1. Which of the following explains the thermodynamic open system?

   a. heat and work cross the boundary of the system, but the mass of the working substance does not
   b. mass of working substance crosses the boundary of the system
   c. both the heat and work as well as mass of the working substance cross the boundary of the system
   d. neither the heat and work nor the mass of the working substance crosses the boundary of the system

2. In Mollier chart (enthalpy - entropy chart) a flow through a turbine (steam and gas) is represented by _____.

   a. Slant line
   b. Horizontal line
   c. Curve line towards left
   d. Vertical line

3. An isolated system of thermodynamics is _____.

   a. a specified region where transfer of energy and/or mass take place
   b. a region of constant mass and only energy is allowed to cross the boundaries
   c. cannot transfer either energy or mass to or from the surroundings
   d. none of above

4. The objective of supercharging an internal combustion engine is _____.

   a. to reduce mass of the engine per brake power
   b. to reduce space occupied by the engine
   c. to increase the power output of an engine when greater power is required
   d. all of the above

5. In steam power plant, what thermodynamic process is followed if the steam vapor condenses from saturated vapor to saturated liquid?

   a. Constant pressure
   b. Combination of constant temperature and pressure
   c. Constant temperature
   d. Constant volume

6. Heat transfer by radiation is governed by _____.

   a. Fourier's Law
   b. Newton's Law
   c. Kirchhoff's Law
   d. Stefan-Boltzman Law

7. The value of Stefan-Boltzman constant is given by _____.

   a. $\sigma = 5.67 \text{ X } 10^{-8} \text{ W/m}^2 - \text{K}^4$
   b. $\sigma = 5.67 \text{ X } 10^{-6} \text{ W/m}^2 - \text{K}^4$
   c. $\sigma = 5.67 \text{ X } 10^{-4} \text{ W/m}^2 - \text{K}^4$
   d. $\sigma = 5.76 \text{ X } 10^{-8} \text{ W/m}^2 - \text{K}^4$

8. The mechanical efficiency of a diesel engine is defined as _____.

   a. Break power/indicated power
   b. Indicated power/Brake power
   c. Brake power multiplied by indicated power
   d. Break power over fuel energy

9. The mechanical efficiency of a gas turbine as compared to internal combustion reciprocating engine is _____.

   a. higher
   b. lower
   c. same
   d. unpredictable

10. The work ratio of closed cycle gas turbine plant depends upon which of the following parameters?

    a. pressure ratio of the cycle and specific heat ratio
    b. temperature ratio of the cycle and specific heat ratio
    c. pressure ratio, temperature ratio and specific heat ratio
    d. only on pressure ratio

11. The normal air-fuel ratio for a gas turbine is _____.

a. 10:1
b. 25:1
c. 45:1
d. 60:1

12. What is the main advantage of making a combined cycle power plant (for example gas-steam plant), compared to single operating plant (gas plant or steam plant alone)?

a. increase thermal efficiency
b. longer plant life
c. surplus of power
d. decrease energy consumption

13. A single acting steam engine produces _____ power than that of double acting steam engine.

a. half
b. equal
c. double
d. four times

14. In hydro-power plant set-up, where does water hammer happen?

a. penstock
b. draft tube
c. turbine
d. surge tank

15. Which of the following are considered to be drawbacks of geothermal energy?
a. It is not available everywhere
b. It is available only in areas where hot rocks are present near the earth' s surface
c. High initial cost
d. All of the above

16. The function of a moderator in a nuclear reactor is _____.

a. to slow down the fast-moving electrons
b. to speed up the slow-moving electrons
c. to start the chain reaction
d. to transfer heat produced inside the reactor to a heat exchanger

17. Solar thermal power generation can be achieved by _____.

a. using focusing collector or heliostats
b. using flat plate collectors
c. using a solar pond
d. any of the above system

18. In steady laminar flow of a fluid through a circular pipe of internal diameter (D) carrying a constant discharge, the hydraulic gradient is inversely proportional to _____.

a. D
b. D^2
c. D^4
d. D^5

19. For laminar flow in a pipe carrying a given discharge the weight of surface roughness is doubled. In such a case, Darcy Weisbach friction factor will _____.

a. remain uncharged
b. be halved
c. be doubled
d. increase forth fold

20. A feasible solution is a set of _____.

a. Negative allocation which removes deficiencies
b. Non-negative allocations which removes deficiencies
c. Negative allocations which do not remove deficiencies
d. None of these

21. Two metal walls have same thickness and cross-sectional area with thermal conductivities k and 2k respectively. If the heat transfer is the same, then temperature drops across the wall will be in the ratio of _____.

a. 1:0.4
b. 2:01
c. 1:01
d. 1:0.04

22. Transient heat conduction occurs when _____.

a. temperature changes with respect to time
b. temperature remains constant with respect to time
c. heat is transferred with finite temperature difference
d. All of the above

23. Fluid Static' s deals with _____.

a. study of fluid in motion
b. study of fluid at rest
c. fluid in transition
d. any of the above

24. Fluid kinematics deals with _____.

a. geometry of motion of fluids
b. geometry of motion of fluids without considering
c. geometry of motion of fluids by considering cause for motion
d. any of the above

25. A lubricant is used to _____.

a. Increasing fractional heat
b. Increasing resistance
c. Decreasing fractional resistance
d. eliminate direct contact between rubbing surface

26. The speed of the air emerging from the blades of a running table fan is intended to be measured as a function of time. The point of measurement is very close to the blade and the time period of the speed fluctuation is four times the time taken by the b

a. a Pitot tube
b. a hot wire anemometer
c. high speed photography
d. a Schlieren system

27. It is defined as the speed in revolutions per minute at which a geometrically similar impeller would operate if it were of such a size as to deliver one gallon per minute against one foot of hydraulic head.

a. specific head
b. linear speed
c. shaft speed
d. specific speed

28. In a cooling tower, “approach” is the temperature difference between the _____.

a. hot inlet water and cold outlet water
b. hot inlet water and WBT
c. cold outlet water and WBT
d. DBT and WBT

29. The work input to air compressor is minimum if the compression law followed is _____.

a. $PV^{1.35} = C$
b. isothermal
c. Isentropic
d. $PV^{1.2} = C$

30. Intercooling is done in multistage compressors to _____.

a. Supply air at two different pressures
b. Cool air during compression
c. Cool air at delivery section
d. Minimize compression power requirement

31. The clearance volume in reciprocating air compressors is provided _____.

a. to reduce the work done per kg of air
b. to increase the volumetric efficiency of the compressor
c. to accommodate valves in the head of the compressor
d. to create turbulence in the air to be delivered

32. It is normally connected (via duct or pipe) to combustion chamber to produce necessary draft so that product of combustion will flow out.

a. chimney
b. exhaust valve
c. blower way
d. furnace hall

33. Heat transfer using fins will be more effective if the fins are _____.

a. fewer in number but thicker
b. larger in number but thicker
c. fewer in number but thinner
d. larger in number but thinner

34. Efficiency of the fin is given by _____. Where, Qi = ideal heat transfer and Qa = actual heat transfer.

a. Qi/Qa
b. Qa/Qi
c. Qa – Qi
d. None of these

35. Common belt conveyor can be used to transport coal at inclinations up to _____.

a. 30°
b. 60°
c. 80°
d. 90°

36. Master scheduling means _____.

a. Assigning of resources required to complete the work order
b. Weekly or monthly breakdown of production requirement for a definite period
c. Time required to complete each operation
d. To show work progress

37. A one ton refrigerating machine means that _____.

a. the total weight of the machine is 1 ton
b. the quantity of the refrigerant used is 1 ton
c. 1 ton of water can be converted into ice
d. 1 ton of ice when melts from and at in 24 hours, the refrigerating effect is equivalent to

38. A device designed to remove moisture from a refrigerant is called _____.

a. dehumidifier
b. solenoid
c. expansion valve
d. filter drier

39. One ton of refrigeration can be expressed as melting of 1000 kg of ice in _____.

a. 1 minute
b. 120 minutes
c. 720 minutes
d. 1440 minutes

40. Which of the following statements is INCORRECT?

a. The refrigerators and heat pumps are reversible heat engines
b. The C.O.P. refers to the ratio of desired effect to the energy supplied to achieve that effect
c. The higher value of, more efficient the refrigerators and heat pumps would be
d. of most of the refrigerators and heat pumps is greater than one

41. In refrigeration system, where is oil separator fitted?

a. After condenser
b. Before compressor
c. Between compressor and condenser
d. Between evaporator and expansion Value

42. During sensible cooling of air, web bulb temperature _____.

a. decreases
b. increases
c. remains constant
d. All of the above

43. In a psychrometric chart, the vertical lines parallel to the ordinate indicates _____.

a. specific humidity
b. wet bulb temperature
c. dew point temperature
d. dry bulb temperature

44. During evaporative cooling process, what happen to wet bulb temperature?

a. decreases
b. remain constant
c. increases
d. unpredictable

45. The effective temperature is a measure of the combined effects of _____.

    a. dry bulb temperature and relative humidity
    b. dry bulb temperature and air motion
    c. wet bulb temperature and air motion
    d. dry bulb temperature, relative humidity and air motion

46. In air-conditioning design for summer months, the condition inside a factory where heavy work is performed as compared to a factory in which light work is performed should have _____.

    a. lower dry bulb temperature and lower relative humidity
    b. lower dry bulb temperature and higher relative humidity
    c. lower dry bulb temperature and same relative humidity
    d. same dry bulb temperature and same relative humidity

47. During the adiabatic cooling of moist air, _____.

    a. DBT remains constant
    b. specific humidity remains constant
    c. relative humidity remains constant
    d. WBT remains constant

48. In basic HVAC application, the most commonly used method for the design of duct size is the _____.

    a. velocity reduction method
    b. equal friction method
    c. static regain method
    d. dual or double method

49. Euler's equation can be used for

    a. Pumps
    b. Radial flow compressors
    c. Axial flow compressor
    d. All the above

50. Clearance volume to the swept volume

    a. Clearance volume to cylinder volume
    b. Swept volume to the clearance volume
    c. Cylinder volume to the clearance volume
    d. Cylinder volume to the clearance volume

51. Gross and net calorific value of a fuel will be the same _____.

    a. if its ash content is zero.
    b. if its carbon content is very low.
    c. if its hydrogen/hydrogen compound content is zero.
    d. Under no circumstances

52. In power plant variable load study, the load curve refers to the graph of _____.

    a. power load versus plant capacity
    b. power load vs speed of prime mover
    c. power load versus time
    d. power vs. generating cost

53. When two bodies are in thermal equilibrium with a third body they are also, in thermal equilibrium with each other. This statement is called

    a. Zeroth law of thermodynamics
    b. First law of thermodynamics
    c. Second law of thermodynamics
    d. Kelvin Planck's law

54. The temperature at which the volume of a gas becomes zero is called?

    a. absolute value
    b. absolute zero temperature
    c. absolute temperature
    d. absolute pressure corresponding to temperature

55. In gasoline engines, if the octane rating fuel and compression ratio are fixed, what is the effect of supercharging on knocking tendency.

    a. no effect
    b. decrease
    c. increase
    d. all of the above

56. A fin-and-tube heat exchanger is kept in still air at 280C. Which of the following is suitable to remove heat from the substance flowing through the tube?

a. Keeping the heat exchanger in stored water at 28°C.
b. Keeping the heat exchanger in stored brine at 28°C.
c. Exposing the heat exchanger at moving air at 28°C.
d. Any of the above

57. A person in cold and windy environment loses body heat through the processes of conduction, convection and radiation. Which of these processes is/are likely to be insignificant compared to the others?

a. Conduction
b. Convection
c. Radiation
d. Convection and radiation

58. In a four-stroke cycle engine, the four operations namely suction, compression, expansion and exhaust are completed in the number of revolutions of crank shaft equal to _____.

a. four
b. three
c. two
d. one

59. What is the material of which the blades of a gas turbine generally made of?

a. Cast iron
b. Cast steel
c. Nickel-cobalt alloy
d. Aluminium

60. The higher inlet temperature towards gas turbine blades normally increase the thermal efficiency but the limitations on temperature is due to _____.

a. Turbine blade material
b. Efficiency of combustion
c. Quality of fuel
d. none of the above

61. A gas turbine power plant is better to be _____ specially in countries like Philippines where there' s renewable source of power like hydro-power, geothermal, wind, etc.

a. base load
b. peak load
c. casual run
d. all of the above

62. In a gas turbine combined cycle plant, a heat recovery steam generator (HRSG) is used to _____.

a. removed gases from steam regenerator
b. recover heat from exhaust gases to generate steam for the steam turbine
c. heat air from intercooler
d. all of the above

63. If the simple Rankine cycle used in steam plant is converted with a reheat process. What is the main purpose of reheating the steam?

a. Reduce the moisture content leaving the turbine
b. Decrease the heat rejected in the condenser
c. Decrease the heat added in the condenser
d. Increase the work of the plant

64. Steam turbines can be used for _____.

a. large marine propulsion
b. electric power generation
c. direct drive of fans, compressors, pumps
d. all of the above

65. The function of a surge tank is _____.

a. to supply water at constant pressure
b. to produce surges in the pipe line
c. to relieve water hammer pressures in the penstock pipe
d. all of the above

66. Energy derived from hot spots beneath the earth is called _____.

a. Bio energy
b. Geothermal energy
c. Nuclear energy
d. Hydrogen energy

67. In nuclear power plant operation, fission chain reaction is possible when _____.

a. fission produces the same number of neutrons which are absorbed
b. fission produces more neutrons than are absorbed

c. fission produces fewer neutrons than are absorbed
d. none of the above

68. Maximum wind energy available is proportional to _____.

a. square of the diameter of rotor
b. air density
c. cube of the wind velocity
d. Any of the above

69. A liquid flows out of an orifice of an enclosed tank filled to a depth h that contains air above the liquid at a pressure P. If the speed of the fluid flowing out is to be reduced _____.

a. the tank should be open to the atmosphere
b. the area of the orifice is increased
c. the air pressure above the liquid should be increased
d. the amount of liquid in the tank should be increased

70. What should be considered in order to produce the greatest increase in the flow rate for viscous liquid such as glycerin through a cylindrical tube.

a. The length of the tube must be decreased at higher temperature
b. The length of the tube must be increased
c. The radius of the tube must be decreased
d. The temperature must be increased

71. Which of the following statement describe PERT?

a. Probabilistic model which is activity oriented
b. Probabilistic model which is event oriented
c. Deterministic model and event oriented
d. Deterministic model and activity oriented

72. Radiation heat transfer is mainly due to _____.

a. quanta of energy as moving as electromagnetic waves.
b. movement of internal molecules of the fluid.
c. energy transfer as vibrational energy in the lattice structure of the material.
d. None of these

73. For the flow over a flat plate, the physical properties are evaluated at _____.

a. bulk temperature
b. film temperature
c. bulk mean temperature
d. log mean temperature

74. A fluid is substance which deforms continuously under the action of _____.

a. shearing force
b. tensile force
c. compressive force
d. none of these

75. Which of the following statement describe the "specific weight" of a substance?

a. varies from point to point according to the value of gravitational acceleration (g)
b. is always constant
c. varies from point to point but not according to the value of gravitational acceleration (g)
d. both (a) and (b)

76. Which of the following a "good" lubricant possess?

a. high Volatility
b. high Acidity
c. high Oiliness
d. any of the above

77. The relationship between discharge and speed for centrifugal fans is given by _____.

a. $Q_1/Q_2 = N_1/N_2$
b. $Q_1/Q_2 = (N_1/N_2)^3$
c. $Q_1/Q_2 = (N_1/N_2)^2$
d. None of the above

78. With reference to a centrifugal pump which of the following statement is INCORRECT?

a. The discharge control valve is fitted in the delivery pipe
b. The suction pipe is provided with a foot valve and a strainer
c. The suction pipe has larger diameter as compared to the discharge pipe
d. The discharge control valve is fitted in thee suction pipe

79. In a centrifugal air compressor, the pressure ratio is increased by _____.

a. increasing the speed of impeller keeping its diameter fixed
b. increasing the diameter of the impeller keeping its speed constant
c. reducing inlet temperature, keeping impeller diameter and speed fixed
d. All of the above

80. The isothermal compression in multistage compressor is achieved by _____.

a. running the compressor at very slow speed
b. constantly cooling the cylinder
c. employing intercooler
d. insulating the cylinder

81. What happen to the volumetric efficiency of compressor if the compression ratio is increase?

a. decreases
b. increases
c. remains unchanged
d. unpredictable

82. The draught which a chimney produces (without using additional fan/blower) is called _____.

a. induced draught
b. natural draught
c. forced draught
d. balanced draught

83. In heat exchanger design, how do you compare the parallel flow and counter flow arrangement of the same specifications?

a. parallel flow arrangement requires less area than counter flow arrangement.
b. counter flow arrangement requires less area (and therefore smaller) than parallel flow arrangement.
c. the surface area requirement is identical.
d. No difference

84. An automobile conventional radiator (located at the front of car) is an example of _____.

a. a parallel flow heat exchanger.
b. a counter flow heat exchanger.
c. an unmixed flow heat exchanger.
d. a cross flow heat exchanger.

85. In traditional material handling, the maximum length of a screw conveyor is about _____.

a. 30 meters
b. 40 meters
c. 60 meters
d. 100 meters

86. From PME Code, pipe color for a low-pressure air piping _____.

a. light yellow
b. violet
c. light blue
d. White

87. Gantt charts are used for _____.

a. Graphical representation of machine operation
b. Small scale-production
c. illustrates a project schedule
d. Showing performance of machine under loaded conditions

88. The ratio of heat extracted in the refrigerator to the work done on the refrigerant is called _____.

a. refrigerating efficiency
b. coefficient of performance of heat pump
c. coefficient of performance of refrigeration
d. any of the above

89. Which of the following best describes the "hermetically sealed compressor unit"?

a. only compressor is sealed
b. only motor is sealed
c. evaporator and compressor are sealed
d. both the compressor and motor are sealed together

90. In a refrigeration system, a hot suction line may be caused by _____.

a. excess refrigeration
b. malfunction of filter element
c. compressor low signal towards expansion valve
d. less refrigerant going through evaporator coil

91. In fin-and-tube evaporator design, fins are provided to _____.

a. increase temperature gradients so as to enhance heat transfer
b. increase turbulence in flow for enhancing heat transfer
c. increase surface area in order to promote the rate of heat
d. decrease the pressure drop of the fluid

92. The rated cooling capacity in Btu per hour divided by the electrical power in Watts for air conditioning system is called _____.

a. Tons of refrigeration
b. Energy Efficiency Ratio
c. Power factor
d. COP

93. The ideal compression refrigeration works on _____

a. Brayton cycle
b. Rankine cycle
c. Reverse Carnot cycle
d. Bell Coleman cycle

94. During sensible heating of moist air, what happen to the value of enthalpy?

a. increases
b. decreases
c. remains constant
d. none of the above

95. In a psychrometric chart, specific humidity lines are represented by _____.

a. horizontal and uniformly spaced
b. horizontal and non-uniformly spaced
c. curved lines
d. vertical and uniformly spaced

96. When air passes over a dry surface which is at a temperature greater than its (air) dry bulb temperature, it undergoes _____.

a. sensible heating process
b. sensible cooling process
c. humidification process
d. dehumidification process

97. In a saturated air-water vapor mixture, which of the following statements is correct in chemical dehumidification process?

a. dry bulb temperature is higher than the wet bulb-temperature
b. dew point temperature is lower than the wet bulb temperature
c. dry bulb, wet bulb and dew point temperatures are the same
d. dry bulb temperature is higher than the dew point temperature

98. Isentropic process is also known as _____.

a. reversible adiabatic process
b. constant temperature process
c. constant pressure process
d. irreversible adiabatic process

99. To cool and dehumidify a moist air, it must be passed over the coil at a temperature _____.

a. which lies between the dry bulb and wet bulb temperatures of the incoming stream
b. which lies between the wet bulb and dew point temperatures of the incoming stream
c. which is lower than the dew point temperature of the incoming stream
d. of adiabatic saturation of incoming steam

100. In a spray washing system, if the temperature of water is higher than the dry bulb temperature of entering air, then the air is

a. heated and dehumidified
b. heated and humidified
c. cooled and humidified
d. cooled and dehumidified

101. The amount of heat required to raise the temperature of 1 kg of water through 1 co is called _____.

a. specific heat at constant temperature
b. specific heat at constant pressure
c. kilo calorie
d. specific heat ratio

102. A type of heat added to or removed from a substance that cause a change of phase without change of temperature.

a. total heat
b. latent heat
c. sensible heat
d. heating value

103. Which of the following statement is correct regarding petrol engines?

a. A fine fuel spray mixed with air is ignited by the heat of compression which is at a high pressure
b. The fuel supplied to the engine cylinder is mixed with necessary amount of air and the mixture in ignited with the help of a spark plug
c. The fuel is first evaporated after passing through a carburetor and is mixed with air before ignition
d. all of the above

104. Heat transfer from higher temperature to low temperature takes place according to _____.

a. Third law of thermodynamics
b. First law of thermodynamics
c. Second law of thermodynamics
d. Zeroth law of thermodynamics

105. During suction stroke of a four-stroke cycle petrol engine, _____.

a. only air is sucked inside cylinder
b. only petrol is sucked inside cylinder
c. mixture of petrol and air is sucked inside cylinder
d. none of the above

106. What is the effect of 'intercooling' in a gas turbine plant?

a. increase in net work output but decrease in thermal efficiency
b. fall in both work ratio and thermal efficiency
c. Decrease in both compressor and turbine work
d. none of the above

107. For a closed cycle gas turbine, ideally the working fluid should have _____to achieve better thermal efficiency.

a. high molecular weight
b. high adiabatic exponent
c. high specific volume
d. all of the above

108. A regenerator in a gas turbine cycle is used to _____.

a. heat the turbine exhaust before it enters the low-pressure stage
b. heat the fuel being supplied to combustion chamber
c. heat the gases leaving the combustion chamber
d. heat the compressed air on its way to combustion chamber

109. In gas turbine, the maximum temperature beginning expansion is limited to about _____ due to thermal limitation of blades material.

a. 800 to 1000 K
b. 600 to 700 K
c. 1000 to 1200 K
d. 1600 to 1800 K

110. The work ratio of closed cycle gas turbine plant depends upon _____.

a. pressure ratio of the cycle and specific heat ratio
b. temperature ratio of the cycle and specific heat ratio
c. pressure ratio, temperature ratio and specific heat ratio
d. only on pressure ratio

111. In combined gas-steam plant, the exhaust gas of gas turbine flow through _____ to recover heat to generate steam.

a. air compressor
b. Gas engine recovery
c. heat recovery steam generator
d. steam exchange box

112. The purpose of governing in steam turbines is to _____.

a. control the speed of the turbine as per process requirement
b. reduce the effective heat drop
c. reheat the steam and improve its quality
d. completely balance against end thrust

113. If the steam generator system pressure of a simple Rankine cycle is converted to a higher pressure. What will be your observation on the heat added requirement to the steam generator?

a. decrease
b. increase
c. same heat added
d. Any of the above

114. In steam power plant, the device used to heat feed water by regenerator is called _____.

a. Thermal device
b. Condenser
c. Regenerative feed water
d. Reheater

115. Gross head of a hydro-power station is _____.

a. the difference of water level between the level in the storage and tail race
b. the height of the water level in the river where the storage is provided
c. the height of the water level in the river where tail race is provided
d. all of the above

116. Which of the following can be a source of geothermal power energy?

a. Liquid dominated reservoirs
b. Steam dominated reservoirs
c. Hot rocks with no water
d. all of the above

117. In nuclear power plant, the most commonly used moderator is _____.

a. Graphite
b. Sodium
c. Deuterium
d. Any of the above

118. The working principle of thermo-electric generator is based on the principle of _____.

a. hall
b. seebeck
c. Brayton effect
d. thermal break effect

119. Which of the following statements are true in relation to water hammer phenomenon?

1. It causes surface erosion in pipes
2. It is accompanied by serious cavitations
3. The volume modules of fluid is the relieved fluid property
4. It is governed by the Reynolds number of the flow.

a. 3 and 5
b. 2 and 4
c. 2 and 5
d. 1, 2 and 3

120. Which of the following statement of a pipe system in series is correct?

a. the volume flow is different
b. the average friction factor in both pipes is constant
c. the total length of the pipes is the same in both the systems
d. the volume flow rate is the same for all pipes, friction head is the sum of friction of individual pipe system, the total static head is the sum of all the individual pipe system

121. In Project Feasibility Study, optimistic time is the _____.

a. Time an activity is expected to take most often when it is repeated
b. Time an activity would take assuming unfavorable conditions.
c. Minimum time an activity is expected if good luck prevails
d. Time given in units of week

122. Radiation shielding between two surfaces _____.

a. increases thermal resistance to radiation and reduces heat transfer rate.
b. increases thermal resistance to radiation and increases heat transfer rate.
c. decreases thermal resistance to radiation and increases heat transfer rate.
d. decreases both thermal resistance to radiation and heat transfer rate.

123. Consider the following parameters:

1. Temperature of the surface
2. Emissivity of the surface
3. Temperature of the air in the room.
4. Length and diameter of the pipe.

The parameters responsible for loss of heat from a hot pipe surface in a room without fans would include _____.

a. 1 alone
b. 1 and 2
c. 1, 2 and 3
d. 1, 2, 3 and 4

124. The mechanism of heat transfer in which there is no medium (like water, air, solid) required for heat energy to travel is:

a. Conduction
b. Diffusion
c. Radiation
d. Convection

125. The maximum density of water occurs at atmospheric pressure and at _____.

a. 0°C
b. 15.5°C
c. 4°C
d. -4°C

126. The statement, "the buoyant force on a floating body equal to the weight of the liquid displaced" is based on _____.

a. Archimedes' principle
b. Bernoulli's law
c. Conservation of mass
d. The law of diminishing returns

127. A lubricant is used primarily to prevent _____.

a. Corrosion of metals
b. Oxidation of metal
c. Wearing out of rubbing metallic surface
d. Reduction of metals

128. A type of mechanical fan where the gas is flowing parallel to the fan axis is _____.

a. Axial fan
b. Mixed axial fan
c. Centrifugal axial fan
d. all of the above

129. Which of the following statements pertaining to a given centrifugal pump is correct?

a. Discharge varies as the square of speed
b. Power varies as the square of speed
c. Discharge varies directly as speed
d. Head varies inversely as speed

130. Why is intercooling in multistage compressors done?

a. To minimize the work of compression
b. To cool the air at delivery
c. To cool the air during compression
d. None of the above

131. A type compressor that are used for gas turbines.

a. Sliding vane
b. Centrifugal
c. Axial flow
d. all of the above

132. The draught produced by steel chimney as compared to that produced by brick chimney for the same height is _____.

a. less
b. more
c. same
d. may be more or less

133. To have high heat transfer coefficient, which of the following heat exchanger is used?

a. Parallel flow
b. Multi pass
c. Single pass
d. Mixed flow

134. The logarithmic mean temperature difference (LMTD) for parallel flow as compared to counter flow (given same size and flow rates of medium) is _____.

a. Low
b. High
c. Of same value
d. Depends on ambient condition

135. A 1-2 heat exchanger arrangement means _____.

a. single pass on shell side and double pass on tube side.
b. double pass on tube side and shell side.
c. single pass on tube side and double pass on shell side.
d. single pass on both tube and shell sides.

136. The purpose of testing an internal combustion engine is _____.

a. to determine the information, which cannot be obtained by calculations
b. to conform the data used in design, the validity of which may be doubtful
c. to satisfy the customer regarding the performance of the engine
d. all of the above

137. In industrial and production management, work sampling is applied for _____.

a. estimation of the percentage utilization of machine tools
b. estimating the percentage of the time consumed by various job activities
c. finding out time standards, especially where the job is not repetitive and where time study by stop watch method is not possible
d. all of the above

138. Where does the highest temperature of refrigerant in a mechanical refrigeration system occur?

a. In evaporator
b. Before expansion valve
c. Between compressor and condenser
d. Between condenser and evaporator

139. In a refrigeration cycle, what is the effect of subcooling in cycle coefficient of performance (COP)?

a. increases thermal resistance to radiation and reduces heat transfer rate.
b. does not change
c. decreases
d. none of the above

140. The diameter of the suction pipe of refrigerating unit compressor in comparison to discharge side is _____.

a. smaller
b. bigger
c. equal in thickness
d. same size

141. With regard to a refrigeration system which of the following statements is correct?

a. It rejects energy to a low temperature body
b. It removes heat from a high temperature body and delivers it to a low temperature body
c. It removes heat from a low temperature body and delivers it to a high temperature body
d. none of the above

142. What happen to relative humidity (RH) during heating and humidification?

a. increases
b. decreases
c. may increase or decrease
d. remains constant

143. Which of the following can be measured by a sling psychrometer?

a. Wet bulb temperature
b. Dry bulb as well as wet bulb temperatures
c. Specific humidity
d. Absolute humidity

144. The saturation temperature of water vapor at its partial pressure is equal to _____.

a. dry bulb temperature
b. wet bulb temperature
c. dew point temperature
d. 0% relative humidity

145. Which statement is/are correct?

1. Dew point is reached by cooling air at constant moisture content
2. Wet bulb temperature changes by addition of moisture at constant enthalpy
3. For saturated air, the dry bulb temperature, wet bulb temperature and dew point are the same
4. Dehumidification of air is achieved by heating.

a. 1 and 3
b. 1 and 2
c. 3 and 4
d. 3 alone

146. Desert coolers are suitable for hot and very dry outside conditions because _____.

a. water is re-circulated in the spray
b. heat is neither added nor removed from the water
c. wet bulb depression is normally very large
d. large quantity of air can be conditioned

147. For air-conditioning the operation theatre in a hospital, the percentage of outside air in the air supplied should be _____.

a. zero
b. 20
c. 50
d. 100

148. A human body feels comfortable when the heat produced by the metabolism of human body is equal to the _____.

a. heat dissipated to the surroundings
b. heat stored in the human body
c. sum of (a) and (b)
d. difference of (a) and (b)

149. The purpose of producing draught in steam generator system is _____.

a. to provide an adequate supply of air for the fuel combustion
b. to exhaust the gases of combustion from the combustion chamber
c. to discharge the gases of combustion to the atmosphere through the chimney
d. all of the above

150. Which of the following statement is correct for a compound steam engine?

a. The cost of the engine, for the same power and economy, is more than that of a simple steam engine.
b. The forces in the working parts are increased as the forces are distributed over more parts.
c. The ratio of expansion is reduced, thus reducing the length of stroke.
d. The temperature range per cylinder is increased, with corresponding increase in condensation.

151. Gross heating value of coal is _____ the net heating value.

a. higher than
b. lower than
c. same as
d. any of the above

152. The ratio of the sum individual maximum demands of the system to the maximum demand of the whole system is called _____.

a. diversity factor
b. generation factor
c. power factor
d. load factor

153. The condition for the reversibility thermodynamic cycle is/are _____.

a. all the process taking place in the cycle of operation must be extremely slow
b. the working parts of the engine must be friction free
c. there should be no loss of energy during the cycle of operation
d. all of the above

154. A definite area or space where some thermodynamic process takes place and chosen for study.

a. thermodynamic system
b. thermodynamic cycle
c. thermodynamic process
d. thermodynamic laws

155. Which of the following statements is/ are true regarding thermodynamic system boundary?

a. it is prescribed region of space which surrounds the system and it may be either a real physical surface or an imaginary surface
b. it is only a real physical surface
c. it is only an imaginary surface
d. it is normally determined where the process or cycle takes place

156. The compression ratio in petrol engines is kept low as compared to diesel engines because higher compression ratio in petrol engines would lead to pre-ignition of fuel. This statement is _____.

a. FALSE
b. TRUE
c. true and false
d. this will depend on the process

157. Conduction is a process of heat transfer from _____.

a. a hot body to a cold body, in a straight line, without affecting the intervening medium
b. one particle of the body to another without the actual motion of the particles

c. one particle of the body to another by the actual motion of the heated particles
d. none of the above

158. The motion of heat flow through a body by conduction is _____.

a. dependent upon the material of the body
b. directly proportional to the temperature
c. inversely proportional to the thickness of the body
d. all of the above

159. The coefficient of thermal conductivity is defined as _____.

a. One degree drop in temperature
b. Quantity of heat transfer per one-degree temperature drop per unit area
c. Quantity of heat transfer per unit time per unit area
d. Quantity of heat transfer per unit time per unit area per one-degree temperature drop per unit length

160. For same output, same speed and same compression ratio, the thermal efficiency of a two-stroke cycle petrol engine as compared to four stroke cycle petrol engine is _____.

a. more
b. less
c. same as long as compression ratio is same
d. same as long as output is same

161. The gas turbine has big advantage with other prime movers because of its _____.

a. simplicity and reliable working
b. few auxiliaries and high rotative speed
c. freedom from vibration and ability to generate large power from units of relatively small size and weight
d. all of the above

162. Which of the following has the highest air-fuel ratio requirement?

a. four stroke diesel engines
b. multi-cylinder engines
c. gas turbines
d. diesel engines

163. In a single-stage open-cycles gas turbine, the mass flow through the turbine is higher than the mass flow through compressor, because _____.

a. the specific volume of air increases by use of intercooler
b. the temperature of air increases in the reheater
c. the combustion of fuel takes place in the combustion chamber and therefore the mass of fuel will be added to the mass of air going through turbine
d. the specific heats at constant pressure for incoming air and exhaust gases are different

164. A simultaneous generation of electricity and steam from one fuel/ energy source is called _____.

a. Waste heat recovery
b. Cogeneration
c. Gas Turbine Plant
d. Steam Turbine-Gas Turbine plant

165. In a reaction turbine, when steam flows through the moving blades, _____.

a. pressure increases while velocity decreases
b. pressure decreases while velocity increases
c. pressure and velocity both decreases
d. pressure and velocity both increases

166. Location of the surge tank in a hydro-electric station should be near to the entrance of _____.

a. tailrace
b. turbine
c. reservoir
d. gate valve/way

167. The molten mass of earth is called _____.

a. Magnous
b. Magna
c. Hot cake
d. Magmus

168. In a nuclear reactor the function of the reflector is to _____.

a. reduce the speed of the neutrons
b. stop the chain reaction
c. reflect the escaping neutrons back into the core
d. all of the above

169. All of the following renewable energy sources are indirect manifestations of solar energy with the exception of _____.

a. Tidal energy
b. Wind power
c. Geothermal energy
d. Ocean thermal energy conversion (OTEC)

170. If the velocity of wind is doubled, then the power output will increase by _____.

a. 10 times
b. 8 times
c. 2 times
d. 6 times

171. What is the arrangement of water tube boilers?

a. water passes through the tubes which are surrounded by flames and hot gases
b. the flames and hot gases pass through the tubes which are surrounded by water
c. forced circulation takes place
d. none of the above

172. The function of a safety valve in boiler is _____.

a. to blow off steam when the pressure of steam inside the boiler exceeds the working pressure
b. to indicate the water level inside the boiler to an observer
c. to measure pressure of steam inside the steam boiler
d. none of the above

173. In feasibility study, critical path is _____.

a. Shortest path and consumes minimum time
b. Shortest path and consumes maximum time
c. Longest path and consumes maximum time
d. No such relationship exists

174. In fluid mechanics, capillarity is defined as the phenomenon of _____.

a. adhesion of liquid particles to the surface
b. combined action of adhesion and cohesion
c. cohesion of liquid droplets to the surface
d. none of these

175. The condition which give indication that the flow of fluid is laminar.

a. Re > 4000
b. Re < 2000
c. 200 > Re < 4000
d. 2500> Re < 4000

176. Lubricant used in machine working at low temperature should possess _____.

a. High pour-point
b. Low flash-point
c. High cloud-point
d. Low pour-point

177. Harmful radiation emitted from the sun is a form of _____.

a. Visible radiation
b. Infrared radiation
c. Ultraviolet radiation
d. none of the above

178. A mechanical fan used to push fan at higher pressure.

a. centrifugal blower
b. axial fan
c. propeller fan
d. all of the above

179. In a centrifugal pump the sum of suction head and delivery head is known as _____.

a. manometric head
b. total flow
c. total head
d. total power

180. In cooling towers, the drift loss is around _____.

a. 2%
b. 5 to 10%
c. 10 to 20%
d. 20 to 30%

181. Why are intake air filters provided on compressors?

a. To reduce temperature of suction air
b. To reduce pressure of suction air

c. To remove dirt and dust from suction air
d. none of the above

182. In multistage reciprocating air compressors, the compression will be isothermal if _____.

a. pressure ratio is same for each stage
b. compressor cylinder is cooled properly
c. compressor runs at slow speed
d. perfect intercooling is provided to the air being compressed

183. In a boiler installation the natural draught is produced _____.

a. due to the fact that furnace gases being light go through the chimney giving place to cold air from outside to rush in
b. Due to the fact that pressure at the grate due to cold column is higher than the pressure at chimney base due to hot column
c. due to the fact that at the chimney top the pressure is more than its environmental pressure
d. all of the above

184. A steam is to be insulated with two layers of materials with different thermal conductivities. What must be the insulation arrangement to have less heat loss?

a. the better insulating must be put inside
b. the better insulation must be put outside
c. any of the two insulations may be planed inside or outside
d. the temperature of steam must be taken in to account while deciding as to which insulation is put where

185. What is the basic concept when dealing with critical radius of insulation?

a. heat loss decreases with addition of insulation
b. heat loss increases with addition of insulation
c. there occurs a decrease in heat flux
d. conduction heat loss is more than convection heat loss

186. Fuel Pulverization is done for _____.

a. Easy transportation
b. Maximum storage capacity
c. Lesser moisture content
d. Better combustion

187. Pyranometer is an instrument used for measuring the _____.

a. Temperature of solar photovoltaic cell
b. Solar irradiance of a solar photovoltaic cell
c. Wind speed of a solar photovoltaic cell
d. Efficiency of a solar photovoltaic Cell

188. A pyrheliometer is an instrument used to measure the _____.

a. Temperature of solar photovoltaic cell
b. Intensity of direct solar radiation at normal incidence
c. Intensity of indirect solar radiation
d. Efficiency of a solar photovoltaic Cell

189. In Production, Planning and Inventory Control, delivery index is the ratio of _____.

a. Finished product to total number of deliveries
b. Deliveries to the customers well in time to total number of deliveries
c. Total number of deliveries to the deliveries to customers
d. None of the above.

190. In a refrigeration cycle the heat is rejected by refrigerant at _____.

a. condenser
b. evaporator
c. compressor
d. expansion valve

191. What is the purpose of subcooling a refrigerant in refrigeration cycle?

a. to increase cooling effect
b. to ensure that only liquid and not the vapor enters the throttling valve
c. to reduce compressor overheating
d. none of the above

192. The capacity of a refrigerating machine is expressed as _____.

a. gross weight of machine in tons
b. rate of absorption of heat from the space being cooled
c. inside volume of the cabinet
d. lowest temperature attained

193. In a steam nozzle, what happens when the inlet and outlet pressure of steam are equal?

a. Pressure drops and fluids flows through the nozzle
b. there is a pressure drop in the nozzle
c. there is no pressure drop and fluid does not flow through the nozzle
d. None of the above

194. During sensible heating of moist air, what happen to the vapor pressure?

a. increases
b. decreases
c. can increase or decrease
d. remains constant

195. What happen to dry bulb temperature during heating and dehumidification?

a. decreases
b. increases
c. remains constant
d. unpredictable

196. Which condition of relative humidity in percent (%) gives the highest rate of evaporation of water?

a. 0%
b. 30%
c. 50%
d. 95%

197. The performance of an evaporative condenser largely depends on _____.

a. ambient temperature
b. dry bulb temperature
c. wet bulb temperature
d. hot water temperature

198. What will be the effect of humidification process for moist air?

a. Both humidity ratio as well as relative humidity decreases
b. Humidity ratio increases but relative humidity decreases
c. Both humidity ratio as well as relative humidity remain constant
d. None of these

199. Sensible heating or cooling on psychometric chart is represented by _____.

a. Curved line
b. Vertical line
c. Inclined line
d. Horizontal line

200. Which one of the following statements is correct?

a. The sensible heat gain is due to the difference in humidity
b. The latent heat gain is due to the temperature difference between the fresh air and the air in space
c. The heat gain through the walls of ducts carrying conditioned air through unconditioned space in the building adds to the sensible heat gain
d. Maximum heat gain to a building occurs through walls

201. The sequence of absorption in flue gas analysis by Orsat's apparatus is respectively _____.

a. CO_2, O_2, CO
b. CO, O_2, CO_2
c. CO_2, CO, O_2
d. O_2, CO_2, CO

202. Which of the following is given as a result of proximate analysis of coal?

a. various chemical constituents, carbon, hydrogen, oxygen and ash
b. fuel constituents as percentage by weight, of moisture, volatile, fixed carbon and ash
c. percentage by weight, of moisture, volatile matter, fixed carbon and ash
d. percentage of chemical constituents including carbon, hydrogen and oxygen

203. In power plant economics, the ratio of the average load to the peak load over a designated period of time is called _____.

a. load factor
b. generated factor
c. diversity factor
d. power factor

204. What is the standard condition for air?

a. 21°C, 101.325 kPa and relative humidity 36%
b. at 15°C and 1kg/cm^2
c. at 0°C and standard atmospheric conditions
d. at atmospheric conditions at any specific location

205. A thermodynamic system is said to be closed if _____.

a. both mass and energy cross the system boundary
b. only energy and work transfer takes place across system boundary without any mass transfer
c. only mass transfer takes place across the system boundary
d. neither mass nor energy transfer takes place across system boundary

206. When a system undergoes through a number of different processes and finally returns to its initial state then it is known as _____.

a. a thermodynamic process
b. a thermodynamic cycle
c. a thermodynamic system
d. a non-cyclic process

207. The ideal thermodynamic cycle on which the gasoline or petrol engine work is _____.

a. Otto cycle
b. Joule cycle
c. Rankine cycle
d. Stirling cycle

208. Thermal conductivity of solid metals _____ if the temperature is increased.

a. decreases
b. increases
c. remains same
d. unpredictable

209. Heat conduction in gases is due to _____.

a. electromagnetic waves
b. motion of electrons
c. mixing motion of the different layers of the gas
d. elastic impact of individual molecules

210. By which of the following modes of heat transfer heat is mainly transferred from an insulated pipe to the surrounding still air?

a. Radiation
b. Free convection
c. Forced convection
d. Conduction

211. The knocking tendency in diesel engines increase with _____.

a. decrease in compression ratio
b. increase in compression ratio
c. increase in the temperature of inlet air
d. increase in cooling water temperature

212. What is the purpose of reheating gas after initial expansion in gas turbine?

a. to increase the compressor work
b. to decrease the compressor work
c. to increase the turbine work
d. to decrease the turbine work

213. What is the main power generating plant that produces more electricity per Unit thermal energy in the fuel input and has greatest surplus of electricity?

a. Steam engine
b. Steam turbine
c. Gas turbine
d. Diesel engine

214. Critical speed of turbine is _____.

a. Speed at which the natural frequency becomes equal to revolution per minute
b. Speed at which turbine operates
c. Speed equal to generator speed
d. Speed at which shaft failure occurs

215. Willian' s line for the steam engine is a straight-line relationship between the steam consumption per hour and _____.

a. pressure of steam
b. efficiency
c. brake power
d. indicated power

216. In steam power plant theory, reheat factor is the ratio of _____.

a. isentropic heat drop to useful heat drop
b. adiabatic heat drop to isentropic heat drop
c. cumulative actual enthalpy drop for all stages to total isentropic enthalpy heat drop
d. All of the above

217. A Pelton wheel is ideally suited for _____.

a. high head and low discharge
b. high head and high discharge
c. low head and low discharge
d. medium head and medium discharge

218. In a liquid-dominated geothermal plant, what process occurs when the saturated steam passes through the turbine?

a. Isobaric
b. Polytrophic
c. Isometric
d. Isothermal

219. The control rods in the control system of nuclear reactors are used to _____.

a. absorb excess neutrons
b. control fuel consumption
c. control temperature
d. all of these

220. Nuclear power plants produce energy through _____.

a. induced fission
b. induced fusion
c. beta decay
d. chemical integration

221. A solar pond is a combination of which of the following combinations?

a. Solar energy collection & heat storage
b. Solar energy storage & heat collection
c. Solar energy collection & energy storage
d. None of the above

222. For a fully developed flow through a pipe, the ratio of maximum velocity to the average velocity is _____.

a. 1
b. 2
c. square root of 2
d. 4

223. A compound steam engine in which the high pressure and low pressure cylinders have common piston rod is called _____.

a. receiver type compound engine
b. Tandem type compound engine
c. Woolf type compound engine
d. none of these

224. In Project Feasibility Study, Latest Finish Time (LFT) is _____.

a. The time from last event to first event of network diagram and is calculated by moving method
b. The latest possible time while which the activity can start
c. Earliest possible time at which an activity can start
d. Earliest possible time at which an activity can start

225. On a summer day, a scooter rider feels more comfortable while on the move than while at a stop light because of _____.

a. an object in motion captures less solar radiation
b. air is transparent to radiation and hence, it is cooler than the body
c. more heat is lost by convection and radiation while in motion
d. air has a low specific heat and therefore it is cooler

226. Consider the following statements:
The Fourier heat conduction equation
Q = -kdT/dx presumes
1. steady-state conditions.
2. constant value
3. uniform temperature at the wall surfaces.
4. one- dimensions/heat flow.
Which of the above statements are correct?

a. 1, 2 and 3
b. 1, 2 and 4
c. 2, 3 and 4
d. 1, 3 and 4

227. Bernoulli' s equation of motion is given by _____. Where p is pressure; ρ is density; g is gravity; z is height; v is flow speed.

a. $p/\rho + gz + z^2/2 = \text{constant}$
b. $p/\rho + z + z^2/2 = \text{constant}$
c. $p/\rho + gz + v^2/2 = \text{constant}$
d. $p/\rho + gz + v^2 = \text{constant}$

228. Capacity of oil to stick on the surface of machine parts under condition of heavy load is called

a. Volatility
b. Oiliness
c. Acid value
d. Flash point

229. The velocity of the gas flowing through a fan can be determined by dividing the volume flow rate to _____.

a. fan shaft rpm
b. fan outlet area
c. blade number
d. fan static efficiency

230. In reciprocating pump the air vessels are used for which of the following purposes?

a. To get continuous supply of liquid at a uniform rate
b. To save the power required to drive the pump
c. To run the pump at a much higher speed without any danger of separation
d. All of the above

231. Cavitation can be avoided in centrifugal if _____.

a. Suction pressure is low by installing balancing valve
b. Suction pressure is maintained at recommended pressure level (by installing expansion tank)
c. Delivery pressure is low by installing bigger diameter pipe
d. Delivery pressure is high by installing smaller diameter pipe

232. Cooling effect in a cooling tower can be improved by _____.

a. reducing humidity of air
b. increasing air velocity over the wet surface
c. lowering the barometric pressure
d. all of the above

233. The volumetric efficiency of an air compressor is the ratio of _____.

a. actual free air delivered to the displacement volume
b. displacement volume of clearance volume
c. volume of air before compression to the volume of air after compression
d. displacement volume to volume of air sucked inside the cylinder

234. Regarding " humidification process" which of the following statements is INCORRECT?

a. Specific humidity and relative humidity increase
b. Moisture is added
c. Humidification process plots as an inclined line on the psychrometric chart
d. Dry bulb temperature remains unchanged

235. The draught produced for a given height of the chimney and given mean temperature of chimney gases _____.

a. decreases with increase in outside air temperature
b. increases with increase in outside air temperature
c. remains the same irrespective of outside air temperature

d. may increase or decrease with increase in outside air temperature

236. Consider the following statements pertaining to heat transfer through fins and Identify the correct statements.

1. Fins must be arranged at right angles to the direction of flow of the working fluid.
2. The temperature along the fin is variable and accordingly the heat transfer rate varies along the tin elements.
3. Fins are equally effective irrespective whether they are on the hot side or cold side of the fluid.
4. Firm are made of materials that have thermal conductivity higher than that of the wall.

a. 1 and 2
b. 1 and 3
c. 2 and 3
d. 3 and 4

237. In a boiler the basic purpose of a steam drum is _____.

a. to separate steam from water
b. to remove salts from water
c. to serve as storage of steam
d. All of the above

238. For evaporators and condensers at a given conditions, the logarithmic mean temperature difference for parallel flow is _____ that for the counter flow.

a. equal to
b. less than
c. greater than
d. any one of the above

239. Pipes carrying steam are generally made up of _____.

a. steel
b. cast iron
c. copper
d. aluminum

240. Lead time is the time gap in between when _____.

a. Material is arrived and then exhausted
b. Material is needed and material is received
c. Material is ordered and material is received
d. Material is received and material is again ordered

241. In a refrigeration cycle the flow of refrigerant is controlled by _____.

a. compressor
b. evaporator
c. expansion valve
d. condenser

242. Why is a flash chamber in the refrigeration circuit installed?

a. To reduce pressure losses through the evaporator
b. To reduce the size of evaporator by avoiding vapor going to evaporator
c. To improve overall heat transfer coefficient
d. all of the above

243. A refrigeration ideal cycle which uses air as the refrigerant.

a. Stirling
b. Ericson
c. Bell-Coleman
d. Carnot

244. An instrument for determining the specific gravity of a fluid.

a. hygrometer
b. calorimeter
c. hydrometer
d. barometer

245. Which one of the following statements is correct?

a. Dew point temperature can be measured with the help of thermometer
b. Dew point temperature is the saturation temperature corresponding to the partial pressure of the water vapor in moist air

c. Dew point temperature is the same as the thermodynamic wet bulb temperature
d. For saturated air, due point temperature is less than the web bulb temperature

246. If air is cooled by a process in which the humidity ratio of air does not change, the process is known as _____.

a. humidification
b. dehumidification
c. chilling
d. sensible cooling

247. What is specific humidity or humidity ratio?

a. Ratio of the mass of water vapor in air in a given volume at a given pressure to the mass of water vapor at same pressure when air is saturated.
b. Ratio of kg moisture actually contained per kg of wet air and kg of moisture required to saturate one kg of dry air at same wet bulb temperature
c. Mass in kg of water vapor contained in the air vapor mixture per kg of dry air.
d. None of these

248. Saturated temperature of water at the partial pressure of the water vapor in the air vapor mixture is called _____.

a. Dew point temperature
b. Dew point depression
c. Wet bulb temperature
d. Degree of saturation

249. If it is desired to condition the outside air from 70% RH and 45°C dry bulb to 50% RH and 25°C dry bulb room condition, the practical arrangement would be _____.

a. cooling and dehumidification
b. dehumidification and pure sensible cooling
c. cooling and humidification
d. dehumidification

250. Which of these statements is correct?

1. Low value of the bypass factor or an air-conditioning equipment signifies higher performance of the equipment.
2. Bypass factor for an air- conditioning equipment signifies the fraction of ambient air mixed with the air to be conditioned.
3. Bypass factor for an air-conditioning equipment signifies the fraction of the air to be conditioned coming in contact with the conditioning surface.

a. 1 and 3 are correct
b. 1 and 2 are correct
c. 3 alone is correct
d. 2 alone is correct

251. Calorific value of both the solid & liquid fuels can be determined by using _____ calorimeter.

a. Junker's
b. Bomb
c. William's
d. Any of the above

252. Peak load for a period of time divided by installed capacity is _____.

a. power factor
b. generation factor
c. utilization factor
d. load factor

253. Identify the wrong statement from the following choices.

a. Both heat and work are path functions
b. Both heat and work exist during interactions only
c. Both heat and work transfer occur across the system boundary
d. Heat is a high-grade energy whereas work is a low-grade energy

254. A body is said to be in thermal equilibrium when there is no change of _____.

a. temperature gradient
b. potential and kinetic gradient
c. pressure and volume
d. density and specific weight

255. The gasoline engines are also known as _____ engines.

a. compression ignition
b. spark ignition
c. diesel engine
d. steam engine

256. In a diesel cycle (used in combustion engine), what is the process taking place during heat addition?

a. Constant-enthalpy process
b. Constant-pressure process
c. Constant temperature process
d. Constant entropy process

257. A sphere, a cube and a thin circular plate, all made of same material and having same mass are initially heated to a temperature of 250°C and then left in air at room temperature for cooling. Then, which one of the following is correct?

a. All will be cooled at the same rate
b. Thin circular plate will be cooled
c. Sphere will be cooled faster
d. Cube will be cooled faster than sphere but slower than circular plate

258. The specific fuel consumption of a diesel engine as compared to that of a petrol engine is _____.

a. lower
b. higher
c. same for same output
d. none of the above

259. In a gas turbine plant, a regenerator increase _____.

a. work output
b. compressor work
c. thermal efficiency
d. fuel consumption

260. The purpose of reduction gears in gas turbine power plant is to _____.

a. reduce the speed of the oil pump supplying oil to the bearings
b. reduce the turbine speed to the designed speed of generator
c. reduce the speed of the HP turbine to the lower speed of the LP turbine
d. reduce the high speed of an impulse turbine to the lower speed of a reaction turbine

261. The simultaneous generation of electricity and steam (or heat) from a single energy source is called _____.

a. Steam turbine-gas turbine
b. Cogeneration
c. Gas turbine plant waste heat recovery
d. energy conservation

262. In dealing with properties of pure substances such as steam, frequently use chart to identify its properties is by using h-s diagram commonly called Mollier diagram. But inspection shows a disadvantage of this diagram because it cannot be used for steam.

a. 50% or less
b. 40% or less
c. 30% or less
d. 60% or less

263. In a reaction turbine, the function of the draft tube is _____.

a. to increase the flow rate
b. to reduce water hammer effect
c. to convert kinetic energy of water to potential energy by a gradual expansion in divergent part
d. none of the above

264. In hydropower plant, what is the power that is always available from the stream even at times of lowest flow and lowest head?

a. available power
b. firm power
c. primary power
d. secondary power

265. In geothermal power plants, the condensed water from the cooling tower/condenser are _____.

a. Recirculate and feed to the boiler
b. injected back toward earth
c. discharged back into the pond
d. All of the above

266. Enriched uranium is required as a fuel in a nuclear reactor while light water is used as moderator and coolant because light water has _____.

a. high neutron absorption cross- section
b. low moderating efficiency
c. high neutron scatter cross-section
d. low neutron absorption cross- section

267. The tidal range is the difference between _____.

a. Water movement speed & high tide
b. Water movement direction & high tide
c. Water elevation at high tide & low tide
d. any of the above

268. Large amounts of solar energy is stored in oceans and seas. The process of harnessing this energy is called _____.

a. Ocean thermal energy conversion (OTEC)
b. Ocean thermal conversion (OTC)
c. Ocean and sea thermal energy conversion (OSTEC)
d. Sea thermal energy conversion (STEC)

269. Solar thermal power generation can be achieved by _____.

a. using focusing collector or heliostat
b. using flat plate collectors
c. using a solar pond
d. any of the above system

270. Aging of pipe implies _____.

a. pipe becoming smoother with time
b. relative roughness decreasing with time
c. absolute roughness increasing linearly with time
d. absolute roughness increasing periodically with time

271. In flow through a pipe, the transition from laminar to turbulent flow does not depend on _____.

a. velocity of the fluid
b. density of the fluid
c. diameter of the pipe
d. length of the pipe

272. Delivery index is the ratio of _____.

a. Finished product to total number of deliveries
b. Deliveries to the customers well in time to total number of deliveries
c. Total number of deliveries to the deliveries to customers
d. None of the above

273. Which of the following in NOT a requirement in Philippine registered mechanical engineering application?

a. Filipino citizens
b. Not convicted of a crime involving moral turpitude
c. BSME graduate from a school duty constituted and recognized by the government
d. Has a minimum two years of experience prior to examination

274. The ratio of energy transferred by convection to that by conduction is called _____.

a. Stanton number
b. Nusselt number
c. Biot number
d. Peelet number

275. Free convection flow depends on all of the following except _____.

a. density
b. coefficient of viscosity
c. gravitational force
d. velocity

276. What is the usual property of liquid lubricants?

a. Flash-point is higher than the fire- point
b. Fire -point is higher than the flash- point
c. Fire -point is lower than the flash- point
d. Flash and fire point are identical

277. Why are intake air filters provided on compressors?

a. To reduce temperature of suction air
b. To reduce pressure of suction air
c. To remove dirt and dust at suction
d. To avoid noise

278. The parameter used by ASME to define fans, blowers and compressors is _____.

a. Fan ratio
b. Specific ratio
c. Blade ratio
d. Twist factor

279. With respect to a reciprocating pump which of the following statements is INCORRECT?

a. The limiting value of separation pressure head for water is 6.8 m absolute
b. During suction, the separation may take place at the beginning of suction stroke
c. During delivery, the separation may take place at the end of delivery stroke
d. Indicator diagram shows variation of pressure head in the cylinder for one revolution of crank

280. Which of the following is the most efficient method of compressing air?

a. Adiabatically
b. Isothermally
c. Isentropically
d. Polytropically

281. Rotary compressor is suited for _____ quantity of air at _____ pressure application.

a. large, low
b. small, low
c. same, high
d. large, high

282. What is optimum intermediate pressure in a two-stage compressor?

a. Average of suction and delivery
b. Geometric mean of suction and discharge pressure
c. 40 percent of difference of two
d. None of the above

283. In a centrifugal air compressor, the pressure ratio can be increased by _____.

a. increasing the speed of impeller keeping its diameter fixed
b. increasing the diameter of the impeller keeping its speed constant
c. reducing inlet temperature, keeping impeller diameter and speed fixed
d. All of the above

284. The draught produced by chimney of given height at given outside temperature _____.

a. decreases if the chimney gas temperature increases
b. increases if the chimney gas temperature increases
c. remains same irrespective of chimney gas temperature
d. may increase or decrease

285. Consider the following statements:
In a shell and tube heat exchanger, baffles are provided on the shell side to

1. prevent the stagnation of shell side fluid.
2. improve heat transfer.
3. provide support for tubes.
4. prevent fouling of tubes.

Which of these statements is/are correct?

a. 1 and 2
b. 2 and 3
c. 1, 2 and 3
d. 1, 2, 3 and 4

286. Consider the following statements:

1. Under certain conditions, an increase in thickness of insulation may increase the heat loss from a heated pipe.
2. The heat loss from an insulated pipe reaches a maximum when the outside radius insulation is equal to the ratio of thermal conductivity to the surface coefficient.
3. Small diameter tubes are invariably insulated.
4. Economic insulation is based on minimum heat loss from pipe

Which of these statements is/are correct?

a. 1 and 3 are correct
b. 2 and 4 are correct
c. 1 and 2 are correct
d. 3 and 4 are correct

287. In coal preparation plant, magnetic separators are used to remove _____.

a. dust
b. clinkers
c. iron particles
d. sand

288. A piezometer is used to measure _____.

a. pressure difference between two points
b. gauge pressure
c. dynamic pressure of a moving gas
d. all of the above

289. Total inventory cost is _____.

a. Ordering cost + carrying cost
b. Carrying cost + shortage cost
c. Ordering cost + shortage cost
d. Ordering cost + carrying cost + shortage cost

290. Which part of the vapor compression refrigeration cycle produces the refrigeration effect?

a. Compressor
b. Condenser
c. Evaporator
d. Expansion valve

291. What is the function of receiver in a refrigeration plant?

a. To allow for variation of load
b. To superheat the refrigerant gas
c. To reduce the power consumption
d. All of the above

292. In a refrigeration cycle, oil separator is installed between _____.

a. condenser and expansion valve
b. compressor and condenser
c. condenser and evaporator
d. none of the above

293. The sensing bulb for the thermal expansion valve is located _____.

a. in the middle of evaporator coils
b. near the evaporator coil inlet
c. at the suction line (exactly after evaporator coil)
d. on the bottom row of evaporator coil

294. Air conditioning is the simultaneous control of _____ in a confined space.

a. temperature and humidity
b. temperature and air movement
c. temperature, humidity, purity and movement of air
d. none of the above

295. Vapor density or absolute humidity is _____.

a. Ratio of the mass of water vapor in air in a given pressure of the mass of water vapor at same pressure when air is saturated
b. Mixture of dry air and vapor depending upon pressure and temperature of mixture
c. Mass in kg of water vapor contained in the air vapor mixture per kg of dry air when air is saturated
d. Mass of the water vapor in grams contained in m^3 of dry air

296. Relative humidity is the _____.

a. Ratio of actual mass of water vapor in air in a given temperature to mass of water vapor at same temperature when air is saturated
b. Mass in kg of water vapor contained in the air vapor mixture per kg of dry air when air is saturated
c. Mass in kg contained in m3 of air vapor mixture at its total pressure
d. None of these

297. In which of the following ways the supply ducts may be arranged?

a. Loop perimeter duct system
b. Radial perimeter duct system
c. Extended plenum duct system
d. All of the above

298. In air conditioning distribution system, _____ is a functional or decorative covering for supply air.

a. Register
b. Grill
c. Diffuser
d. none of the above

299. The conditions conducive to comfort depend upon which of the following factors _____.

a. Temperature
b. Humidity
c. Air motion and purity
d. All of the above

300. An air handling system normally includes _____.

a. Cooling coil
b. Filter system
c. Fan
d. All of the above

301. Incomplete combustion of fuel in the furnace is judged by high _____ of the flue gases.

a. CO content
b. dew point temperature and O_2 content
c. CO_2 content
d. O_2 content

302. The area under load curve divided by maximum demand represented in load curve is called _____.

a. load factor
b. connected load
c. average load
d. diversity load

303. "When two bodies which are in thermal equilibrium with a third body, then they are in thermal equilibrium with each other." This statement is _____.

a. Zeroth law of thermodynamics
b. Second law of thermodynamics
c. Third law of thermodynamics
d. First law of thermodynamics

304. "Heat flows from cold substance to hot substance with the aid of external work." This refers to _____.

a. Clausius statement
b. Newton Second Law
c. Kelvin Statement
d. Planck Statement

305. To have best thermal efficiency in spark ignition engine, the fuel air mixture ratio should be _____.

a. lean
b. rich
c. may be lean or rich
d. chemically correct

306. For same output, same speed and same compression ratio the thermal efficiency of a two-stroke cycle petrol engine as compared to that of a four-stroke cycle petrol engine is _____.

a. more
b. less
c. same as long as compression ratio is same
d. same as long as output is same

307. Increasing the compression ratio in spark ignition engines can cause which of the following?

a. increases the tendency for knocking
b. decreases tendency for knocking
c. does not affect knocking
d. none of the above

308. The emissive power of a body depends on _____.

a. physically nature
b. nature of body
c. temperature of body
d. all of the above

309. What is the critical radius of insulation for a sphere if K= Thermal conductivity in W/m-K. h= Heat transfer coefficient in W/m^2 -K.

a. 2 Kh
b. 2 K/h
c. K/h
d. $\sqrt{2kh}$

310. "The ratio of the emissive power and absorptive power of all bodies is equal to the emissive power of a perfectly black body. " This statement is known as _____.

a. Planck's law
b. Stefan's law
c. Kirchhoff's Law
d. Black body law

311. The ratio of break power to indicated power of a diesel engine is called _____.

a. mechanical efficiency
b. thermal efficiency
c. volumetric efficiency
d. relative efficiency

312. When starting gas turbine plant, the turbine train is usually rotated by either diesel engine or motor with speed equal to _____.

a. rated speed of the gas turbine
b. 50 to 60% of the rated speed of the gas turbine
c. no relation with speed of the turbine
d. none of the above

313. In theory, the work output from the turbine is given by _____.

a. change of internal energy between inlet and outlet
b. change of enthalpy between inlet and outlet
c. change of entropy between inlet and outlet
d. change of temperature between inlet and outlet

314. An equipment for raising the temperature of boiler feed water with utilization of heat coming from exhaust of gas turbine.

a. hot water tank
b. economizer
c. hot well
d. steam heater

315. Steam turbines can be governed by the following method/s.

a. Throttle governing
b. Nozzle control governing
c. By-pass governing
d. All of the above

316. The ratio of air horse power supplied by compressor to the horse power supplied by the prime mover to the compressor is known as _____.

a. Mechanical efficiency
b. Volumetric efficiency
c. Overall efficiency
d. Isothermal efficiency

317. In hydro-power plant application, Francis turbine is usually used for _____.

a. low head installation up to 30 m
b. medium head installation from 30 to 180 m
c. high head installation above 180 m
d. for all heads

318. Mercury is used as working substance for binary vapor plants because it has _____.

a. higher critical temperature and pressure
b. higher saturation temperature than other fluids
c. relatively low vaporization pressure

d. all of the above

319. A nuclear reactor is said to be critical when the neutron population in the reactor core is _____.

a. rapidly increasing leading to the point of explosion
b. decreasing from the specified value
c. reduced to zero
d. constant

320. Solar desalination provides _____.

a. Drinking water in areas where only salty or brackish water is available and distilled water for batteries
b. Distilled water needed for batteries
c. Drinking water in areas where only salty or brackish water is available
d. None of the above

321. In hydro-power plant penstock, water hammer in pipe occurs due to _____.

a. water hitting the pipe at a very high speed
b. bursting of pipe due to excess pressure
c. abruptly stopping the flow by closing the valve
d. any of the above

322. The maximum flow velocity through a circular pipe occurs _____.

a. at the pipe wall
b. at the center of the pipe
c. cannot be predicted
d. depends on flow

323. Shadow prices in projects appraisal analysis are used _____.

a. to determine feasibility of project
b. for lost items
c. to convert inputs into cost and output into benefits
d. All of the above

324. The expression for Reynolds number is _____.

a. $Re = \rho VD/\mu$
b. $Re = \mu/\rho VD$
c. $Re = \mu VD/\rho$
d. $Re = \rho\mu D/V$

325. Hydraulic gradient line is equal to _____.

a. Sum of pressure head + datum head
b. Sum of pressure heat + kinetic head
c. Sum of pressure heat + kinetic head + datum head
d. Sum of kinetic head + datum head

326. When the resistance to movement of sliding/moving parts is only due to internal resistance between the lubricant itself, then lubricant is called _____.

a. Fluid film
b. Boundary
c. Thin film
d. Extreme pressure

327. Single most important property of lubricated oil is _____.

a. Its fire point
b. Cloud point
c. Oiliness
d. Viscosity index

328. The specific ratio of blowers is _____.

a. Less than 1.11
b. More than 1.20
c. Between 1.11 and 1.20
d. None of the above

329. For pumping molasses, it is preferable to use _____.

a. reciprocating pump
b. centrifugal pump with double shrouds
c. open impeller pump
d. multistage centrifugal pump

330. What is the principle on which a centrifugal compressor works?

a. Centripetal action
b. Conversion of pressure energy into kinetic energy
c. Conversion kinetic energy into pressure energy
d. None of the above

331. The ratio of compressor discharge pressure to the inlet pressure of air is called _____.

a. volumetric efficiency
b. compressor efficiency
c. expansion ratio
d. compression ratio

332. The efficiency of vane type compressor as compared to roots type compressor for the same pressure ratio is _____.

a. more
b. less
c. same
d. may be more or less

333. In forced draught systems, the function of chimney is mainly _____.

a. to produce draught to accelerate the combustion of fuel
b. to discharge gases high up in the atmosphere to avoid hazard
c. to reduce the temperature of the hot gases discharged
d. none of the above

334. Consider the following statements pertaining to heat transfer through fins:

1. Fins are equally effective irrespective of whether they are on the hot side or cold side of the fluid.
2. The temperature along the fin is variable and hence, the rate of heat transfer varies along the elements of the fin.
3. The fins may be made of materials that have a higher thermal conductivity than the material of the wall.
4. Fins must be arranged at right angles to the direction of flow of the working fluid.

Which of the above statement are correct?

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 1 and 3 are correct
d. 2 and 3 are correct

335. Which one of the following heat exchange gives parallel straight-line patter of temperature distribution for both cold and hot fluid?

a. Parallel flow with unequal heat capacities
b. Counter flow with equal heat capacities fluid
c. Parallel flow equal heat capacities
d. Counter flow with unequal heat Capacities

336. Rotary compressors are used to handle _____.

a. Large quantities of air at high pressure
b. Small quantity of air at high pressure
c. Large quantities of air at low pressure
d. Small quantity of air at low pressure

337. Man-machine charts indicates _____.

a. Idle time for men and machine both
b. Idle time of machine only
c. Idle time of men only
d. None of above

338. In a simple vapor compression refrigeration system, the sequential order of major components are _____.

a. compressor, throttle valve, condenser, evaporator
b. compressor, evaporator, throttle valve, condenser
c. compressor, throttle valve, evaporator, condenser
d. compressor, condenser, expansion device, evaporator

339. The refrigerant denoted by R-717 is _____.

a. sulphur dioxide
b. ammonia
c. methyl chloride
d. carbon dioxide

340. In refrigeration cycle a capillary tube is used in relatively small capacity units (like household refrigerators) to _____.

a. control the temperature of refrigerated space
b. produce cooling effect
c. convert refrigerant from liquid to vapor state
d. control the flow of refrigerant

341. What kind of expansion device is normally used for domestic refrigerator?

a. Strainer along with drier
b. Capillary tube
c. Accumulator
d. Thermostatic valve

342. In refrigeration system, thermal expansion valve with remote valve responds based on _____.

a. amount of superheat in the vapor leaving the coil
b. amount of superheat in the liquid
c. temperature in the evaporator coils
d. pressure in the evaporator coils

343. What happen to relative humidity during cooling and dehumidification of moist air?

a. increases
b. decreases
c. can increase or decrease
d. remains constant

344. The mixing of two or more streams of moist air in air conditioning is _____.

a. a general polytrophic process
b. an adiabatic process
c. an isothermal
d. a constant pressure

345. The gap between dry bulb and wet bulb will increase as _____.

a. Specific humidity is unchanged
b. Moisture content increase
c. Air has lesser moisture
d. Atmospheric temperature rises

346. In spray humidification process, the total heat _____.

a. decreases
b. remains same
c. increases
d. unpredictable

347. What happens to the wet bulb temperature during sensible cooling process?

a. decreases
b. remain constant
c. increases
d. unpredictable

348. What happen to the specific humidity during evaporative cooling process with recirculated water spray?

a. it decreases
b. it remains same
c. it increases
d. none of the above

349. In water spray humidification process, the dry bulb temperature _____.

a. decreases
b. remains same
c. increases
d. unpredictable

350. An instrument consisting of a wet and dry bulb thermometer (used in air conditioning) is called _____.

a. manometer
b. pyrometer
c. psychrometer
d. A or C

351. Ultimate analysis of coal determines its _____ content.

a. carbon, hydrogen, nitrogen, oxygen & sulphur
b. carbon, ash, sulphur & nitrogen
c. carbon, sulphur, volatile matter & ash
d. carbon, volatile matter, ash & moisture

352. Stoichiometric ratio is _____.

a. Chemically correct air-fuel ratio by volume
b. Chemically correct air-fuel ratio by weight
c. Theoretically mixture of air for complete combustion
d. Actual ratio of air to fuel for maximum efficiency

353. The ratio of the sum of individual maximum demands of the system to the maximum demand of the whole system is known as _____.

a. diversity factor
b. utilization factor
c. power factor
d. demand factor

354. The difference between the sum of the peaks of two or more individual loads and the peak of the combined loads.

a. Base load
b. Reserve capacity factor
c. Load diversity
d. Load distribution factor

355. A Centigrade (°C) and Fahrenheit (°F) thermometers are immersed in a fluid and showed identical numerical value. What is the possible value?

a. - 39.9850°C
b. + 39.985°C
c. - 40°C
d. + 40°C

356. When water starts boiling its vapor pressure is _____.

a. 76 cm of height
b. Pressure of water in the container
c. Below atmospheric pressure
d. Equals to that of the atmospheric pressure

357. Second law of thermodynamics deals with _____.

a. energy
b. entropy
c. heat
d. work

358. A standard vapor is compressed to half of its volume without changing its temperature. The result is _____.

a. All the vapor condenses to liquid
b. Some of the liquid evaporates and the pressure does not change
c. The pressure will be double compare to its initial value
d. Some of the vapor condenses and the pressure does not change

359. In internal combustion engines, a higher compression ratio causes _____.

a. pre-ignition
b. increase in detonation
c. an acceleration in the rate of combustion
d. any one of these

360. The total emissivity power is defined as the total amount of radiation emitted by a black body _____.

a. per unit time
b. per unit temperature
c. per unit area
d. per unit thickness

361. A gray body is one whose absorptivity _____.

a. varies with temperature
b. varies with the wavelength of incident ray
c. varies with temperature and wavelength of incident ray
d. does not vary with temperature and wavelength of incident ray

362. The ratio of the energy radiated from a material's surface to that radiated from a blackbody at the same temperature and wavelength and under the same viewing condition is _____.

a. Transmissivity
b. Reflectivity
c. Absorptivity
d. Emissivity

363. For a centrifugal compressor, the slip is defined as _____.

a. Sum of velocity of whirl at outlet under ideal and actual conditions
b. Difference of velocity of whirl at outlet under ideal and actual conditions
c. Ratio of velocity of whirl at outlet under ideal and actual conditions
d. Ratio of impeller diameter to casing diameter

364. Maximum temperature which is developed in the cylinder of a diesel engine is usually in the range of _____.

a. 1000-1500°C
b. 1500-2000°C
c. 2000-2500°C
d. 2500-3000°C

365. Thermal efficiency of closed cycle gas turbine plant increases by _____.

a. reheating
b. intercooling
c. regenerator
d. all of the above

366. Mercury is used together with steam in binary vapor cycle because it has _____.

a. higher critical temperature and pressure
b. higher saturation temperature than other fluids
c. relatively low vaporization pressure
d. all of the above

367. In steam turbines the reheat factor _____.

a. increases with the increase in number of stages
b. decreases with the increase in number of stages
c. remains same irrespective of number of stages
d. none of the above

368. Pelton turbines are designed mostly in _____ arrangement.

a. horizontal
b. vertical
c. inclined
d. curved

369. Which of the following power plant has a very high first cost but low operating cost?

a. Gas power plant
b. Diesel Power Plant
c. Geothermal Power Plant
d. Desalination plant

370. Nuclear reactors are used to _____.

a. produce heat for thermoelectric power
b. produce fissionable material
c. propel ships, submarines, aircrafts
d. all of the above

371. The maximum energy conversion efficiency of a wind turbine for a given swept area is _____.

a. 25.1%
b. 50.4%
c. 59.3%
d. 99.9%

372. The maximum velocity distribution across the section of a horizontal pipe is _____.

a. parabolic
b. hyperbolic
c. straight line (linear)
d. all of the above

373. From PME Code, what is the pipe color for a low-pressure air piping?

a. light yellow
b. brown
c. light blue
d. white

374. A variable which has no physical meaning but is used to obtain an initial basic feasible solution to the linear programming problem is referred to as _____.

a. basic variable
b. non-basic variable
c. artificial variable
d. basis

375. In refrigeration system, what should be the safety design precautions if the discharge pressure is too high?

a. disc valve should operate
b. cut-out switch must be calibrated with same pressure setting of relief valve
c. high-pressure cut-out switch should operate before the relief valve opens
d. disc valve should work before cut- our pressure

376. Function of a siphon is _____.

a. to lift water from a reservoir to a height greater than the level in the supply reservoir
b. to lift water from one reservoir to another maintain at the same level
c. to connect two reservoirs maintained at different elevations
d. any of the above

377. For flow through parallel pipes _____.

a. discharge remains same
b. head loss remains same
c. velocity remains same
d. total head loss is the sum of individual head losses

378. Grease are not used to lubricate _____.

a. Rail axel boxes
b. Gears
c. Bearing working at high temperature
d. Delicate and complicated Instruments

379. Reducing the RPM of a fan by 10 percent brings about the following changes in power consumption

a. Increase by 21%
b. Increase by 33%
c. Decrease by 25%
d. Decrease by 10%

380. A centrifugal pump should be installed above the water level in such a way that _____.

a. the negative pressures are not allowed to develop in the impeller
b. the negative pressures do not reach as low value equivalent vapor pressure
c. its height is more than 10.28 m at ordinary temperature of liquid
d. flow is more

381. Which of the following conditions should be satisfied for minimum work to be done to compress and deliver a quantity of air by multi-stage compression?

a. The work done in each stage should be same
b. The intercooling should be perfect
c. The compression ratio in each stage should be same
d. All of the above

382. Which of the following is a positive displacement compressor?

a. Axial flow compressor
b. Centrifugal compressor
c. Roots blower
d. None of the above

383. For rotary compressor the theoretical criterion of the thermodynamic efficiency is _____ compression.

a. isothermal
b. polytropic
c. isentropic
d. none of the above

384. In designs of chimneys and smoke - stacks system, an artificial draught is produced by _____.

a. induced fan
b. forced fan
c. induced and forced fan
d. all of the above

385. Consider the following statements regarding condensation heat transfer for:

1. A single tube, horizontal position is preferred over vertical position for better heat transfer.
2. Heat transfer coefficient decreases if the vapor steam moves at high velocity.
3. Condensation of steam on oily surface is dropwise.
4. Condensation of pure benzene vapor is always dropwise.

Which of these statements is/are correct?

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 1 and 3 are correct
d. 3 and 4 are correct

386. In a shell and tube heat exchanger, baffles provide the shell side to:

1. prevent the stagnation of shell side fluids.
2.improve heat transfer.
3.provide support for tubes.
4.prevent fouling of tubes.

Which of the above statements are correct?

a. 1, 2, 3 and 4
b. 1, 2 and 3
c. 1 and 2
d. 2 and 3

387. Which of the following is/are overfeed type stoker?

a. chain grate
b. spreader
c. travelling grate
d. all of the above

388. Vehicle manufacturing assembly line is an example of _____.

a. Product layout
b. Process layout
c. Manual layout
d. Fixed layout

389. The lowest temperature during the cycle in a vapor compression system occurs _____.

a. after expansion
b. after condensation
c. after evaporation
d. after compression

390. Cooling towers are used sometimes in high tonnage refrigeration plants, the water cooled in these towers is supplied to _____.

a. cool refrigerant in evaporator
b. cool refrigerant in condenser
c. cool compressor cylinder only
d. all of the above

391. In a vapor absorption plant, which of the following components is a substitute for the compressor of the vapor compression system?

a. Aqua pump and generator
b. Absorber
c. Heat exchange and generator
d. Absorber, aqua pump and generator

392. A positive displacement compressor, in which the pressure rise takes place due to back flow of high-pressure air from the receiver is known as _____.

a. Screw compressor
b. Vane blower
c. Roots blower
d. turbo fan

393. What is the evaporator function in refrigeration system?

a. Converts low-pressure liquid to high-pressure gas
b. Absorbs heat into the refrigeration system
c. Absorbs heat into the refrigerant by the principle of latent heat of fusion

d. Converts high-pressure gas to low- pressure liquid

394. The relative humidity of air will be _____ percent when the dry bulb and wet bulb temperatures of air are same.

a. zero
b. 40
c. 60
d. 100

395. Sensible heat ratio is defined as _____.

a. latent heat over sensible heat
b. sensible heat over latent heat
c. latent heat over total heat
d. sensible heat over total heat

396. Humidification is a process of _____.

a. Heat addition without affecting specific humidity
b. Adding moisture at same wet bulb temperature
c. Adding humidity without any change in dry bulb temperature
d. None of the above

397. If sensible heat added is 150 kcal/ sec and latent heat added is 100 kcal/s, then sensible heat factor is _____.

a. 0.67
b. 0.40
c. 0.60
d. 0.30

398. Which of the following parameters remain constant during sensible heating / cooling?

a. Enthalpy
b. Wet bulb temperature
c. Humidity ratio
d. Dry bulb temperature

399. Both cooling and dehumidification can be achieved by passing air over a cooling coil where effective surface temperature is _____ the dew point temperature of the entering air.

a. lower than
b. equal to
c. higher than
d. none of the above

400. By which of the following are dust and other impurities in air removed?

a. Centrifugal device
b. Adhesive impregnated filters
c. Air washing and electrostatic precipitation
d. any of the above

401. Coalification means _____.

a. process of conversion of lignite into anthracite.
b. underground gasification of coal.
c. complete combustion of coal.
d. direct hydrogenation of coal.

402. In power plant economics, it is defined as "the ratio of the average load to the peak load over a designed period of time".

a. diversity factor
b. load factor
c. plant use factor
d. reactive factor

403. “Heat cannot flow from a region of low temperature to a region of high temperature unless assisted by external force" this statement is known as _____.

a. Clausius statement of second law of thermodynamic
b. Kelvin-Planck statement of second law of thermodynamics
c. Clausius-Kelvin statement of second law of thermodynamics
d. None of the above

404. Which of the following method of compressing air requires less power consumption?

a. Adiabatic process
b. Isothermal process

c. Isentropic process
d. Polytropic process

405. It is impossible to construct an engine which operating a cycle, will produce no other effect than the extraction heat from a single heat reservoir and performs an equivalent amount of work. This statement refers to _____.

a. Clausius statement
b. Kelvin Planck statement
c. Carnot statement
d. Planck statement

406. If diesel is used as fuel in a gasoline engine, then the engine will _____.

a. not run
b. run more efficiently
c. run at high speed
d. explode

407. In internal combustion engine, scavenging means _____.

a. Using fresh air for compressor
b. To reduce detonation
c. Using air for throwing burnt gases out of cylinder during exhaust stroke
d. Using correct fuel air ratio

408. In internal combustion engine operation, scavenging process leads to increase in _____.

a. Fuel efficiency
b. Power output
c. Heat rejection
d. Speed

409. In a centrifugal compressor, an increase in speed at a given pressure ratio causes _____.

a. decrease in flow
b. increase in flow and decrease in efficiency
c. increase in efficiency
d. decrease in flow and increase

410. Heat transfer in liquids and gases takes place by _____.

a. conduction
b. convection
c. radiation
d. forced convection

411. The temperature of cooling water (at 21°C) leaving the diesel engine should not be more than _____ to have better heat exchange.

a. 30°C
b. 40°C
c. 60°C
d. 80°C

412. Capital cost of a gas turbine plant is _____ than that of a steam power plant of same capacity.

a. same
b. lower
c. higher
d. any of the above

413. Steam plant thermal efficiency may be increased by increasing the boiler pressure. However, the undesirable effect is that the moisture content will increase. This undesirable effect may be corrected by _____.

a. Exhausting to atmosphere
b. Reheating
c. Regenerative feed water installation
d. Decreasing condenser pressure

414. What is the standard thermodynamic cycle used in thermal (steam) power plant?

a. Brayton cycle
b. Carnot cycle
c. Rankine cycle
d. Stirling cycle

415. The power output from a hydro- electric power plants depends on three parameters.

a. head, type of dam and discharge
b. head, discharge and efficiency of the system

c. efficiency of the system, type of draft tube of turbine used
d. type of dam, discharge and type of catchment area

416. The word "geo" means _____.

a. Gas
b. Heat
c. Solid
d. Earth

417. What are rods usually made of cadmium or carbon steel used to control fission in a nuclear reactor to absorb neutron?

a. Welding rods
b. Control rods
c. Nuclear rods
d. Fission rods

418. Nuclear power is generated by using Uranium as fuel to produce nuclear fission. Once the nuclear fission is present, the heat is combined with the water to make steam. This steam then turns the _____.

a. Generators
b. Steam turbines
c. Gas turbine
d. Compressor

419. The function of a solar collector is to convert _____.

a. solar energy into electricity
b. solar energy into radiation
c. solar energy into thermal energy
d. mechanical to kinetic energy

420. If a steam pipe is to be insulated by two insulating materials, then for best results

a. better thermal conductivity should be installed first
b. inferior should be put first
c. no effect on heat loss
d. no such relationship exists

421. From PME Code, the pipe color for a high-pressure piping.

a. Orange
b. Silver gray
c. Red
d. Violet

422. Micro-motion study is _____.

a. the analysis of working of men and methods by using a motion picture camera with a timing device in the field of view
b. the motion study observed after fixed interval of time
c. the scientific, analytical procedure for establishing the standard work method
d. the motion study of a sequence of operations conducted systematically

423. A composite slab has two layers of different material with thermal conductivity k_1 and k_2. If each layer has same thickness, the equivalent thermal conductivity of the slab would be

a. k_1k_2
b. $k_1 + k_2$
c. $(k_1 + k_2)\ (k_1k_2)$
d. $2\ k_1k_2 + k_2$

424. Two long parallel surfaces each of emissivity of 0.7 are maintained at different temperature and accordingly have radiation heat exchange between them. If it is desired to reduce 75% of this radiant heat transfer by inserting in parallel shield of emissivity on both sides, the number of sheets should be

a. one
b. two
c. three
d. four

425. A fluid is said to be Newtonian when the shear stress is/are _____.

a. directly proportional to the velocity gradient
b. inversely proportional to the velocity gradient
c. independent of the velocity gradient
d. all of the above

426. Shear stress develops on a fluid element if _____.

a. the fluid is at rest
b. the fluid container is subjected to uniform leaner acceleration
c. the fluid is inversed
d. the fluid is viscous and the flow is uniform

427. Machines operating under high temperature and load are best lubricated by _____.

a. Mineral oils
b. Solid lubricants
c. Grease
d. Animal Oil

428. Which type of control gives maximum benefits for fan application from energy saving point of view?

a. Discharge damper control
b. Inlet guide vane control
c. Variable pitch control
d. Speed control

429. The identical centrifugal pumps are operated in parallel as to deliver in to a common delivery pipe. Speed, total discharge (Q) and total head are the same. Compared the discharge (Q) and head (H) of each of the pump.

a. Both total Q and total H would increase, each approximately by 50%
b. Total Q would be approximately doubled but H would remain the same
c. Total H would be approximately doubled. But Q would remain the same
d. Total H would be doubled. But Q would be approximately halved

430. The main purpose of providing fins on radiator of car is to _____.

a. Reduce fuel consumption
b. Improve heat rejection
c. Make combustion more efficient
d. Guard against mechanical impacts

431. In two stage compressor what is optimum intermediate pressure?

a. average of suction and delivery
b. geometric mean of suction and discharge pressure
c. 40 percent of difference of two
d. None of the above

432. In a compressor the phenomenon of surging refers to _____.

a. unsteady, periodic and reversed flow
b. no pressure rises, there is only churning of flow
c. reduction in lift force at high angles of incidence
d. fixed mass flow rate regardless of pressure ratio

433. The draught in locomotive boilers in produced by _____.

a. forced fan
b. chimney
c. steam jet
d. only motion of locomotive

434. For evaporator and condenser for the given conditions, the logarithmic mean temperature difference for parallel flow is _____.

a. equal to that for counter flow.
b. greater than that for counter flow.
c. smaller than that for counter flow.
d. very much smaller than that for counter flow.

435. Fire tube boilers are those in which _____.

a. forced circulation takes place
b. tube is laid vertically
c. water passes through the tubes and flue gases surround them
d. flue gases pass through tubes and water surrounds them

436. Provisions of fins on a heat transfer surface will be higher if there are _____.

a. lower number of thin fins.
b. large number of thin fins.
c. large number of thin fins.

d. large number of thick fins.

437. Capacity of the underfeed stoker is of the order of _____.

a. 100 to 200 kg of coal burned per hour
b. 100 to 500 kg of coal burned per hour
c. 200 to 2000 kg of coal burned per hour
d. 100 to 4000 kg of coal burned per Hour

438. In an MRP system, component demand is _____.

a. Forecasted
b. Established by the master production schedule
c. Calculated by the MRP system from the master production schedule
d. Ignored

439. During which component of vapor compression refrigeration system, the enthalpy remains constant?

a. compressor
b. condenser
c. throttle valve
d. evaporator

440. In the refrigeration circuit a flash chamber is installed _____.

a. to reduce the size of the evaporator by avoiding vapors going to evaporator
b. to improve overall heat transfer coefficient
c. to reduce pressure losses through the evaporator
d. all of the above

441. Accumulators for refrigeration system should have adequate volume to store refrigerant charge at least _____ of system charge.

a. 10 percent
b. 30 percent
c. 50 percent
d. 70 percent

442. A water temperature rise of 15 F° in a chiller condenser is equivalent to _____.

a. 37.5 C°
b. -9.44 C°
c. 7.5 C°
d. 8.33 C°

443. A steady flow device (open system) used to increase pressure by slowing down the fluid.

a. throttle valve
b. diffuser
c. generator
d. nozzle

444. The air temperature at which water vapor in the air starts condensing is known as _____.

a. dew point temperature
b. dry bulb temperature
c. wet bulb temperature
d. saturation temperature

445. In a cooling tower, the dissipation of heat is mainly due to _____.

a. convection (evaporation)
b. conduction
c. convection and radiation
d. radiation

446. The removal of moisture from air at constant dry bulb temperature is called _____.

a. Drying
b. Rectification
c. Sensible cooling with
d. Dehumidification

447. If we have 100% RH, then dew point temperature (DPT), wet bulb temperature (WBT) and dry-bulb temperature (DBT) are related to each other as _____.

a. DBT
b. DPT=WBT=DBT
c. WBT>DBT>DPT
d. None of these

448. During heating and humidification process, which of the following parameters increase?

a. Dew point temperature
b. Dry bulb temperature
c. Humidity ratio
d. all of the above

449. In Psychrometric chart, which of the following statement is correct?

a. It is used to determine properties of refrigerants
b. It enables to determine WBT and DBT
c. It is seldom used for air conditioning design
d. It provides plots for moist air conditioning

450. Which of the following air conditioning systems is suitable for air conditioning large space such as theatres, cinemas etc.

a. Unitary
b. Zonal
c. Central
d. Unitary-central

451. Preheating of a gaseous fuel results in increased _____.

a. flame length
b. flame temperature
c. quantity of flue gas
d. ignition temperature

452. The ratio of the sum of individual maximum demands of the system to the overall maximum demand of the whole system.

a. Demand factor
b. Diversity factor
c. Power factor
d. Utilization factor

453. Carnot cycle consists of _____.

a. two adiabatic processes and two constant pressure processes
b. two constant processes and two constant temperature processes
c. two adiabatic processes and two constant temperature processes
d. one adiabatic process and one constant temperature process

454. In dealing with pure substance, the ratio of the mass of vapor to the total mass of liquid plus vapor in the liquid-vapor mixture is called _____.

a. Quantity of mixture
b. Quality of the mixture
c. Moisture content of the mixture
d. Entropy property of the mixture

455. Heat required to effect phase transition and without change in temperature from solid into ice is known as _____.

a. latent heat of fusion
b. latent heat of solidification
c. internal latent heat
d. none of the above

456. In a four-stroke cycle, the minimum temperature inside the engine cylinder occurs at the _____.

a. beginning of suction stroke
b. end of suction stroke
c. beginning of exhaust stroke
d. end of exhaust stroke

457. The objective of supercharging the engine is _____.

a. to reduce mass of the engine per brake power
b. to reduce space occupied by the engine
c. to increase the power output of an engine when greater power is required
d. all of the above

458. Heat transfer by convection is governed by _____.

a. Fourier's Law
b. Newton's Law
c. Kirchhoff’s Law
d. Stefan-Boltzman Law

459. The amount of radiation heat transfer mainly depends upon the _____.

a. nature of the body
b. temperature of the body
c. type of surface of the body
d. all of these

460. The radiation energy emitted by a real body is always _____.

a. equal to a black body
b. less than the black body
c. greater than the black body
d. zero

461. In case of a four-cylinder diesel engine, how much fuel heat is carried away by exhaust gases _____.

a. 25 to 35 percent
b. 7 to 27 percent
c. 15 to 25 percent
d. 5 to 15 percent

462. A closed cycle gas turbine works on _____.

a. Carnot cycle
b. Rankine cycle
c. Joule cycle
d. Atkinson cycle

463. In a super-position set-up of steam power plant, what do you call the part where it serves as the source of energy of another plant with a working substance that has lower boiling point?

a. Cogeneration
b. Topping
c. Bottoming
d. any of the above

464. In a steam power plant, the function of condenser is _____.

a. to maintain pressure below atmospheric to increase work output from the prime mover
b. to receive large volumes of steam exhausted from steam prime mover
c. to condense large volumes of steam to water which may be used again in boiler
d. all of the above

465. Francis, Kaplan and propeller turbines fall under the category of _____.

a. impulse turbine
b. reaction turbine
c. impulse reaction combined
d. axial flow

466. Low head dams, commonly used for flood control on rivers provides an opportunity for electric power generation using hydraulic turbine-generators. The heads for this power plant could be from?

a. 10-20 meters
b. 3-10 meters
c. 5-15 meters
d. 8-15 meters

467. Geothermal energy comes from _____.

a. the Sun
b. falling water
c. fossil fuels
d. Earth's internal heat

468. The material most commonly used for shielding of reactor in nuclear power plant is _____.

a. carbon
b. lead
c. concrete
d. all of these

469. The primary fuel used in nuclear power plants is _____.

a. U235
b. U238
c. Pu239
d. Pu233

470. Photovoltaic cell or solar cell converts _____.

a. thermal energy into electricity
b. electromagnetic radiation directly into electricity
c. solar radiation into thermal energy
d. solar energy to potential energy

471. The PME color code for steam pipes with high-pressure applications.

a. orange
b. yellow
c. blue
d. green

472. In fluid flow, which of the following parameters determines the friction factor of turbulent flow in a rough pipe?

a. Froude number and relative roughness
b. Reynolds numbers and relative roughness
c. Density and the length of pipe
d. Specific volume, density and specific weight

473. Which of the following is main advantage of PERT over Gantt charts?

a. Time of every activity is clear
b. Inter-relationship among activities is clearly shown
c. Early start and late finish of activities are clearly marked
d. Activities and events are clearly Shown

474. For a fluid flowing over a heated plate, the temperature gradient is _____.

a. Negligible at the top of the layer
b. Negligible at the surface
c. Infinite at plane surface
d. None of these

475. Plank' s law is applicable to _____.

a. Monochromatic radiation
b. Radiation of all wavelengths
c. Radiation from black and grey bodies
d. None of these

476. The specific speed of a hydraulic pump is the speed at which geometrically similar pump working against a unit head and _____.

a. delivering unit quantity of water
b. consuming unit power
c. having unit velocity of power
d. having unit radical velocity

477. Which of the following are the function/s of a volute casing in a centrifugal pump?
1. to collect water from the periphery of the impeller and to transmit it to the delivery pipe
2. to increase the discharge of the pump
3. to increase the efficiency of the pump
4. to reduce the loss of head in discharge.

a. 1,2 and 3
b. 2, 3 and 4
c. 1, 3 and 4
d. 1 and 2

478. Single most important property of lubricated oil is _____.

a. Its fire point
b. Cloud point
c. Oiliness
d. Viscosity index

479. Axial fans are best suitable for _____ application.

a. Large flow, low head
b. Low flow, high head
c. High head, large flow
d. Low flow, low head

480. What is the best pumps installation set-up when liquid must be delivered at high very heads?

a. single pump arrangement
b. one-pass arrangement
c. series installation
d. parallel installation

481. The isothermal compression in multistage compressor is achieved by _____.

a. running the compressor at very slow speed
b. constantly cooling the cylinder
c. employing intercooler
d. insulating the cylinder

482. Which of the following statement is correct?

a. The ratio of the discharge pressure to the inlet pressure of air is called compressor efficiency.
b. The compression ratio for the compressor is always greater than unity.
c. The compressor capacity is the ratio of work done per cycle to the stroke volume.
d. During isothermal compression of air, the work done in a compressor is maximum.

483. What is the function of a diffuser in a compressor system?

a. It converts kinetic energy into pressure energy
b. It converts pressure energy into kinetic energy
c. It increases degree of reaction
d. It decreases power consumption

484. For the same draught produced, the power of induced draught fan as compared to forced draught fan is _____.

a. less
b. more
c. same
d. not predictable

485. In a heat exchanges with one fluid evaporating or condensing in the surface, the best arrangement to be used is _____.

a. parallel flow
b. counter flow
c. cross flow
d. some in all above

486. In a pulverized fuel fixed large power boiler, the heat transfer from the burning fuel to the walls of the furnace is _____.

a. by conduction only
b. by convection only
c. by conduction and convection
d. predominant by radiation

487. Bucket elevators are used for _____.

a. carrying coal in horizontal direction
b. carrying coal in vertical direction
c. carrying coal in any direction
d. none of the above

488. In case of Economic Order Quantity (EOQ), if set up cost is variable then optimum order quantity _____.

a. Decreases
b. Increases
c. Remains same
d. No such relationship exists

489. In vapor compression cycle the refrigerant after condensation process is cooled below the saturation temperature, such process is called _____.

a. normal cooling
b. super-cooling
c. sub-cooling
d. none of the above

490. Heat rejection by refrigerant takes place at _____.

a. Evaporator
b. Condenser
c. Drier
d. All of these

491. The material of pipelines for a system using R-22, R-132, R-410, R-407C as refrigerant should be _____.

a. aluminum
b. copper
c. Steel
d. Brass

492. What is the effect of the presence of frost on the cooling coils of the evaporator of refrigeration system?

a. It reduces the life of cooling coils

b. It increases the compressor pressure
c. It makes the compressor run for comparatively short runs
d. It blocks the flow of air and therefore decreases the heat transfer rate

493. The by-pass factor for a cooling coil _____.

a. increases with increase in velocity of air passing through it
b. decreases with increase in velocity of air passing through it
c. remains unchanged with increase in velocity of air passing through it
d. may increase or decrease with increase in velocity of air passing through it depending upon the condition of air entering

494. When water is added to air at constant dry bulb temperature, the process is known as _____.

a. sensible cooling
b. humidification
c. dehumidification
d. chilling

495. If air is heated without changing its moisture content, the dew point will _____.

a. decrease
b. remain same
c. increase
d. none of the above

496. The specific measurement of moisture content in air is called _____.

a. relative humidity
b. percent saturation
c. degree of saturation
d. specific humidity

497. In a sensible heating process, the moisture content _____.

a. Increase
b. Remains constant
c. Decreases
d. any of the above

498. The condensation of moisture contained in air will start at _____.

a. dew point temperature
b. dry bulb temperature
c. wet bulb temperature
d. any of the above

499. As relative humidity decreases, the dew point will be _____ wet bulb temperature.

a. lower than
b. equal to
c. higher than
d. none of the above

500. Sensible heat is the heat added to _____.

a. measure dew point temperature
b. vaporize water into steam and vice versa
c. change the temperature of a liquid or vapor without change in phase
d. none of the above