

THERMODYNAMICS TERMS

1. Enthalpy of an ideal gas is a function only of _____.
 - A. entropy
 - B. internal energy
 - C. temperature**
 - D. pressure
2. Which of the following is the most efficient thermodynamic cycle?
 - A. Brayton
 - B. Otto
 - C. Carnot**
 - D. Diesel
3. What is the first law of thermodynamics?
 - A. internal energy is due to molecular motions
 - B. entropy of the universe is increased by irreversible processes
 - C. energy can neither be created nor destroyed**
 - D. heat energy cannot be completely transformed into work
4. An ideal gas is compressed isothermally. What is the enthalpy change?
 - A. always negative
 - B. always positive
 - C. zero**
 - D. undefined
5. Name the process that has no heat transfer.
 - A. Isothermal
 - B. Isobaric
 - C. Polytropic
 - D. Adiabatic**
6. An ideal gas is compressed in a cylinder so well insulated that there is essentially no heat transfer. The temperature of the gas
 - A. Decreases
 - B. Increases**
 - C. remain constant
 - D. is zero
7. What is the SI unit of pressure?
 - A. $\frac{kg}{cm^2}$
 - B. $\frac{dynes}{cm^2}$
 - C. Pascal**
 - D. Psi
8. The equation $C_p = C_v + R$ applies to which of the following?
 - A. Enthalpy
 - B. ideal gas**
 - C. two phase states
 - D. all pure substances
9. In the flow process, neglecting kinetic and potential energies, the integral of Vdp represents what ?
 - A. heat transfer
 - B. flow energy
 - C. enthalpy change
 - D. shaft work**
10. Mechanical energy of pressure transformed into energy of heat.
 - A. Kinetic energy
 - B. Enthalpy**
 - C. Heat exchanger
 - D. Heat of compression
11. The theory of changing heat into mechanical work.
 - A. Thermodynamics**
 - B. Kinematics
 - C. Inertia
 - D. Kinetics
12. Average pressure on a surface when a changing pressure condition exist.
 - A. Back pressure
 - B. Partial pressure
 - C. Pressure drop
 - D. Mean effective pressure**
13. Which of the following cycles consists two isothermal and two constant volume processes?
 - A. Diesel cycle
 - B. Ericsson cycle
 - C. Stirling cycle**
 - D. Otto cycle
14. A control volume refers to what?
 - A. A fixed region in space**
 - B. A reversible process
 - C. An isolated system
 - D. A specified mass

15. In the polytropic process, $PV^n = \text{constant}$, if the value of n is infinitely large, the process is

- A. isobaric
- B. isometric**
- C. isothermal
- D. polytropic

16. If the temperature is held constant and the pressure is increased beyond the saturation pressure, then the working medium must be:

- A. compressed liquid**
- B. subcooled liquid
- C. saturated vapor
- D. saturated liquid

17. Is one whose temperature is below the saturation temperature corresponding to its pressure.

- A. Superheated vapor
- B. Wet vapor
- C. Subcooled liquid**
- D. Saturated liquid

18. Number of molecules in a mole of any substance is a constant called _____.

- A. Rankine constant
- B. Avogadro's number**
- C. Otto constant
- D. Thompson constant

19. If the pressure of a gas is constant the volume directly proportional to the absolute temperature.

- A. Boyle's law
- B. Joule's law
- C. Charles' law**
- D. Kelvin's law

20. The number of protons in the nucleus of an atom or the number of electrons in the orbit of an atom.

- A. Atomic volume
- B. Atomic number**
- C. Atomic weight
- D. Atomic mass

21. In a P-T diagram of a pure substance, the curve separating the solid phase from the liquid phase is:

- A. vaporization curve
- B. fusion curve**
- C. boiling point
- D. sublimation point

22. A water temperature of 18 °F in the water cooled condenser is equivalent in °C to _____

- A. 7.78
- B. 10**
- C. 263.56
- D. -9.44

23. The latent heat of vaporization in Joules per kg is equal to _____

- A. 5.4×10^2
- B. 4.13×10^3
- C. 22.6×10^5**
- D. 3.35×10^5

24. Form of energy associated with the kinetic energy of the random motion of large number of molecules.

- A. Internal energy
- B. Kinetic energy
- C. Heat of fusion
- D. Heat**

25. If the temperature is held constant and the pressure is increased beyond the saturation pressure, then, the working medium must be:

- A. saturated vapor
- B. compressed liquid**
- C. saturated liquid
- D. subcooled liquid

26. Is the condition of pressure and temperature at which a liquid and its vapor are indistinguishable.

- A. Critical point**
- B. Dew point
- C. Absolute humidity
- D. Relative humidity

27. When a substance in gaseous state is below the critical temperature, it is called

- A. vapor**
- B. cloud
- C. moisture
- D. steam

28. Superheated vapor behaves

- A. just as gas
- B. just as steam
- C. just as ordinary vapor
- D. approximately as a gas**

29. Which of the following provides the basis for measuring thermodynamic property of temperature?

- A. Zeroth law of thermodynamics**
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics

30. Which of the following is commonly used as liquid absorbent?

- A. Silica gel
- B. Activated alumina
- C. Ethylene glycol**
- D. None of these

31. Mechanism designed to lower the temperature of air passing through it.

- A. Air cooler**
- B. Air defense
- C. Air spill over
- D. Air cycle

32. A device for measuring the velocity of wind.

- A. Aneroid barometer
- B. Anemometer**
- C. Anemoscope
- D. Anemograph

33. Heat normally flowing from a high temperature body to a low temperature body wherein it is impossible to convert heat without other effects:

- A. first law of thermodynamics
- B. second law of thermodynamics**
- C. third law of thermodynamics
- D. zeroth law of thermodynamics

34. The temperature at which its vapor pressure is equal to the pressure exerted on the liquid.

- A. Absolute humidity
- B. Calorimetry
- C. Boiling point**
- D. Thermal point

35. A nozzle is used to

- A. increase velocity and decrease pressure**
- B. decrease velocity as well as pressure
- C. increase velocity as well as pressure
- D. decrease velocity and increase pressure

36. The sum of the energies of all the molecules in a system where energies appear in several complex form.

- A. kinetic energy
- B. potential energy
- C. internal energy**
- D. frictional energy

37. The total energy in a compressible or incompressible fluid flowing across any section in a pipeline is a function of

- A. Pressure and velocity
- B. Pressure, density and velocity
- C. Pressure, density, velocity and viscosity
- D. Flow energy, kinetic energy, height above datum and internal energy**

38. The ratio of the density of a substance to the density of some standard substance.

- A. Relative density
- B. Specific gravity**
- C. Specific density
- D. Relative gravity

39. Is one whose pressure is higher than the saturation pressure corresponding to its temperature.

- A. Compressed liquid**
- B. Saturated liquid
- C. Saturated vapor
- D. Super heated vapor

40. The changing of solid directly to vapor without passing through the liquid state is called

- A. Evaporation
- B. Vaporization
- C. Sublimation**
- D. Condensation

41. Weight per unit volume is termed as _____.

- A. Specific gravity
- B. Density
- C. Weight density**
- D. Specific volume

42. What is the SI unit of force?

- A. Pound
- B. Newton**
- C. Kilogram
- D. Dyne

43. The volume of fluid passing a cross-section of steam in unit time.

- A. Steady flow
- B. Uniform flow
- C. Discharge**
- D. Continuous flow

44. What equation applies in the first law of thermodynamics for an ideal gas in a reversible open steady-state system?

- A. $Q - W = U_2 - U_1$
- B. $Q + VdP = H_2 - H_1$**
- C. $Q - VdP = U_2 - U_1$
- D. $Q - PdV = H_2 - H_1$

45. A pressure of 1 millibar is equivalent to

- A. $1000 \frac{\text{dynes}}{\text{cm}^2}$**
- B. 1000 cm of Hg
- C. 1000 psi
- D. $1000 \frac{\text{kg}}{\text{cm}^2}$

46. When a system deviates infinitesimally from equilibrium at every instant of its state, it is undergoing:

- A. isobaric process
- B. quasi-static process**
- C. isometric process
- D. cyclic process

47. What is the force which tends to draw a body toward the center about which it is rotating?

- A. Centrifugal force
- B. Centrifugal in motion
- C. Centrifugal advance
- D. Centripetal force**

48. What is the process that has no heat transfer?

- A. Reversible isometric
- B. Isothermal
- C. Polytropic
- D. Adiabatic**

49. Which of the engine is used for fighter bombers?

- A. Turbojet**
- B. Pulsejet
- C. Rockets
- D. Ramjet

50. Exhaust gases from an engine posses:

- A. solar energy
- B. kinetic energy**
- C. chemical energy
- D. stored energy

51. At critical point the latent enthalpy of vaporization is

- A. temperature dependent
- B. zero**
- C. minimum
- D. maximum

52. What is the force which tends to draw a body toward the center about which it is rotating?

- A. Centrifugal force
- B. Centrifugal in motion
- C. Centrifugal advance
- D. Centripetal force**

53. When a system deviates infinitesimally from equilibrium at every instant of its state, it is undergoing

- A. isobaric process
- B. quasi - static process**
- C. isometric process
- D. cyclic process

54. A pressure of 1 millibar is equivalent to

- E. $1000 \frac{\text{dynes}}{\text{cm}^2}$**
- F. 1000 cm of Hg
- G. 1000 psi
- H. $1000 \frac{\text{kg}}{\text{cm}^2}$

55. Work done per unit charge when charged is moved from one point to another.

- A. Equipotential surface
- B. Potential at a point**
- C. Electrostatic point
- D. Potential difference

56. How many independent properties are required to completely fix the equilibrium state of a pure gaseous compound?

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

57. Which of the following relations defines enthalpy?

- A. $h = u + p/T$
- B. $h = u + pV$**
- C. $h = u + p/V$
- D. $h = pV + T$

58. Which of the following is true for water at a reference temperature where enthalpy is zero?

- A. Internal energy is negative**
- B. Entropy is non - zero
- C. Specific volume is zero
- D. Vapor pressure is zero

59. On what plane is the Mollier diagram plotted?

- A. $p - V$
- B. $p - T$
- C. $h - s$**
- D. $h - u$

60. The compressibility factor z , is used for predicting the behavior of non - ideal gases. How is the compressibility factor defined relative to an ideal gas? (subscript c refers to critical value)

- A. $z = P/P_c$
- B. $z = PV/RT$**
- C. $z = T/T_c$
- D. $z = (T/T_c)(P_c/P)$

61. How is the quality x of a liquid - vapor mixture define

- A. The fraction of the total volume that is saturated vapor
- B. The fraction of the total volume that is saturated liquid
- C. The fraction of the total mass that is saturated vapor**
- D. The fraction of the total mass that is saturated liquid

62. What is the expression for heat of vaporization?

- A. h_g
- B. h_f
- C. $h_g - h_f$**
- D. $h_f - h_g$

63. What is the value of the work done for a closed, reversible, isometric system?

- A. Zero**
- B. Positive
- C. Negative
- D. Indeterminate

64. What is the equation for the work done by a constant temperature system?

- A. $W = mRT \ln(V_2 - V_1)$
- B. $W = mR (T_2 - T_1) \ln(V_2 - V_1)$
- C. $W = MRT \ln (V_2 - V_1)$**
- D. $W = RT \ln (V_2 - V_1)$

65. What is true about the polytropic exponent n for a perfect gas undergoing an isobaric process?

- A. $n > 0$
- B. $n < 0$
- C. $n = \infty$
- D. $n = 0$

66. How does an adiabatic process compare to isentropic process?

- A. Adiabatic: Heat transfer = 0, Isentropic: Heat transfer = 0
- B. Adiabatic: Heat transfer = 0 ,Isentropic: Heat transfer = 0
- C. Adiabatic: Reversible, Isentropic: Not reversible
- D. Both: Heat transfer = 0; Isentropic: Reversible**

67. During an adiabatic, internally reversible process, what is true about the change in entropy?

- A. It is always zero**
- B. It is always less than zero
- C. It is always greater than zero
- D. It is temperature-dependent

68. For an irreversible process, what is true about the change in entropy of the system and surroundings

- A. $ds = \frac{dq}{dt}$
- B. $ds = 0$
- C. $ds > 0$**
- D. $ds < 0$

69. For which type of process does the equation $dQ = Tds$ hold?

- A. Irreversible
- B. Reversible**
- C. Isobaric
- D. Isothermal

70. Which of the following is true for any process?

- A. $\Delta S (\text{Surrounding}) + \Delta S (\text{system}) > 0$
- B. $\Delta S (\text{Surrounding}) + \Delta S (\text{system}) < 0$
- C. $\Delta S (\text{Surrounding}) + \Delta S (\text{system}) \leq 0$
- D. $\Delta S (\text{Surrounding}) + \Delta S (\text{system}) \geq 0$**

71. Which of the following thermodynamic cycle is the most efficient?

- A. Brayton
- B. Rankine
- C. Carnot**
- D. Otto

72. The ideal reversible Carnot cycle involves four basic processes. What type of processes are they?

- A. All isothermal
- B. All adiabatic
- C. All isentropic
- D. Two isothermal and two isentropic**

73. What is the temperature difference of the cycle if the entropy difference is ΔS , and the work done is W ?

- A. $W - \Delta S$
- B. $W / \Delta S$**
- C. $\Delta S / W$
- D. $\Delta S - W$

74. Which of the following is not an advantage of a superheated, closed Rankine cycle over an open Rankine cycle?

- A. Lower equipment cost
- B. Increased efficiency
- C. Increased turbine life
- D. Increased boiler life**

75. Which of the following statements regarding Rankine cycle is not true?

- A. Use of a condensable vapor in the cycle increases the efficiency of the cycle
- B. The temperatures at which energy is transferred to and from the working liquid are less separated than in a Carnot cycle
- C. Superheating increases the efficiency of a Rankine
- D. In practical terms, the susceptibility of the engine materials to corrosion is not a key limitation on the operating efficiency**

76. Which one of the following is standard temperature and pressure (STP)

- A. 0 °K and 1 atm pressure
- B. 0 °F and zero pressure
- C. 32 °F and zero pressure
- D. 0 °C and 1 atm pressure**

77. A substance is oxidized when which of the following occurs?

- A. It turns red
- B. It loses electrons**
- C. It gives off heat
- D. It absorbs energy

78. Which of the following is not a unit of pressure?

- A. Pa
- B. $\frac{kg}{m-s}$**
- C. bars
- D. $\frac{kg}{m^2}$

79. Which of the following is the definition of Joule?

- A. Newton meter**
- B. $\frac{kg\ m}{s^2}$
- C. unit of power
- D. rate of change of energy

80. Which of the following is the basis for Bernoulli's for fluid flow?

- A. The principle of conservation of mass
- B. The principle of conservation of energy**
- C. The continuity equation
- D. Fourier's law

81. Equation of state for a single component can be any of the following except:

- A. the ideal gas law
- B. any relationship interrelating 3 or more state functions
- C. relationship mathematically interrelating thermodynamic properties of the material
- D. A mathematical expression defining between states interrelating a path**

82. The state of a thermodynamic system is always defined by its :

- A. absolute temperature
- B. process
- C. properties**
- D. temperature and pressure

83. In any non quasi-static thermodynamic process, the overall entropy of an isolated system will

- A. increase and then decrease
- B. decrease and then increase
- C. increase only**
- D. decrease only

84. Entropy is the measure of:

- A. the internal energy of a gas
- B. the heat capacity of a substance
- C. randomness or disorder**
- D. the change of enthalpy of a system

85. Which of the following statements about entropy is false?

- A. Entropy of a mixture is greater than that of its components under the same condition
- B. An irreversible process increases entropy of universe
- C. Net entropy change in any closed cycle is zero
- D. Entropy of a crystal at 0 °F is zero**

86. Work or energy can be a function of all of the following except:

- A. force and distance
- B. power and time
- C. force and time**
- D. temperature and entropy

87. Energy changes are represented by all except which one of the following:

- A. $mC_p dt$
- B. $-\int V dP$
- C. $T ds - P dV$
- D. $\frac{dQ}{T}$**

88. $U + pV$ is a quantity called:

- A. shaft work
- B. entropy
- C. enthalpy**
- D. internal energy

89. In flow process, neglecting KE and PE changes, $\int v dP$ represents which item below?

- A. Heat transfer
- B. Shaft work**
- C. Enthalpy change
- D. Closed system work

90. Power may be expressed in units of

- A. ft – lb
- B. kw – hr
- C. Btu
- D. $\frac{Btu}{hr}$**

91. Equilibrium condition exist in all except which of following?

- A. In reversible processes
- B. In processes where driving forces infinitesimals
- C. In a steady state flow process**
- D. Where nothing can occur without an effect on system's surrounding

92. In a closed system (with a moving boundary) which of the following represents work done during isothermal process?

- A. $W = 0$
- B. $W = P(V_2 - V_1)$
- C. $W = P_1 V_1 \ln \frac{V_2}{V_1}$**
- D. $W = \frac{P_2 V_2 - P_1 V_1}{1-n}$

93. A substance that exists, or is regarded as existing as a continuum characterized by a low resistance to flow and the tendency to assume the shape of its container

- A. Fluid**
- B. Atom
- C. Molecule
- D. Vapor

94. A substance that is homogeneous in composition and homogeneous and invariable in chemical aggregation.

- A. Pure substance**
- B. Simple substance
- C. Vapor
- D. Water

95. A substance whose state is defined by variable intensive thermodynamic properties.

- A. Pure substance
- B. Simple substance**
- C. Vapor
- D. Water

96. A system in which there is no exchange of matter with the surrounding or mass does not cross its boundaries.

- A. Open system
- B. Closed system**
- C. Isolated system
- D. Nonflow system

97. A system that is completely impervious to its surrounding or neither mass nor energy cross its boundaries.

- A. Open system
- B. Closed system
- C. Isolated system**
- D. Nonflow system

98. A system in which there is a flow of mass across its boundaries.

- A. Open system**
- B. Closed system
- C. Isolated system
- D. Steady flow system

99. The properties that are dependent upon the mass of the system and are total values such as total volume a total internal energy.

- A. Intensive properties
- B. Extensive properties**
- C. Specific properties
- D. State properties

100. The properties that are independent of the mass the system such as temperature, pressure, density and volume.

- A. Intensive properties**
- B. Extensive properties
- C. Specific properties
- D. State properties

101. The properties for a unit mass and are intensive by definition such as specific volume.

- A. Intensive properties
- B. Extensive properties
- C. Specific properties**
- D. Thermodynamic properties

102. The condition as identified through the properties of the substance, generally defined by particular values of any two independent properties.

- A. State**
- B. Point
- C. Process
- D. flow

103. The only base unit with a prefix kilo is

- A. kilogram**
- B. kilometer
- C. kilojoule
- D. kilopascal

104. The force of gravity on the body.

- A. Weight**
- B. Specific gravity
- C. Attraction
- D. Mass

105. The mass per unit volume of any substance.

- A. Density**
- B. Specific volume
- C. Specific weight
- D. Specific gravity

106. The force of gravity on unit volume is

- A. density
- B. specific volume
- C. specific weight**
- D. specific gravity

107. The reciprocal of density is

- A. specific volume**
- B. specific weight
- C. specific gravity
- D. specific heat

108. Avogadro's number, a fundamental constant of nature, is the number of molecules in a gram-mole. This constant is

- A. 6.05222×10^{23}
- B. 6.02252×10^{23}
- C. 6.20522×10^{23}
- D. 6.50222×10^{23}

109. The ratio of the gas constant to Avogadro's number is:

- A. Maxwell's constant
- B. Boltzmann's constant**
- C. Napier's constant
- D. Joule's constant

110. The absolute zero on the Fahrenheit scale is at

- A. -459.7 °F**
- B. 459.7 °F
- C. -273.15 °C
- D. 273.15 °C

111. Absolute temperatures on the Fahrenheit scale are called:

- A. degrees Rankine**
- B. degrees Kelvin
- C. absolute Fahrenheit
- D. absolute Celsius

112. The absolute zero on the Celsius scale is at

- A. -459.7 °F
- B. 459.7 °F
- C. -273.15 °C**
- D. 273.15 °C.

113. What is the absolute temperature in celsius scale

- A. degrees Rankine
- B. degrees Kelvin**
- C. absolute Fahrenheit
- D. absolute Celsius

114. The Fahrenheit scale was introduced by Gabriel Fahrenheit of Amsterdam, Holland in what year

- A. 1592
- B. 1742
- C. 1730
- D. 1720**

115. The Centigrade scale was introduced by Anders Celsius in what year?

- A. 1542
- B. 1740**
- C. 1730
- D. 1720

116. The National Bureau of Standards uses, among others, the liquid -vapor equilibrium of hydrogen at

- A. -196 °C
- B. 196 °C
- C. 253 °C
- D. -253 °C**

117. The National Bureau of Standards uses, among others, the liquid - vapor equilibrium of Nitrogen at

- A. -196 °C**
- B. 196 °C
- C. 253 °C
- D. -253 °C

118. The liquid - vapor equilibrium of Oxygen is at what temperature?

- A. 197.82 °C
- B. -197.82 °C
- C. 182.97 °C
- D. -182.97 °C**

119. The solid - liquid equilibrium of Mercury is at what temperature?

- A. 38.87 °C
- B. -38.87 °C**
- C. 37.88 °C
- D. -37.88 °C

120. The solid - liquid equilibrium of Tin is at what temperature?

- A. -38.87 °C
- B. 38.87 °C
- C. 231.9 °C**
- D. -231.9 °C

121. The solid - liquid equilibrium of Zinc is at what temperature?

- A. 231.9 °C
- B. 419.505 °C**
- C. 444.60 °C
- D. 630.5 °C

122. The liquid-vapor equilibrium of Sulfur is at what temperature?

- A. 231.9 °C
- B. 419.505 °C
- C. 444.60 °C**
- D. 630.5 °C

123. The solid - liquid equilibrium of Antimony is at what temperature?

- A. 630.5 °C**
- B. 419.505 °C
- C. 444.60 °C
- D. 231.9 °C

124. The solid - liquid equilibrium of silver is at what temperature?

- A. 630.5 °C
- B. 960.8 °C**
- C. 1063 °C
- D. 1774 °C

125. The solid - liquid equilibrium of Gold is at what temperature?

- A. 630.5 °C
- B. 960.8 °C
- C. 1063 °C**
- D. 1774 °C

126. The solid - liquid equilibrium of Platinum is at what temperature?

- A. 630.5 °C
- B. 960.8 °C
- C. 1063 °C
- D. 1774 °C**

127. The solid - liquid equilibrium of Tungsten is at what temperature?

- A. 3730 °C
- B. 3370 °C**
- C. 3073 °C
- D. 3037 °C

128. The device that measures temperature the electromotive force.

- A. thermometer
- B. thermocouple**
- C. electro-thermometer
- D. thermoseebeck

129. The emf is a function of the temperature difference between the junction, a phenomenon called:

- A. Seebeck effect**
- B. Stagnation effect
- C. Primming
- D. Electromotive force

130. The device that measure temperature by electromotive force called thermocouple was discovered by:

- A. Galileo
- B. Fahrenheit
- C. Celsius
- D. Seebeck**

131. When two bodies, isolated from other environment, are in thermal equilibrium with a third body, the two are in thermal equilibrium with each other.

- A. Zeroth law of thermodynamics**
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics

132. The total entropy of pure substances approaches zero as the absolute thermodynamic temperature approaches zero.

- A. Zeroth law of thermodynamics
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics**

133. If any one or more properties of a system change system is said to have undergone a _____.

- A. cycle
- B. process**
- C. flow
- D. control

134. When a certain mass of fluid in a particular state passes through a series of processes and returnn its to initial state, it undergoes a.

- A. revolution
- B. rotation
- C. process
- D. cycle**

135. The term given to the collection of matter consideration enclosed within a boundary.

- A. System**
- B. Matter
- C. Environment
- D. Atoms

136. The region outside the boundary or the space and matter external to a system:

- A. Ex- system
- B. Surrounding**
- C. Matter
- D. Extension

137. The true pressure measured above a perfect vacuum.

- A. Absolute pressure**
- B. Gage pressure
- C. Atmospheric pressure
- D. Vacuum pressure

138. The pressure measured from the level of atmospheric pressure by most pressure recording instrument like pressure gage and open-ended manometer.

- A. Gage pressure**
- B. Atmospheric pressure
- C. Barometric pressure
- D. Absolute pressure

139. The pressure obtained from barometric reading

- A. Absolute pressure
- B. Gage pressure
- C. Atmospheric pressure**
- D. Vacuum pressure

140. It is a form of energy associated with the kinetic random motion of large number of molecules.

- A. Internal energy
- B. Kinetic energy
- C. Heat**
- D. Enthalpy

141. The heat needed to change the temperature of the body without changing its phase.

- A. Latent heat
- B. Sensible heat**
- C. Specific heat
- D. Heat transfer

142. The heat needed by the body to change its phase without changing its temperature.

- A. Latent heat**
- B. Sensible heat
- C. Specific heat
- D. Heat transfer

143. The measure of the randomness of the molecules of a substance.

- A. Enthalpy
- B. Internal energy
- C. Entropy**
- D. Heat

144. The heat energy transferred to a substance at a constant pressure process is : _____

- A. enthalpy**
- B. heat internal
- C. energy
- D. entropy

145. It is the energy stored within the body.

- A. Enthalpy
- B. Heat
- C. Internal energy**
- D. Entropy

146. A theoretically ideal gas which strictly follows Boyle's law and Charle's law of gases.

- A. Universal gas
- B. Perfect gas**
- C. Combined gas
- D. Imperfect gas

147. In a confined gas, if the absolute temperature is held constant, the volume is inversely proportional to the absolute pressure.

- A. Boyle's law**
- B. Charles law
- C. Dalton's law
- D. Avogadro's law

148. In a confined gas if the absolute pressure is held constant the volume is directly proportional to the absolute temperature.

- A. Boyle's law
- B. Charles' law**
- C. Dalton's law
- D. Avogadro's law

149. The pressure exerted in a vessel by a mixture of gases is equal to the sum of the pressures that each separate gas would exert if it alone occupied the whole volume of the vessel.

- A. Boyle's law
- B. Charles' law
- C. Dalton's law**
- D. Avogadro's law

150. At equal volume, at the same temperature and pressure conditions, the gases contain the same number of molecules.

- A. Boyle's law
- B. Charles' law
- C. Dalton's law
- D. Avogadro's law**

151. A process in which the system departs from equilibrium state only infinitesimally at every instant.

- A. Reversible process
- B. Irreversible process
- C. Cyclic process
- D. Quasi-static process**

152. A process which gives the same states/conditions after the system undergoes a series of processes :

- A. Reversible process
- B. Irreversible process
- C. Cyclic process
- D. Quasi-static process**

153. A thermodynamic system that generally serves as a heat source or heat sink for another system.

- A. Combustion chamber
- B. Heat reservoir**
- C. Heat engine
- D. Stirling engine

154. A thermodynamic system that operates continuously with only energy (heat and work) crossing its boundaries; its boundaries are impervious to the flow of mass.

- A. **Heat engine**
- B. Steady flow work
- C. Stirling engine
- D. Ericsson engine

155. A surface that is impervious to heat is

- A. isothermal surface
- B. **adiabatic surface**
- C. isochoric surface
- D. isobaric surface

156. One of the consequences of Einstein's theory of relativity is that mass may be converted into energy and energy into mass, the relation being given by the famous equation, $E = mc^2$. What is the value of speed of light c ?

- A. $2.7797 \times 10^{10} \frac{cm}{s}$
- B. **$2.9979 \times 10^{10} \frac{cm}{s}$**
- C. $1.7797 \times 10^{10} \frac{cm}{s}$
- D. $2.9979 \times 10^{10} \frac{cm}{s}$

157. In the polytropic process we have $p v^n = \text{constant}$ the value of n is infinitely large, the process is called

- A. **constant volume process**
- B. constant pressure process
- C. constant temperature process
- D. adiabatic process

158. The thermodynamic cycle used in a thermal power plant is :

- A. Ericsson
- B. Brayton
- C. Joule
- D. **Rankine**

159. For the same heat input and same compression ratio

- A. both Otto cycle and Diesel cycle are equally efficient
- B. Otto cycle is less efficient than diesel cycle
- C. **efficiency depends mainly on working substance**
- D. none of the above is correct

160. A heat exchange process where in the product of pressure and volume remains constant called:

- A. heat exchange process
- B. isentropic process
- C. throttling process
- D. **hyperbolic process**

161. Which of the following provides the basis for measuring thermodynamic property of temperature?

- A. **Zeroth law of thermodynamics**
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics

162. 1 watt...

- A. **1 Nm/s**
- B. 1 Nm/min
- C. 1 Nm/hr
- D. 1 kNm/hr

163. Under ideal conditions, isothermal, isobaric, isochoric and adiabatic processes are :

- A. dynamic processes
- B. stable processes
- C. **quasi-static processes**
- D. static processes

164. Isentropic flow is

- A. perfect gas flow
- B. irreversible adiabatic flow
- C. ideal fluid flow
- D. **reversible adiabatic flow**

165. Exhaust gases from an engine possess

- A. solar energy
- B. **kinetic energy**
- C. chemical energy
- D. stored energy

166. The extension and compression of a helical spring is an example of what process?

- A. isothermal cycle
- B. thermodynamic process
- C. adiabatic process
- D. reversible process

167. At critical point the latent enthalpy of vaporization is

- A. dependent on temperature
- B. **zero**
- C. minimum
- D. maximum

168. Which of the following relations is not applicable in a free expansion process?

- A. Heat supplied is zero
- B. Heat rejected is zero
- C. Work done is zero
- D. Change in temperature is zero**

169. The triple point of a substance is the temperature and pressure at which:

- A. the solid and liquid phases are in equilibrium
- B. the liquid and gaseous phases are in equilibrium
- C. the solid, liquid and the gaseous phases are in equilibrium
- D. the solid does not melt, the liquid does not boil and the gas does not condense**

170. According to Clausius statement

- A. Heat flows from hot substance to cold substance, unaided
- B. Heat cannot flow from cold substance to hot substance
- C. Heat can flow from cold substance to hot substance with the aid of external work
- D. A and C**

171. A heat engine is supplied heat at rate of 30,000 J/s gives an output of 9 kW. The thermal efficiency of the engine is _____.

- A. 30%**
- B. 43%
- C. 50%
- D. 55%

172. The RMS velocity of hydrogen gas at N.T.P. is approximately _____.

- A. 3838 m/s
- B. 1839 m/s**
- C. 4839 m/s
- D. 839 m/s

173. Which of the following cycles has two isothermal and two constant volume processes?

- A. Joule cycle
- B. Diesel cycle
- C. Ericsson cycle
- D. Stirling cycle

174. "It. is impossible to construct a heat engine that operates in a cycle and receives a given quantity of heat from a high temperature body and does an equal amount of work" The above statement is known as :

- A. Gay Lussac's law
- B. Kinetic Theory
- C. Kelvin - Planck's law**
- D. Joule -Thomson's law

175. For steam nozzle, which of the following ratio will have the value less than unity?

- A. (Pressure at inlet)/(Pressure at outlet)
- B. Specific volume at inlet/(Specific volume at outlet)**
- C. Temperature of steam at inlet/(Temperature of steam at outlet)
- D. None of the above

176. A Bell-Coleman cycle is a reversed

- A. Stirling cycle
- B. Brayton cycle
- C. Joule cycle**
- D. Carnot cycle

177. Ericsson cycle consists of the following processes

- A. two isothermal and two constant volume
- B. two isothermal. and two constant isentropic
- C. two isothermal and two constant pressure
- D. two adiabatic and two constant pressure

178. A steam nozzle changes

- A. kinetic energy into heat energy
- B. heat energy into potential energy
- C. potential energy into heat energy
- D. heat energy into kinetic energy**

179. Which is not correct for calculating air standard efficiency?

- A. All processes are reversible
- B. Specific heat remains unchanged at all temperatures
- C. No account of the mechanism of heat transfer is considered
- D. Gases dissociate at higher temperatures**

180. According to Pettlier Thomson effect:

- A. It is impossible to construct a heat engine that operates in a cycle and receives a given quantity of heat from a high temperature body and does an equal amount of work
- B. It is impossible to construct a device that operates in a cycle and produces no effect other than the transfer of heat from a cooler body to hotter body
- C. When two dissimilar metals are heated at one end and cooled at other, e.m.f. that is developed is proportional to difference of temperatures at two ends
- D. Work can't be converted into heat**

181. In actual gases the molecular collisions are :

- A. plastic
- B. elastic
- C. inelastic**
- D. inplastic

182. The Beattie-Bridgeman equation of state is quite accurate in cases of:

- A. all pressures above atmospheric pressure
- B. densities less than about 0.8 times the critical density**
- C. near critical temperature
- D. none of the above

183. Which of the following statement about Van der Waals equation is correct?

- A. It is valid for all pressures and temperatures
- B. It represents a straight line on PV versus V plot
- C. It has three roots of identical value at the critical point**
- D. The equation is valid for diatomic gases only

184. The Clapeyron's equation is applicable to :

- A. 1 system in equilibrium
- B. a change of state
- C. a change of state when two phases are in equilibrium**
- D. a change of state when water and water vapor are involved

185. The vapor pressure is related to the enthalpy of vaporization by the:

- A. Clausius - Clapeyron's equation**
- B. Dalton's law
- C. Raoult's law
- D. Maxwell's equation

186. Solubility of a gas in a liquid at small concentration can be represented by which law ?

- A. Henry's law**
- B. Clausius – Clapeyron's equation
- C. Dalton's law
- D. Roul't's law

187. A compound pressure gauge is used to measure:

- A. complex pressures
- B. variable pressures
- C. average pressures
- D. positive and negative pressures**

188. Which of the engine is used for fighter bomber?

- A. Turboprop
- B. Turbojet**
- C. Ramjet
- D. Pulsejet

189. The thermal efficiency of gas-vapor cycle as compared to steam turbine or gas turbine

- A. greater than**
- B. less than
- C. not comparable
- D. equal

190. The process in which heat energy is transferred to thermal energy storage device is known as:

- A. adiabatic
- B. regeneration**
- C. intercooling
- D. heat transfer

191. The absolute zero in Celsius scale is:

- A. 100
- B. 0
- C. -273**
- D. 273

192. What is the temperature when water and vapor are in equilibrium with the atmospheric pressure?

- A. Ice point
- B. Steam point**
- C. Critical point
- D. Freezing point

193. The temperature of a pure substance at a temperature of absolute zero is :

- A. unity
- B. zero**
- C. infinity
- D. 100

194. When the number of reheat stages in a reheat cycle is increased, the average temperature:

- A. increases**
- B. decreases
- C. is constant
- D. is zero

195. A temperature measurement in an ordinary thermometer which has constant specific humidity

- A. Critical temperature
- B. Dew point temperature**
- C. Dry bulb temperature
- D. Wet bulb temperature

196. In a closed vessel, when vaporization takes place temperature rises. Due to the rising temperature, the pressure increases until an equilibrium is established between the temperature and pressure. The temperature of equilibrium is called:

- A. dew point
- B. ice point
- C. superheated temperature
- D. boiling point**

197. When hot soup was served in a cup during dinner an engineer was so eager to drink it. Since it was hot, he added cubes of ice to cool the soup and stirred it. He noticed that dew starts to form on the outer surface of the cup. What is this temperature equal to

- A. superheated temperature
- B. equal to zero
- C. standard temperature
- D. equal to air's dew point temperature**

198. Is a measure of the energy that is no longer available to perform useful work within the current environment.

- A. Absolute entropy**
- B. Absolute enthalpy
- C. Fugacity
- D. Molar value

199. A graph of enthalpy versus entropy for steam.

- A. Mollier diagram**
- B. Moody diagram
- C. Steam table
- D. Maxwell diagram

200. The reaction of inertia in an accelerated body is called

- A. Kinetic reaction**
- B. Endothermic reaction
- C. Kinematic reaction
- D. Dynamic reaction

201. A Mollier chart of thermodynamic properties is shown in which of the following diagrams?

- A. T-S diagram
- B. P-V diagram
- C. h-S diagram**
- D. p-h diagram

202. The following are included in the first law of thermodynamics for closed system EXCEPT:

- A. heat transferred in and of the system
- B. work done by or on the system
- C. internal energy**
- D. kinetic energy

203. All processes below are irreversible except one. Which one?

- A. Magnetization with hysteresis
- B. Elastic tension and release of a steel bar**
- C. Inelastic deformation
- D. Heat conduction

204. The combination of conditions that best describe a thermodynamic process is given by which of the following?

I. Has successive states through which the system passes
II. When reversed leaves no change in the system
III. When reversed leaves no change in the system or the surroundings
IV. States are passes through so quickly that the surroundings do not change

- A. I and II
- B. I and III
- C. I and IV
- D. I only**

205. The sum of the energies of all the molecules in a system where energies appear in several complex forms is the:

- A. kinetic energy
- B. potential energy
- C. internal energy**
- D. frictional energy

206. The Carnot refrigeration cycle includes all of the following process except :

- A. isentropic expansion
- B. isothermal heating
- C. isenthalpic expansion**
- D. isentropic compression

207. The maximum possible work that can be obtained a cycle operating between two reservoirs is found from

- A. process irreversibility
- B. availability
- C. Carnot efficiency**
- D. Reversible work

208. The following factors are necessary to define thermodynamic cycle except

- A. the working substance
- B. high and low temperature reservoirs
- C. the time it takes to complete the cycle**
- D. the means of doing work on the system

209. All of the following terms included in the second law for open system except

- A. shaft work
- B. flow work
- C. internal energy
- D. average work**

210. The following terms are included in the first law of thermodynamics for open systems except

- A. heat transferred in and out of the system
- B. work done by or in the system
- C. magnetic system**
- D. internal system

211. The following terms are included in the first law of thermodynamics for closed systems except:

- A. heat transferred in and out of the system
- B. work done by or on the system
- C. internal energy
- D. kinetic energy**

212. Which of the following statements about a path function is not true?

- A. On a p- v diagram, it can represent work done
- B. On a t - s diagram, it can represent heat transferred
- C. It is dependent on the path between states of thermodynamic equilibrium
- D. It represents values of p, v, t, and s between states that are path functions**

213. A constant pressure thermodynamic process obeys:

- A. Boyle's law
- B. Charles law**
- C. Amagat's law
- D. Dalton's law

214. The first and second laws of thermodynamics are

- A. continuity equations
- B. momentum equations
- C. energy equations**
- D. equations of state

215. Represents the temperature an ideal gas will attain when it is brought to rest adiabatically.

- A. Absolute zero temperature
- B. Stagnation temperature**
- C. Boiling temperature
- D. Critical temperature

216. Gauge pressure and absolute pressure dife each other by:

- A. the system units
- B. atmospheric pressure**
- C. the size of the gauge
- D. nothing they mean the same thing

217. Each of the following are correct values of standard atmospheric pressure except:

- A. 1,000 atm
- B. 14.962 psia
- C. 760 torr
- D. 1013 mm Hg.**

218. All of the following are properties of an ideal gas except:

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

219. Which of the following is not the universal gas constant?

- A. 1545 ft-lb/lbmol-°R
- B. 8.314 J/mol.K
- C. 8314 kJ/mol. K**
- D. 8.314 kJ/kmol.K

220. The following are all commonly quoted values of standard temperatures and pressure except:

- A. 32°F and 14.696 psia
- B. 273.15 K and 101.325 kPa
- C. 0°C and 760 mm Hg
- D. 0°F and 29.92 in Hg**

221. The variation of pressure in an isobaric process is:

- A. linear with temperature
- B. described by the perfect gas law
- C. inversely proportional to temperature
- D. zero**

222. For fluid flow, the enthalpy is the sum of internal energy and _____.

- A. entropy
- B. work flow**
- C. pressure
- D. temperature

223. A thermodynamic process whose deviation from equilibrium is infinitesimal at all times is _____.

- A. reversible
- B. isentropic
- C. in quasi - equilibrium**
- D. isenthalpic

124. Which thermodynamic property best describes the molecular activity of a substance?

- A. Enthalpy
- B. Entropy
- C. Internal energy**
- D. External energy

225. Stagnation enthalpy represents the enthalpy of a fluid when it is brought to rest _____

- A. isometrically
- B. adiabatically**
- C. isothermally
- D. disobarically

226. During stagnation process, the kinetic energy of a fluid is converted to enthalpy which results in an:

- A. increase in the fluid specific volume
- B. increase in the fluid pressure
- C. increase in the fluid temperature and pressure**
- D. increase in the fluid temperature

227. The properties of fluid at the stagnation in state are called _____

- A. stagnation property
- B. stagnation phase
- C. stagnation state**
- D. stagnation vapor

228. All of the following are thermodynamic properties except _____

- A. temperature
- B. pressure
- C. density
- D. modulus of elasticity**

229. A liquid boils when its vapor pressure equals

- A. the gage pressure
- B. the critical pressure
- C. the ambient pressure**
- D. one standard atmosphere

230. A system composed of ice and water at 0°C is said to be: _____

- A. a multiphase material
- B. in thermodynamic equilibrium
- C. in thermal equilibrium
- D. all of the above**

231. The heat of fusion of a pure substance is:

- A. the change in phase from solid to gas
- B. the change in phase from liquid to gas
- C. the energy released in a chemical reaction
- D. the energy required to melt the substance**

232. The heat of vaporization involves the change in enthalpy due to:

- A. the change in phase from solid to gas
- B. the change in phase from liquid to gas**
- C. the energy released in a chemical reaction
- D. the change in phase from solid to liquid

233. The heat of sublimation involves the change in enthalpy due to _____.

- A. **the change in phase from solid to gas**
- B. the change in phase from liquid to gas
- C. the energy released in a chemical reaction
- D. the change in phase from solid to liquid

234. A specific property

- A. **defines a specific variable (e.g., temperature)**
- B. is independent of mass
- C. is an extensive property multiplied by mass
- D. is dependent of the phase of the substance

235. A material's specific heat can be defined as

- A. the ratio of heat required to change the temperature of mass by a change in temperature
- B. being different for constant pressure constant temperature processes
- C. all function of temperature
- D. **all of the above**

236. If a substance temperature is less than its saturation temperature, the substance is :

- A. **subcooled liquid**
- B. wet vapor
- C. saturated vapor
- D. superheated vapor

237. If a substance temperature is equal to its saturation temperature, the substance is a _____

- A. subcooled liquid
- B. wet vapor
- C. **saturated liquid and vapor**
- D. superheated vapor

238. If a substance's temperature is greater than its saturation temperature, the substance is a _____

- A. subcooled liquid
- B. wet vapor
- C. saturated vapor
- D. **superheated vapor**

239. Critical properties refer to

- A. extremely important properties, such as temperature and pressure.
- B. heat required for phase change and important for energy production
- C. **property values where liquid and gas phase are indistinguishable**
- D. properties having to do with equilibrium conditions, such as the Gibbs and Helmholtz functions.

240. For a saturated vapor, the relationship between temperature and pressure is given by:

- A. the perfect gas law
- B. Van der Waal's equation
- C. **the steam table**
- D. a Viral equation of state

241. Properties of a superheated vapor are given by

- A. the perfect gas law
- B. **a superheated table**
- C. a one to one relationship, such as the properties of saturated steam
- D. a Viral equation of state

242. Properties of non-reacting gas mixtures are given by

- A. geometric weighting
- B. volumetric weighting
- C. **volumetric weighting for molecular weight and density, and geometric weighting for all other properties except entropy**
- D. arithmetic average

243. The relationship between the total volume of a mixture of non-reacting gases and their partial volume given by :

- A. gravimetric fractions
- B. **Amagat's law**
- C. Dalton's law
- D. mole fractions

244. The relationship between the total pressure of a mixture of non-reacting gases and the partial pressures of constituents is given by :

- A. gravimetric fractions
- B. volumetric fractions
- C. **Dalton's law**
- D. mole fractions

245. Which of the following is the best definition of enthalpy?

- A. The ratio of heat added to the temperature increases in a system
- B. **The amount of useful energy in a system**
- C. The amount of energy no longer available to the system
- D. The heat required to cause a complete conversion between two phases at a constant temperature

246. Which of the following statements is not true for real gases?

- A. Molecules occupy a volume not negligible in comparison to the total volume of gas
- B. Real gases are subjected to attractive forces between molecules (e.g., Van der Waal's forces)
- C. The law of corresponding states may be used for real gases
- D. Real gases are found only rarely in nature**

247. The stagnation state is called the isentropic stagnation state when the stagnation process is:

- A. reversible as well dynamic
- B. isotropic
- C. adiabatic
- D. reversible as well as adiabatic**

248. The entropy of a fluid remains constant during what process?

- A. polytropic stagnation process
- B. unsteady stagnation process
- C. combustion process
- D. isentropic stagnation process**

249. All of the following processes are irreversible except

- A. stirring of a viscous fluid
- B. an isentropic deceleration of a moving perfect fluid**
- C. an unrestrained expansion of a gas
- D. phase changes

250. All of the following processes are irreversible except

- A. chemical reactions
- B. diffusion
- C. current flow through an electrical resistance
- D. an isentropic compression of a perfect gas**

251. All of the following processes are irreversible except

- A. magnetization with hysteresis
- B. elastic tension and release of a steel bar**
- C. inelastic deformation
- D. heat conduction

252. Which of the following state(s) is/are necessary for a system to be in thermodynamic equilibrium?

- A. Chemical equilibrium
- B. Thermal equilibrium
- C. Mechanical equilibrium
- D. Chemical, mechanical, and thermal equilibrium**

253. Adiabatic heat transfer within a vapor cycle refers to:

- A. heat transfer that is atmospheric but not reversible
- B. the transfer of energy from one stream to another in a heat exchanger so that the energy of the input streams equals the energy of the output streams**
- C. heat transfer that is reversible but not isentropic
- D. there is no such thing as adiabatic heat transfer

254. Which of the following gives polytropic under n?

- A. $\frac{\log \frac{P_2}{P_1}}{\log \frac{V_2}{V_1}}$**
- B. $\frac{\log \frac{P_1}{P_2}}{\log \frac{V_1}{V_2}}$
- C. $\frac{\log \frac{V_1}{V_2}}{\log \frac{P_2}{P_1}}$
- D. $\frac{\log \frac{V_1}{V_2}}{\log \frac{P_1}{P_2}}$

255. The work done in an adiabatic process in a system:

- A. is equal to the change in total energy in a closed system
- B. is equal to the total net heat transfer plus the entropy change
- C. is equal to the change in total energy of closed system plus the entropy change
- D. is equal to the change in total energy of closed system plus net heat transfer**

256. Based on the first law of thermodynamics, which of the following is wrong?

- A. The heat transfer equals the work plus energy change
- B. The heat transfer cannot exceed the work done**
- C. The net transfer equal the net work of the cycle
- D. The net heat transfer equals the energy change if no work is done

257. Assuming real processes, the net entropy change in the universe:

- A. must be calculated
- B. equals zero
- C. is negative
- D. is positive**

258. Which of the following types of flowmeters is most accurate?

- A. Venturi tube
- B. Pitot tube**
- C. Flow nozzle
- D. Foam type

259. What is referred by control volume?

- A. An isolated system
- B. Closed system
- C. Fixed region in space**
- D. Reversible process only

260. What is the most efficient thermodynamic cycle?

- A. Carnot**
- B. Diesel
- C. Rankine
- D. Brayton

261. How do you treat a statement that is considered a scientific law?

- A. We postulate to be true
- B. Accept as a summary of experimental observation**
- C. We generally observed to be true
- D. Believe to be derived from mathematical theorem

262. An instrument commonly used in most research and engineering laboratories because it is small and fast among the other thermometers

- A. Mercury thermometer
- B. Liquid-in-glass thermometer
- C. Gas thermometer
- D. Thermocouple**

263. In an actual gases, the molecular collisions are

- A. plastic
- B. elastic
- C. inelastic**
- D. inplastic

264. Which of the following is used in thermal power plant?

- A. Brayton
- B. Reversed Carnot
- C. Rankine**
- D. Otto

265. The elongation and compression of a helical spring is an example of

- A. irreversible process
- B. reversible process**
- C. isothermal process
- D. adiabatic process

266. Otto cycle consists of

- A. Two isentropic and two constant volume processes**
- B. Two isentropic and two constant pressure processes
- C. Two adiabatic and two isothermal processes
- D. Two isothermal and two constant volume processes

267. Brayton cycle has

- A. Two isentropic and two constant volume processes
- B. Two isentropic and two constant pressure processes**
- C. One constant pressure, one constant volume and two adiabatic processes
- D. Two isothermal, one constant volume and one constant pressure processes

268. A Bell-Coleman cycle is a reversed

- A. Stirling cycle
- B. Joule cycle**
- C. Carnot cycle
- D. Otto cycle

269. A steam nozzle changes

- A. kinetic energy into heat energy
- B. heat energy into potential energy
- C. heat energy into kinetic energy**
- D. potential energy into heat energy

270. The pitot tube is a device used for measurement of

- A. pressure
- B. flow
- C. velocity**
- D. discharge

271. The continuity equation is applicable to

- A. Viscous, unviscous fluids
- B. Compressibility of fluids
- C. Conservation of mass**
- D. Steady, unsteady flow

272. The work done by a force of R Newtons moving in a distance of L meters is converted entirely into kinetic energy and expressed by the equation:

- A. $RL=2MV^2$
- B. $RL=2MV$
- C. **$RL=\frac{1}{2}MV^2$**
- D. $RL=\frac{1}{2}MV$

273. Gas being heated at constant volume is undergoing the process of:

- A. isentropic
- B. adiabatic
- C. **isometric**
- D. isobaric

274. Dew point is defined as

- A. **The temperature to which the air must be cooled at constant pressure to produce saturation**
- B. The point where the pressure and temperature lines meet
- C. The temperature which dew is formed in the air
- D. The pressure which dew is formed in the air

275. What do you call the changing of an atom of element into an atom of a different element with a different atomic mass?

- A. Atomization
- B. **Atomic transmutation**
- C. Atomic pile
- D. Atomic energy

276. What do you call the weight of the column of air above the earth's surface?

- A. Air pressure
- B. Aerostatic pressure
- C. Wind pressure
- D. **Atmospheric pressure**

277. What keeps the moisture from passing through the system?

- A. **Dehydrator**
- B. Aerator
- C. Trap
- D. Humidifier

278. What condition exists in an adiabatic throttling process?

- A. Enthalpy is variable
- B. **Enthalpy is constant**
- C. Entropy is constant
- D. Specific volume is constant

279. The specific gravity of a substance is the ratio of its density to the density of:

- A. mercury
- B. gas
- C. air
- D. **water**

280. A compound pressure gauge is used to measure:

- A. complex pressures
- B. variable pressures
- C. compound pressures
- D. **positive and negative pressures**

281. Isentropic flow is

- A. perfect gas flow
- B. ideal fluid flow
- C. frictionless reversible flow
- D. **reversible adiabatic flow**

282. Under ideal conditions, isothermal, isobaric, isochoric, and adiabatic processes are:

- A. dynamic processes
- B. stable processes
- C. **quasi-static processes**
- D. static processes

283. One Watt is:

- A. **$1 \frac{N.m}{s}$**
- B. $1 \frac{N.m}{min}$
- C. $1 \frac{N.m}{hr}$
- D. $1 \frac{kN.m}{s}$

284. A temperature above which a given gas cannot be liquefied:

- A. Cryogenic temperature
- B. Vaporization temperature
- C. Absolute temperature
- D. **Critical temperature**

285. The effectiveness of a body as a thermal radiator at a given temperature.

- A. Absorptivity
- B. Emissivity**
- C. Conductivity
- D. Reflectivity

286. Which of the following occurs in a reversible polytropic process?

- A. Enthalpy remains constant
- B. Internal energy does not change
- C. Some heat transfer occurs**
- D. Entropy remains constant

287. The instrument used to measure atmospheric pressure is:

- A. Rotameter
- B. Manometer
- C. Venturi
- D. Barometer**

288. A pneumatic tool is generally powered by

- A. water
- B. electricity
- C. steam
- D. air**

89. Which of the following gases can be used to measure the lowest temperature?

- A. Nitrogen
- B. Helium**
- C. Oxygen
- D. Hydrogen

90. The triple point of a substance is the temperature and pressure at which:

- A. The solid and liquid phases are in equilibrium
- B. The solid and gaseous phases are in equilibrium
- C. The solid, liquid and gaseous phases are in equilibrium
- D. The solid does not melt, the liquid does not boil and the gas does not condense**

291. Which of the following relations is not applicable in a free expansion process?

- A. Heat rejected is zero
- B. Work done is zero
- C. Change in temperature is zero**
- D. Heat supplied is zero

292. Ericsson cycle has

- A. Two isothermal and two constant pressure processes.**
- B. Two isothermal and two constant volume processes.
- C. Two isothermal and two constant entropy processes.
- D. Two adiabatic, one constant volume and constant pressure processes

293. A Stirling cycle has

- A. Two adiabatic processes and two constant volume processes
- B. Two adiabatic and two constant pressure processes
- C. Two isothermal and two constant pressure processes
- D. Two isothermal and two constant volume processes**

294. The temperature of the fluid flowing under pressure through a pipe is usually measured by:

- A. a glass thermometer
- B. an electric resistance thermometer
- C. a thermocouple
- D. all of the above**

295. Specific heat capacity is an SI derived unit described

- A. $\frac{\text{J}}{\text{kg}}$
- B. $\frac{\text{I}}{\text{mk}}$
- C. $\frac{\text{kJ}}{\text{kgK}}$**
- D. $\frac{\text{J}}{\text{m}}$

296. Which of the following is mathematically a thermodynamic property?

- A. A point function**
- B. Discontinuous
- C. A path function
- D. Exact differential

297. When the expansion or compression of gas takes place "without transfer of heat" to or from the gas, the process is called:

- A. reversible
- B. adiabatic**
- C. polytropic
- D. isothermal

298. Another name for the liquid valve is.

- A. Freon valve
- B. Shut-off valve
- C. King valve**
- D. Master valve

299. A liquid whose temperature is lower than the saturation temperature corresponding to the existing pressure:

- A. Subcooled liquid**
- B. Saturated liquid
- C. Pure liquid
- D. Compressed liquid

300. The law that states "Entropy of all perfect crystalline solids is zero at absolute zero temperature:

- A. Zeroth law of thermodynamics
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics**

301. What should be the temperature of both water and steam whenever they are present together?

- A. Saturation temperature for the existing pressure**
- B. Boiling point of water at 101.325 kPa
- C. Superheated temperature
- D. One hundred degrees centigrade

302. A manometer is an instrument that is used to measure:

- A. air pressure**
- B. heat radiation
- C. condensate water level
- D. air volume

303. What is the area under the curve of a temperature-entropy diagram?

- A. Volume
- B. Heat**
- C. Work
- D. Entropy

304. What do bodies at a temperature above absolute zero emit?

- A. Energy
- B. Heat of convection
- C. Thermal radiation**
- D. Heat of compression

305.PAST ME BOARD QUESTION

In the absence of any irreversibilities, a thermoelectric generator, a device that incorporates both thermal and electric effects, will have the efficiency of a/an

- A. Carnot cycle**
- B. Otto cycle
- C. Diesel cycle
- D. Rankine cycle

306. Both Stirling and Ericson engines are

- A. internal combustion engines
- B. external combustion engines**
- C. Carnot engines
- D. Brayton engines

307. Nozzles does not involve any work interaction. The fluid through this device experiences:

- A. no change in potential energy**
- B. no change in kinetic energy
- C. no change in enthalpy
- D. vacuum

308. If the actual kinetic energy of a nozzle is K_a and K_i is the maximum value that can be attained by an isentropic expansion from an initial to final state, then the efficiency of the nozzle is:

- A. $\frac{K_i}{K_a}$
- B. $\frac{K_a - K_i}{K_a}$
- C. $\frac{K_a - K_i}{K_i}$
- D. $\frac{K_a}{K_i}$**

309. The convergent section of a nozzle increases the velocity of the flow of the gas. What does it do to its pressure?

- A. Pressure becomes constant
- B. Pressure equals the velocity
- C. It increases the pressure
- D. It decreases the pressure**

310. In a closed vessel, when vaporization takes place, the temperature rises. Due to the rising temperature, pressure increases until an equilibrium is established between the temperature and pressure. The temperature of equilibrium is called _____.

- A. dew point
- B. ice point
- C. boiling point**
- D. superheated temperature

311. At steam point, the temperatures of water and its vapor at standard pressure are:

- A. extremes or maximum
- B. unity
- C. in equilibrium**
- D. undefined

312. When hot soup was served in a cup during dinner, an engineer was so eager to drink it. Since it was hot, he added cubes of ice to cool the soup and stirred it. He noticed that dew starts to form on the outermost surface of the cup. He wanted to check the temperature of the outermost surface of the cup. What is this temperature equal to?

- A. Superheated temperature
- B. Equal to zero
- C. Standard temperature
- D. Equal to air's dew point temperature**

313. What do you call a conversion technology that yields electricity straight from sunlight without the aid of a working substance like gas or steam without the use of any mechanical cycle?

- A. Power conversion
- B. Stirling cycle conversion
- C. Solar thermal conversion
- D. Photovoltaic-energy conversion**

314. Which of the following property of liquid extend resistance to angular or shear deformation:

- A. Specific gravity
- B. Specific weight
- C. Viscosity**
- D. Density

315: What is the pressure at the exit of a draft tube in a turbine?

- A. Below atmospheric
- B. Above atmospheric
- C. Atmospheric**
- D. Vacuum

316. When changes in kinetic energy of a compressed gas are negligible or insignificant, the work input to an adiabatic compressor is _____.

- A. negligible
- B. zero
- C. infinity
- D. equal to change in enthalpy**

317. What is the area under the curve of a pressure-volume diagram?

- A. Nonflow work**
- B. Steadyflow work
- C. Heat
- D. Power

318. In Stirling and Ericson cycle, regeneration can g

- A. increase efficiency**
- B. decrease efficiency
- C. control efficiency
- D. limit efficiency

319. The first law of thermodynamics is based on which of the following principles?

- A. Conservation of mass
- B. Enthalpy-entropy relationship
- C. Entropy-temperature relationship
- D. Conservation of energy**

320. In a two-phase system, 30% moisture means

- A. 70% liquid and 30% vapor
- B. 70% vapor and 30% liquid**
- C. 30% liquid and 100% vapor
- D. 30% vapor and 100% liquid

321. At 101.325 kPa, the boiling point of water is 100 °C the pressure is decreased, the boiling temperature will:

- A. increase
- B. decrease**
- C. remain the same
- D. drop to zero

322. Which of the following is equivalent to 1 hp in Btu/hr

- A. 778
- B. 2545**
- C. 746
- D. 3.41

323. What is the pressure above zero?

- A. Gage pressure**
- B. Absolute pressure
- C. Vacuum pressure
- D. Atmospheric Pressure

324. One Newton - meter is equal to:

- A. 1 Joule**
- B. 1 Btu
- C. 1 Calorie
- D. 1 Ergs

325. Which of the following is the instrument used to measure fluid velocity?

- A. Pitot tube**
- B. Orsat apparatus
- C. Anemometer
- D. Viscosimeter

326. Cryogenic temperature ranges from:

- A. -150 °F to -359 °F
- B. -250 °F to -459 °F**
- C. -100 °F to -300 °F
- D. -200 °F to -400 °F

327. Steam at 2 kPa is saturated at 17.5 °C. In what state will the state be at 40 °C if the pressure is 2.0 kPa?

- A. Superheated**
- B. Saturated
- C. Subcooled
- D. Supersaturated

328. Acceleration is proportional to force.

- A. Newton's law**
- B. Archimedes principle
- C. Law of gravitation
- D. Theory of relativity

329. Which of the following could be defined as simply push and pull?

- A. Power
- B. Inertia
- C. Work
- D. Force**

330. The true pressure measured above a perfect vacuum is:

- A. absolute pressure**
- B. atmospheric pressure
- C. gauge pressure
- D. vacuum. pressure

331. If an initial volume of an ideal gas is compressed to one-half its original volume and to twice its original temperature, the pressure:

- A. doubles
- B. halves
- C. quadruples**
- D. triples

332. When the expansion or compression of gas takes place without transfer of heat to or from the gas, the process is called:

- A. isometric process
- B. isothermal process
- C. isobaric process
- D. adiabatic process**

333. A body radiates heat proportional to the fourth power of its absolute temperature:

- A. Stefan-Boltzmann law**
- B. Planck's law
- C. Kirchhoff's law
- D. Maxwell's law

334. All substances emit radiation, the quantity and quality of which depends upon the absolute temperature and the properties of the material, composing the radiating body.

- A. Stefan-Boltzmann law
- B. Planck's law**
- C. Kirchhoff's law
- D. Maxwell's law

335. For bodies in thermal equilibrium with their environment, the ratio of total emissive power to the absorptivity is constant at any temperature.

- A. Stefan-Boltzmann law
- B. Planck's law
- C. Kirchhoff's law**
- D. Maxwell's law