho = \frac{\text{metric slug}}{\text{m}^2}$ (d) All the above
- 198.** Head loss due to a sudden enlargement in a pipe is
(a) $\frac{v_1^2 - v_2^2}{2g}$ (b) $\frac{(v_1 - v_2)^2}{2g}$
(c) $\frac{(v_1 - v_2)^2}{g}$ (d) $\frac{v_1^2 - v_2^2}{g}$
- 199.** The metacentre is
(a) centroid of the displaced volume of fluid
(b) centroid of pressure of the displaced volume of fluid
(c) point of intersection of buoyant force and gravitational force
(d) point of intersection of buoyant force and centre line of body
- 200.** Mercury is generally used in barometer because
(a) of higher density due to which height of barometer will be small
(b) it has practically zero vapour pressure
(c) it shines and can be easily read
(d) it does not stick to the tube walls
- 201.** The velocity distribution for flow between two fixed parallel plates
(a) is constant over the cross-section
(b) varies parabolically across the section
(c) is zero at the plates and linearly increases towards the plates
(d) is zero in the middle and increases towards the plates
- 202.** In a flowing fluid, a particle may possess
(a) inertial energy
(b) pressure energy
(c) kinetic energy
(d) elevation or gravitation potential
(e) all of the above
- 203.** Width of the weir with end contraction is
(a) less than the width of channel
(b) more than the width of channel
(c) equal to the width of channel
(d) half the width of channel
- 204.** One dimensional flow is
(a) restricted to flow in a straight line
(b) uniform flow
(c) one which neglects changes in a transverse direction
(d) the most general flow
- 205.** The contraction of area for flow through orifice in tank depends on
(a) shape of orifice (b) size of orifice
(c) head in tank (d) all of the above
- 206.** The velocity distribution in the turbulent boundary layer follows
(a) straight line law (b) parabolic law
(c) hyperbolic law (d) logarithmic law
- 207.** General energy equation holds for
(a) steady flow (b) turbulent flow
(c) laminar flow (d) non-uniform flow
- 208.** A body floats in stable equilibrium
(a) when its metacentric height is zero
(b) when metacentre is above e.g.,
(c) when its e.g. is below its centre of buoyancy
(d) none of the above

