FLUID MECHANICS TERMS

1. If the energy of the incident photon is less than the work function:
   A. an electron will be ejected
   B. more than one electron will be ejected
   C. an electron will not be ejected
   D. less than one electron will be ejected

2. For supersonic flow, the pressure of fluid must decrease as the fluid flow area of the duct
   A. increases
   B. decreases
   C. remain the same
   D. none of these

3. Density in terms of viscosity is
   A. kinematic viscosity / dynamic viscosity
   B. dynamic viscosity / kinematic viscosity
   C. kinematic viscosity x dynamic viscosity
   D. none of the above

4. Liquids and gases take the following characteristic(s) of their contents.
   A. Volume
   B. Shape
   C. Shape and volume
   D. Neither shape nor volume

5. Alcohol finds use in manometers as
   A. it provides suitable meniscus for the inclined tube
   B. its density being less can provide longer length for a pressure difference, thus more accuracy can be obtained
   C. A and B above are correct
   D. Cheap and easily available

6. Which of the following statements about a Newtonian fluid is most accurate?
   A. Shear stress is proportional to strain
   B. Viscosity is zero
   C. Shear stress is multi- valued
   D. Shear stress is proportional to rate of strain

7. The normal stress is the same in all directions at a point in fluid:
   A. independent of the motion of one fluid layer relative to an adjacent layer
   B. when there is no motion of one fluid layer relative to an adjacent layer
   C. only if the fluid is frictionless
   D. only if fluid is frictionless and incompressible

8. Which of the following is not a characteristic of fluid pressure?
   A. It is the same in all directions at a point in the fluid
   B. It acts normal to a surface
   C. It is a shear stress
   D. It is linear with depth

9. The length of mercury column at a place at an altitude will change with respect to that at ground in;
   A. a linear relation
   B. a parabolic relation
   C. will remain constant
   D. first slowly and then steeply

10. All of the following dimensionless parameters are applicable to fluid flow problems except the _____
   A. Reynolds number
   B. Froude number
   C. Mach number
   D. Biot number

11. Mass density of liquid (p) is given by which of the following?
   A. p = Mass / volume
   B. p = metric slug /m^2
   C. p = kg sec^2 / m^4
   D. all of the above

12. The speed of sound in all fluid is most closely related to all of the following properties except _____
   A. compressibility
   B. density
   C. bulk modulus
   D. thermal conductivity

13. Under which condition, the specific weight of water is 1000 kg/m3?

A. at normal pressure of 760 mm
B. at 4°C temperature
C. at mean sea level
D. all of the above

14. All of the following can be characteristics of fluids except _____.

A. kinematic viscosity
B. surface tension
C. bulk modulus
D. hysteresis

15. Which of the following can be used to measure the flow of water in a pipe of diameter 3000 mm?

A. Venturimeter
B. Rotameter
C. Nozzle
D. Pitot tube

16. The pressure at a given depth due to several immiscible liquids is:

A. the average of the individual pressures
B. the sum of the individual pressures
C. independent of the individual pressures
D. unknown

17. The equation of continuity of flow is applicable if:

A. the flow is one dimensional
B. the flow is steady
C. the velocity is uniform over the cross - section
D. all of the above conditions are together

18. Uniform flow takes place when:

A. conditions remain unchanged with time at any point
B. rate of change of velocity of fluid is zero
C. at every point the velocity vector is identical magnitude and direction for any given instant
D. the change in transverse direction is zero

19. The continuity equation of an ideal fluid flow:

A. states that the net rate of in - flow into any small volume must be zero
B. applies to irrotational flow only
C. states that the energy remains constant along streamline
D. states that energy is constant everywhere in the fluid

20. A pitot tube can be used to measure fluid velocity as described by the Bernoulli's equation and the relationship between:

A. kinetic energy and static pressure
B. fluid pressure and height of the fluid
C. fluid pressure and impact energy
D. pressure and momentum

21. In order to avoid vaporization in the pipe line, the pipe line over the ridge is laid in such a way 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

22. The stream function is a useful parameter in describing _____

A. the conservation of mass
B. the conservation of momentum
C. the conservation of energy
D. the equation of state

23. For high speed flows, the potential energy of the fluids are:

A. positive
B. negative
C. negligible
D. none of these

24. McLeod gauge used for low pressure measurement operates on the principle of _____

A. Gas law
B. Boyle's law
C. Charles law
D. Pascal's law

25. A Kaplan turbine is

A. a high head mixed flow turbine
B. an impulse turbine, inward flow
C. a reaction turbine, outward flow
D. low head axial flow turbine

26. The most common method for calculating frictional energy loss for laminar flowing fluids in noncircular pipes is:

A. the Darcy equation
B. the Hagan - Poisevill equation
C. the Hazen - Williams equation
D. the Swamee - Jin equation

27. The parameter f in the expression for head-loss is
   A. the fraction of flow that is totally turbulent
   B. the Darcy friction factor
   C. the height of the roughness scale in turbulent flow
   D. the static coefficient of friction

28. Friction factor for both laminar and turbulent flows can be found plotted in a
   A. steam table
   B. psychrometric chart
   C. Moody diagram D.
   D. Mollier diagram

29. Which of the following is relative velocity?
   A. The difference between two velocities
   B. Average velocity
   C. Sum of two velocities
   D. Vector difference of two velocities

30. Which of the following is the highest head?
   A. 33 inch Hg
   B. 31.0 ft. water
   C. 1.013 kg kg/cm^2
   D. 75.0 cm of Hg

31. For stable equilibrium of floating body its metacenter should lie:
   A. below the center of gravity
   B. below the center of buoyancy
   C. above the center of buoyancy
   D. above the center of gravity

32. Center of pressure on an inclined plane lies _____
   A. at the centroid
   B. above the centroid
   C. below the centroid
   D. at metacenter

33. The line of action of the buoyant forces always acts through the centroid of the _____
   A. submerged body
   B. volume of the floating body
   C. volume of the fluid vertically above the body
   D. displaced volume of the fluid

34. The hydraulic grade line of a pipeline denotes which of the following?
   A. Total energy
   B. Pressure energy
   C. Potential energy
   D. The sum of pressure energy and potential energy

35. The energy grade line of a pipeline denotes which of the following
   A. Total energy
   B. Pressure energy
   C. Potential energy
   D. The sum of pressure energy and potential energy

36. The presence of friction in the energy grade line will always cause the line to slope
   A. down in the direction of the flow
   B. upward in the direction of the flow
   C. level (no slope)
   D. there is no effect of friction on the energy grad line

37. The pitot tube is a device used for measurement of
   A. pressure
   B. flow
   C. velocity
   D. discharge

38. Hydrometer is used to find out
   A. specific gravity of liquids
   B. specific gravity of solids
   C. specific gravity of gases
   D. relative humidity

39. The fluid forces taken into consideration in the Navier Stokes equation are:
   A. gravity, pressure and viscous
   B. gravity, pressure and turbulent
   C. pressure, viscous and turbulent
   D. gravity, viscous and turbulent

40. Permissible velocity of water flowing through concrete tunnel, is generally
   A. 4 - 5 m/s
   B. 10 - 12 m/s
   C. 13 - 16 m/s
   D. 20 m/s

41. Orifice refers to 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. with partially full flow
   D. in hydraulic structure with regulation provision

42. The value of coefficient of discharge in comparison to coefficient of velocity is found to be _____
   A. more
   B. less
   C. same
   D. more/less depending on flow

43. Weir refers to an opening
   A. having closed perimeter and of regular form through which water flows
   B. having prolonged sides with length of 2 to 3 diameters of opening in thick wall
   C. having partially full flow
   D. in hydraulic structure with regulation provision

44. Which of the following parameters determine the friction factor of turbulent flow in a rough pipe?
   A. Froude number and relative roughness
   B. Froude number and Mach. number
   C. Reynolds number and relative roughness
   D. Mach number and relative roughness

45. Power transmitted through a pipe is maximum when the loss of head due to friction is :
   A. one - 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

46. In a nozzle if back pressure is same as inlet pressure; then _____
   A. no flow takes place
   B. maximum flow takes place
   C. flow becomes subsonic in diverging section
   D. flow becomes supersonic in converging as well as supersonic section

47. The flow on two sides of a normal shock wave is called
   A. sonic
   B. sub- sonic
   C. supersonic
   D. supersonic on one side and sub - sonic on the other side

48. Which of the following is the basic of Bernoulli's law for fluid flow?
   A. Continuity equation
   B. Principle of conservation of energy
   C. Fourier's law
   D. Principle of conservation of mass

49. Which of the following is NOT a characteristic of fluid pressure?
   A. It is a shear stress
   B. It is the same in all directions at a point in the fluid
   C. It acts normal to a surface
   D. It is linear with depth

50. Refers to the compressibility of a fluid, the fractional change in fluid volume per unit change in fluid.
   A. Viscosity
   B. Bulk modulus
   C. Density
   D. Pressure

51. A pitot tube can be used to measure fluid velocity as described by the Bernoulli equation: and the relationship between:
   A. kinetic energy and static pressure
   B. fluid pressure and static pressure.
   C. fluid pressure and impact energy
   D. pressure and momentum

52. The ratio of the area to the wetted perimeter is known as _____.
   A. flow factor
   B. hydraulic radius
   C. Kutter's C
   D. value of k in Darcy - Weisbach formula

53. What is the coefficient of contraction?
   A. The ratio of the area of vena contracta to the area of the orifice
   B. The ratio of actual discharge to the theoretical discharge
   C. The ratio of the actual velocity to the theoretical velocity
   D. The ratio of the effective head to the actual head

54. Where is vena contracta most likely located?

A. At the orifice
B. At a distance approximately ½ the diameter of the orifice
C. At a distance approximately equal to the diameter of the orifice
D. At a distance approximately twice the diameter of the orifice

55. A substance that is able to flow and yields to any force tending to change its shape without changing its volume such as water and air.

A. Fluid
B. Flux
C. Gas oil
D. Water gas

56. The velocity of a fluid particle at the center of the pipe section is _____.

A. maximum
B. minimum
C. average
D. logarithmic average

57. For supersonic flow, the pressure of fluid must increase as the fluid flow area of the duct:

A. increases
B. decreases
C. constant
D. none of these

58. Which is incorrect statement regarding apparent shear forces.

A. It can never be found in frictionless fluid regardless of its motion
B. It can never be found when the fluid is at rest
C. It depends upon cohesive forces
D. It may occur owing to cohesion when the fluid is at rest

59. The time required for half a quantity of radioactive particles to decay (disintegrate) is called its _____

A. average life
B. median life
C. time constant
D. half time

60. SI unit of viscosity is :

A. 10 times poise
B. 9.81 times poise
C. 1 / 9.81 times poise
D. 1/ 10 times poise

61. For computation convenience, fluids are usually classed as :

A. rotational or irrotational
B. real or ideal
C. laminar or turbulent
D. Newtonian or non-Newtonian

62. Which of the following is not a dimensionless parameter?

A. Kinetic viscosity
B. Weber number
C. Darcy Weisbach friction factor
D. Froude number

63. Which of the following is not a characteristic of real fluids?

A. Finite viscosity
B. Non - uniform velocity distributions
C. Compressibility
D. Experience of eddy currents and turbulence

64. Which of the following is not the mass density of water?

A. 62.5 Ibm/ft^3
B. 100 kg/m^3
C. 1 g/cm^3
D. 1 kg/L

65. The upper critical Reynolds number for pipe flow is:

A. of no practical importance to designers
B. always used to design pipes for strength
C. the number at which turbulent flow changes over to laminar flow
D. the number at which laminar flow changes into turbulent flow

66. Which of the following statements about gauge pressure is most correct? Gauge pressure are measured relative to _____.

A. atmospheric pressure
B. a vacuum
C. each other
D. the surface

67. The volumetric change of the fluid caused by a resistance is called _____

A. volumetric strain
B. volumetric index
C. compressibility
D. adhesion

68. Compressibility of a fluid relates the fractional change in fluid volume per unit change in fluid.

A. temperature
B. density
C. pressure
D. viscosity

69. Property of a fluid whereby its own molecules are attracted is known as _____

A. adhesion
B. cohesion
C. surface tension
D. viscosity

70. The term subsonic flow refers to a flowing gas with a speed:

A. less than the local speed of sound
B. equal to the speed of sound
C. greater than the speed of sound
D. much greater than the speed of sound

71. The pressure at a point in a fluid will not be same in all the directions if the fluid is:

A. viscous
B. viscous and static
C. inviscous and in motion
D. viscous and is in motion

72. The statement that "the hydrostatic pressure a fluid exerts on an immersed object or on container walls is a function only of fluid depth" is

A. the perfect gas law
B. D'Alembert's paradox
C. the hydrostatic paradox
D. Boyle's law

73. Bernoulli's equation is s/an _____

A. momentum equation
B. conservation of energy equation
C. conservation of mass equation
D. equation of state

74. An ideal fluid is one that :

A. is very viscous
B. obeys Netwon's law of viscosity
C. is assumed in problems in conduit flow
D. is frictionless and incompressible

75. The relationship between pressure and altitude in the atmosphere is given by the:

A. perfect gas law
B. conservation of mass
C. barometric height relationship
D. first law of thermodynamics

76. The fact the buoyant force on a floating object equal to the weight of the water displaced is:

A. Bernoulli's law
B. Archimedes' principle
C. The law of diminishing returns
D. The conservation of mass

77. Which of the following terms does not appear in the steady flow energy equation (the extended Bernoulli's equation)?

A. Kinetic energy
B. Potential energy
C. Friction losses
D. Hysteresis losses

78. Neglecting the forces due to inertia, gravity and frictional resistance, the design of a channel can be made by comparing

A. Weber number
B. Reynolds number
C. Froude's number
D. Prant'l number

79. The difference between stagnation pressure and total pressure is :

A. due to height difference
B. due to fluid kinetic energy
C. none of the terms are interchangeable
D. important only in supersonic flow

80. Fully turbulent flow in a pipe is characterized by all of the following except:

A. a parabolic velocity profile
B. a momentum exchange due to fluid masses rather than molecules
C. a maximum velocity at the fluid center line
D. a 1/7 velocity profile

81. The laminar friction factor of fluid flowing through a pipe is a function of all of the following except:

A. fluid velocity
B. pipe diameter
C. pipe roughness
D. Reynolds number

82. The continuity equation is applicable to:

A. viscous unviscous fluids
B. compressibility of fluids
C. conservation of mass
D. steady unsteady flow

83. The rise or fall of head 'h' in a capillary tube of diameter 'd' and liquid surface tension 's' and specific weight 'w' is given by:

A. 4s/wd
B. 4ds/w
C. 4wd/s
D. 4ws/d

84. The study of the practical laws of fluid flow and the resistance of open pipes and channels.

A. fluid mechanics
B. hydraulics
C. aerodynamics
D. thermodynamics

85. Which of the following turbine is different from the others?

A. Fourneyron turbine
B. Francis turbine
C. Kaplan turbine
D. Pelton wheel

86. Running away speed of a Pelton wheel gives:

A. actual operating speed
B. no load speed
C. full load speed
D. no load speed when governor mechanism fails

87. Which of the following turbine is different from the others?

A. Pelton wheel
B. Banki turbine
C. Jonval turbine
D. Kaplan turbine

88. The characteristic length of the Reynold's number used to calculate the friction in noncircular full running pipes is based on the _____.

A. run length
B. pipe length
C. hydraulic diameter (the equivalent diameter)
D. wetted circumference

89. The hydraulic radius of noncircular pipe is:

A. the square root of the flow area
B. the ratio of the area to the wetted perimeter
C. the radius of a pipe of equivalent area
D. none of the above

90. The Darcy equation can be used for all liquids and flows except:

A. water
B. alcohol
C. gasoline
D. air flowing supersonically

91. The Hazen - Williams formula for head loss due to friction is based upon :

A. A rigorous mathematical derivation
B. empirical data
C. semi - empirical analysis
D. screndipity

92. The extended Bernoulli equation includes all of the following terms except:

A. potential energy
B. kinetic energy
C. nuclear energy
D. friction losses

93. An equipotential line is one that:

A. has no velocity component tangent to it
B. has uniformly varying dynamic pressure
C. has no velocity component normal to it
D. exists in case of rotational flow

94. What is the use of a Hydraulic jump?

A. increase the flow rate
B. reduce the flow rate
C. reduce the velocity of flow
D. reduce the energy of flow

95. What do you call the lowest portion to storage basin from where the water is not drawn?

A. bottom storage
B. sub soil storage
C. spring reserve
D. dead storage

96. The presence of friction in the hydraulic grade line will always cause the line to slope

A. down in the direction of the flow
B. upward in the direction of the flow
C. level (no slope)
D. there is no effect of friction on the energy grade line

97. The presence of a minor loss in the energy grade line will cause the line to slope :

A. down in the direction of the flow
B. upward in the direction of the flow
C. vertically downward
D. there is no effect of friction on the energy grade line

98. What do you call the pressure which the fluid exerts on an immersed object or container walls?

A. Normal pressure
B. Standard liquid pressure
C. Hydrostatic pressure
D. Gage pressure

99. Viscosity for a fluid is defined as the constant proportionality between shear stress and what other variable?

A. The spatial derivative of velocity
B. The time derivative of pressure
C. The time derivative of density
D. The spatial derivative of density

100. What is the classification of the fluid flow if the fluid travels parallel to the adjacent layers and the paths of the individual particles do not cross each other?

A. Steady flow
B. Laminar flow
C. Uniform flow
D. Turbulent flow

101. Which of the following refers to the measure of a fluid's sensitivity to changes in viscosity with changes in temperature?

A. Viscosity index
B. Coefficient of viscosity
C. Viscosity ratio
D. Viscosity factor

102. If the Mach number is greater than 1 but lesser than 5, what is the standard classification of the travel?

A. Transonic travel
B. Subsonic travel
C. Hypersonic travel
D. Supersonic travel

103. What is measured by a Pitot tube?

A. Volumetric discharge
B. Mass flow
C. Pressure
D. Velocity

104. What is the difference between the energy grade line and the hydraulic grade line?

A. potential energy
B. pressure energy
C. kinetic energy
D. friction losses

105. Kinetic energy is not neglected in calculations of:

A. high speed flow
B. low speed flow
C. steady flow
D. equilibrium flow

106. Discharge losses through orifice are due to;

A. friction losses
B. minor losses
C. both friction and minor losses
D. pressure losses

107. Which of the following is considered as an important parameter in the study of compressible flow?

A. speed of fluid
B. speed of sound
C. speed of light
D. speed of fluid flow

108. Is the velocity at which an infinitesimal small pressure wave travels through a medium.

A. Subsonic velocity
B. Hypersonic velocity
C. Sonic velocity
D. Monatomic velocity

109. It is the ratio of the actual velocity of the fluid to the velocity of sound.

A. Mach number
B. Froude number
C. Sonic number
D. Euler number

110. The flow is called sonic when Mach number is:

A. equal to 1
B. less than 1
C. more than 1
D. none of these

111. The following flow is sub - sonic when Mach no. is:

A. greater than 1
B. less than 1
C. more than 1
D. none of these

112. The flow is supersonic when Mach no. is:

A. greater than zero
B. less than 1
C. greater than 1
D. none of these

113. The flow is transonic when

A. M = O
B. M < 1
C. M > 1
D. M = 1

114. The pressure decreases as the temperature and velocity increases while the fluid velocity and Mach number:

A. increases
B. decreases
C. remains constant
D. none of these

115. The Mach number is unity or one at the location of smallest flow area, called the :

A. decreasing are
B. throat
C. increasing area
D. none of these

116. What happens to the velocity of fluid after passing the throat although the flow area

A. increases rapidly
B. decreases rapidly
C. remains constant
D. none of these

117. Which of the following is an example of a Newtonian fluid?

A. Motor oils
B. Gas
C. Paints
D. Clay slurries

118. What is the critical pressure of water ?

A. 150 kg/cm^3
B. less than 200 kg/cm^2
C. more than 200 kg/cm^2
D. 100 kg/cm^2

119. The volumetric change of the fluid caused by a resistance is called :

A. volumetric change
B. volumetric index
C. compressibility
D. adhesion

120. The energy of a fluid flowing at any section in a pipeline is a function of:

A. velocity of flow only
B. pressure only
C. height above a chosen datum, density, internal energy, pressure and velocity of flow
D. pressure, height above a chosen datum, velocity of flow, density of fluid

121. If the fluid travels parallel to the adjacent layers and the paths of individual particles do not cross, the fluid is said to be:

A. turbulent
B. critical
C. dynamic
D. laminar

122. Center of pressure on an inclined plane lies:

A. at the centroid
B. above the centroid
C. below the centroid
D. at the metacenter

123. At any instant, if the number of particles passing ever cross - section of the stream is the same, the flow is said to be:

A. steady flow
B. uniform flow
C. continuous flow
D. laminar flow

124. The ratio of cross-sectional area of flow to the wetted perimeter is:

A. hydraulic lead
B. hydraulic section
C. hydraulic mean depth
D. hydraulic gradient

125. If A is the cross-sectional area of the flow and Pw is the wetted perimeter of a pipe, then what is the hydraulic depth. H_d ?

A. Pw - A
B. Pw / A
C. A / Pw
D. Pw x A

126. If Q is the volume in gallon; D is height or elevation in ft, and m is weight in Ibs per gallon , what is the desired energy to lift the water from lower to higher elevation ?

A. E = mD/Q
B. E = mDQ
C. E = mQ/D
D. E = QD/m

127. The flow of the convergent section of a nozzle is always subsonic. If the flow is subsonic then the Mach number is:

A. greater than unity
B. less than unity
C. near unity
D. unity