Quiz terms - aes

Bachelor of Secondary Education Major in English (University of St. La Salle)

CHAPTER 3 – DIESEL PLANT

1. An engine in which the fuel is burned directly within the working cylinder.
   A. Internal combustion engine
   B. External combustion engine
   C. Compression ignition engine
   D. Spark ignition engine

   Answer: A

2. An engine in which the fuel is burned outside of the power cylinder.
   A. Internal combustion engine
   B. External combustion engine
   C. Compression ignition engine
   D. Spark ignition engine

   Answer: B

3. An engine where the ignition is caused by heat of compression.
   A. Internal combustion engine
   B. External combustion engine
   C. Compression ignition engine
   D. Spark ignition engine

   Answer: C

4. What temperature is required to ignite the fuel oil?
   A. 800 to 1000F
   B. 700 to 900F
   C. 900 to 1100F
   D. 1000 to 1200F

   Answer: A

5. What air pressure is required to produce the required ignition temperature?
   A. 350 to 500 psi
   B. 250 to 400 psi
   C. 450 to 600 psi
   D. 150 to 300 psi

   Answer: A

6. In a four stroke Diesel engine, drawing air into the cylinder is what stroke?
   A. First stroke
   B. Second stroke
   C. Third stroke
   D. Fourth stroke

   Answer: A

7. Compressing air in a four stroke cycle is
   A. First stroke
   B. Second stroke
   C. Third stroke
   D. Fourth stroke

   Answer: B

8. Which of the following strokes is produced by the burning gases:
   A. First stroke
   B. Second stroke
   C. third stroke
   D. fourth stroke

   Answer: C

9. Which of the following strokes expels the burned gases?
   A. First stroke
   B. Second stroke
   C. Third stroke
   D. Fourth stroke

   Answer: D

10. Clearing a cylinder of exhaust gases by forcing into it a current of air which provides clean air for the next compression stroke.
    A. Scavenging
    B. Supercharging
    C. Choking
    D. Knocking

    Answer: A

11. Increasing the total amount of charging air in the working cylinder of the engine.
    A. Scavenging
    B. Supercharging
    C. Choking
    D. Knocking

    Answer: B

12. The portion of the piston which extends below the piston pin and serves as a guide for the piston and connecting rod.
    A. Piston skirt
    B. Piston ring
    C. Piston scoring
    D. Piston seizure

    Answer: A

13. Rings located in the grooves of the piston usually near the top and near the bottom.
    A. Piston skirt
    B. Piston ring
    C. Piston scoring
    D. Piston seizure

    Answer: B

14. Binding of the piston and the cylinder wall as a result of the lubrication having been destroyed by excessive temperature and friction.
    A. Piston skirt
    B. Piston ring
    C. Piston scoring
    D. Piston seizure

    Answer: D

15. Grooves in the cylinder wall or piston or in both. It is caused by the piston scraping the cylinder wall in its movement without proper lubrication.
    A. Piston skirt
    B. Piston ring
    C. Piston scoring
    D. Piston seizure

    Answer: C

16. A device which automatically governs or controls the speed of an engine.
    A. Servomotor
    B. Governor
    C. Indicator
    D. Speedometer

    Answer: B

17. A combination of liquids which do not mix - or combine chemically.
    A. Emulsion

B. Deposition
C. Evaporation
D. Separation

Answer: A

18. What temperature should be the maximum to which lubricating oil is permitted to rise?
A. Not more than 100F
B. Not more than 200F
C. Not more than 300F
D. Not more than 400F

Answer: A

19. What air pressure is needed for air starting a Diesel engine?
A. 250 psi
B. 150 psi
C. 350 psi
D. 450 psi

Answer: A

20. At what temperature will self-igniting cartridges ignite?
A. About 200F
B. About 190F
C. About 210F
D. About 250F

Answer: B

21. The fuel is supplied by one pump and switched to each cylinder by a multi outlet rotating valve or distributor.
A. Distributor system
B. Injector system
C. Non injector system
D. Non distributor system

Answer: A

22. This is virtually a distributor two stage pumping system that is, modified distributor system.
A. Distributor system
B. Injector system
C. Non injector system
D. Non distributor system

Answer: B

23. A chamber so proportioned with respect to the clearance volume proper of the cylinder that only about 30% of the combustion takes place within the chamber itself.
A. Pre combustion chamber
B. Separate combustion chamber
C. Ante combustion chamber
D. Mixed combustion chamber

Answer: A

24. The entire charge is ignited in the separate combustion chamber before the initial expansion takes place, forcing the burning gases through the connecting passages and against the moving piston.
A. Pre combustion chamber
B. Separate combustion chamber
C. Ante combustion chamber
D. Mixed combustion chamber

Answer: B

25. A chamber so designed that injection takes place directly opposite its outlet, the chamber extending backward from the outlet.
A. Pre combustion chamber
B. Separate combustion chamber
C. Ante combustion chamber
D. Air cell chamber

Answer: C

26. Fuel is injected only into the main cylinder, during expansion of the burning gases in the main chamber, when the pressure therein drops below that of the air in the cell.
A. Pre combustion chamber
B. Separate combustion chamber
C. Ante combustion chamber
D. Air cell chamber

Answer: D

27. What is the temperature of the air in the cylinder when the Diesel engine is operating at full load?
A. Between 800 and 1100F
B. Between 800 and 1000F
C. Between 900 and 1200F
D. Between 900 and 1100F

Answer: A

28. What are the exhaust gas temperatures at normal operating conditions?
A. Between 400 and 700F
B. Between 500 and 800F
C. Between 300 and 600F
D. Between 200 and 500F

Answer: A

29. How are high speed Diesel engines started?
A. By an electric motor
B. By compressed air
C. By diesel fuel
D. By an electric spark

Answer: A

30. What speeds are considered high speed diesel engine?
A. 100 to 2000 rpm or 3000 rpm
B. 100 to 1000 rpm
C. 100 to 1500 rpm
D. 100 to 1750 rpm

Answer: A

31. It is a device used for atomizing or cracking fuel oil and through which the fuel oil Is injected into the working cylinders of Diesel engines.
A. Atomizer
B. Fuel spray nozzle
C. Injector
D. Cracker

Answer: A

32. What is the proper seat width of a spray valve?
A. 1/16 in.
B. 1/8 in.
C. 1/32 in.
D. ¼ in.

Answer: A

33. A cylindrical vessel connected in the fuel system to absorb the shock of the injection pumps and to provide a reservoir at high pressure for supplying an even flow of fuel oil to the cylinders.
A. Absorber

B. Accumulator
C. Governor
D. Injector

Answer: B

34. How hot are the exhaust gases?
A. 400 to 700F
B. 300 to 600F
C. 200 to 500F
D. 500 to 800F

Answer: A

35. Which of the following is an automatic device used for keeping constant air pressure?
A. Relief valve
B. Unloader
C. Strainer
D. Barometer

Answer: B

36. What is the other term of the diameter of the circular cylinder?
A. Bore
B. Stroke
C. Swept volume
D. Clearance

Answer: A

37. What do you call the maximum distance traveled by the piston?
A. Bore
B. Stroke
C. Swept volume
D. Clearance

Answer: B

38. Which of the following is the product of the cylinder area and stroke?
A. Bore
B. Stroke
C. Swept volume
D. Clearance

Answer: C

39. The ratio of the clearance volume to the swept volume.
A. Fractional clearance
B. Compression ratio
C. Expansion ratio
D. Cut off ratio

Answer: A

40. The piston is at maximum reach from the crankshaft to which of the following?
A. Top dead center
B. Bottom dead center
C. ¾ from top center
D. ¾ from bottom center

Answer: A

41. The piston is closest to the crankshaft to which of the following?
A. Top dead center
B. Bottom dead center
C. ¾ from top center
D. ¾ from bottom center

Answer: B

42. Which of the following engines where the expanding combustion gases act on one end of the piston?
A. Single acting engine
B. Double acting engine
C. Single expansion engine
D. Double expansion engine

Answer: A

43. Which of the following types of engine where the expanding combustion gases act on both ends of the piston?
A. Single acting engine
B. Double acting engine
C. Single expansion engine
D. Double expansion engine

Answer: B

44. The compression ratio of a Diesel engine varies from about:
A. 13.5 to 17.5
B. 8 to 10
C. 14 to 19
D. 10.5 to 14.5

Answer: A

45. In standard Diesel, thermal efficiency was not much higher than about what percent?
A. 35%
B. 30%
C. 40%
D. 50%

Answer: A

46. A closed heat exchanger that transfers heat from compressed air to cooler air.
A. Regenerator
B. Intercooler
C. Aftercooler
D. Reheater

Answer: C

47. Which of the following is used to improve cold weather starting?
A. Poppet valve
B. Glow plug
C. Check valve
D. Spark plug

Answer: B

48. The rated power that the manufacturer claims the engine is able to provide on a continuous basis without incurring damage.
A. Brakepower
B. Continuous duty rating
C. Intermittent rating
D. Power rating

Answer: B

49. What is the peak power rating that can be produced on an occasional basis?
A. Brakepower
B. Continuous duty rating
C. Intermittent rating
D. Power rating

Answer. C

50. Which of the following is the value of a property that includes the effect of friction?
    A. Brake value
    B. Friction value
    C. Indicated value
    D. Actual value

    Answer. A

CHAPTER 4 – GAS TURBINE

1. Brayton cycle has:
    A. Two isentropic and two constant volume processes
    B. Two isentropic and two constant pressure processes
    C. One constant pressure, one constant volume and two adiabatic processes
    D. Two isothermals, one constant volume and a constant pressure process

    Answer: B

2. Brayton cycle cannot be used in reciprocating engines even for same adiabatic compression ratio and work output because:
    A. Otto cycle is highly efficient
    B. Brayton cycle is less efficient
    C. Brayton cycle is for slow speed engines only
    D. Large volume of low pressure air cannot be efficiently handled in reciprocating engines

    Answer: D

3. Which cycle is generally used for gas turbine?
    A. Otto cycle
    B. Dual cycle
    C. Carnot cycle
    D. Brayton cycle

    Answer: D

4. When r is the compression ratio, the efficiency of Brayton cycle is given by:
    A. $1\text{-}1/r^{(k-1)/k}$
    B. $1\text{-}1/r^{k-1}$
    C. $1\text{-}1/r^{k}$
    D. 1-1/r

    Answer: A

5. A regenerator in a gas turbine:
    A. Reduces heat loss during exhaust
    B. Allows use of higher compression ratio
    C. Improves thermal efficiency
    D. Allows use of fuels of inferior quality

    Answer: C

6. Which of the following compressors is generally used for gas turbines?
    A. Lobe type
    B. Centrifugal type
    C. Axial flow type
    D. Reciprocating type

    Answer: C

7. The constant pressure gas turbine works on the principle of:
    A. Carnot cycle
    B. Bell-Coleman cycle
    C. Rankine cycle
    D. Brayton cycle

    Answer: D

8. What type of gas turbine is used in air craft?
    A. Open cycle type
    B. Closed cycle type with reheating
    C. Closed type with reheating and regeneration
    D. Open cycle type with reheating, regeneration and intercooling

    Answer: A

9. In a gas turbine combined cycle plant, a waste heat boiler is used to:
    A. Heat air from intercooler
    B. Gases from regenerator
    C. Recover from regenerator
    D. None of the above

    Answer: C

10. Overall efficiency of a gas turbine is:
    A. Equal to Carnot cycle efficiency
    B. Equal to Rankine cycle efficiency
    C. Less than Diesel cycle efficiency
    D. More than Otto or Diesel cycle efficiency

    Answer: C

11. Which of the following turbine has least weight per bhp developed?
    A. Simple open cycle gas turbine
    B. Open cycle gas turbine with inter-cooling and reheating
    C. Open cycle gas turbine with inter-cooling, reheating and regenerating
    D. Closed cycle gas turbine

    Answer: A

12. Which of the following is/are advantage of closed cycle gas turbine over open cycle gas turbine?
    A. No containing of working substance with combustion gases
    B. Inferior quality fuel can be used
    C. Low maintenance costs
    D. All of the above

    Answer: D

13. The range of compression ratio in a gas turbine is:
    A. 3 to 5
    B. 5 to 8
    C. 8 to 12
    D. 12 to 20

    Answer: B

14. A constant volume combustion gas turbine operates on:
    A. Ericson cycle
    B. Joule cycle
    C. Brayton cycle
    D. Atkinson cycle

    Answer: D

15. Past ME Board Question
    Heat exchanger used to provide heat transfer between the exhaust gases and the air prior to its entrance to the combustor.
    A. Evaporator
    B. Combustion chamber
    C. Regenerator
    D. Heater

    Answer: C

16. Past ME Board Question

How does the value for work per unit mass flow of air in the compressor and turbine influenced by the addition of a regenerator?
A. Slightly increased
B. Unchanged
C. Greatly decreased
D. Greatly increased

Answer: B

17. Past ME Board Question
What is the ideal cycle for gas turbine work?
A. Brayton cycle
B. Stag combined cycle
C. Bottom cycle
D. Ericson cycle

Answer: A

18. Past ME Board Question
Brayton cycle cannot be used in reciprocating engines even for same adiabatic compression ratio and work output because:
A. Brayton cycle is highly efficient
B. Brayton cycle is for low speed engines only
C. Brayton cycle needs large air-fuel ratio
D. Large volume of low pressure air cannot be efficient handled in reciprocating engines

Answer: D

19. Past ME Board Question
In order to increase the gas velocity gas turbines generally have fixed nozzles. This is to allow the:
A. Compression of gases
B. Condensation of gases
C. Expansion of gases
D. Evaporation of gases

Answer: C

20. Combustion turbines or gas turbines are the preferred combustion engines in application much above _____.
A. 8MW
B. 9mw
C. 10MW
D. 7MW

Answer: C

21. Large units gas turbine regularly operate:
A. In 100 to 200 MW range
B. In 50 to 100 MW range
C. Over 150 MW
D. Below 150 MW

Answer: A

22. Small units gas turbine typically have:
A. Double shafts
B. Single shafts
C. Triple shafts
D. Quadruple shafts

Answer: B

23. Heavy duty gas turbines typically have:
A. Double shafts
B. Single shaft
C. Triple shafts
D. Quadruple shafts

Answer: B

24. Which of the following is basically a jet engine that exhausts into a turbine generator?
A. Aeroderivative gas turbine
B. Industrial gas turbine
C. Brayton engine
D. Joule turbine

Answer: A

25. Most aeroderivative combustion turbine produce less than:
A. 20 MW
B. 30 MW
C. 40 MW
D. 50 MW

Answer: C

26. The compression ratio based on pressures in the compression stage in a gas turbine is typically:
A. 11 to 16
B. 5 to 8
C. 12 to 18
D. 8 to 14

Answer: A

27. The compression ratio based on pressures of heavy duty gas turbine is in the range of ____.
A. 14 to 15
B. 19 to 21
C. 11 to 16
D. 16 to 18

Answer: A

28. Aeroderivative combustion turbine have higher compression ratios typically:
A. 14 to 15
B. 19 to 21
C. 11 to 16
D. 16 to 18

Answer: B

29. Most heavy duty combustion turbines have how many compression stages?
A. 14 to 16
B. 18 to 20
C. 10 to 12
D. 16 to 18

Answer: D

30. The temperature of the gas entering the expander section is typically:
A. 1200 C to 1290 C
B. 1000 C to 1200 C
C. 1500 C to 1490 C
D. 1300 C to 1390 C

Answer: A

31. The exhaust temperature which makes the exhaust an ideal heat source for combined cycles is typically:
A. 540 C to 590 C
B. 600 C to 650 C
C. 300 C to 350 C
D. 440 C to 490 C

Answer: A

32. Most combustion turbines have:
A. 2 to 3 expander stages
B. 3 to 4 expander stages
C. 4 to 5 expander stages
D. 1 to 2 expander stages

Answer: B

33. The exhaust flow rate in modern heavy duty turbines per 100 MW is approximately:
    A. 240 to 250 kg/s
    B. 140 to 150 kg/s
    C. 340 to 350 kg/s
    D. 440 to 450 kg/s

    Answer: A

34. The Brayton gas turbine cycle is also known as:
    A. Joule cycle
    B. Stirling cycle
    C. Ericsson cycle
    D. Atkinson cycle

    Answer: A

35. Approximately how many percent of the turbine power is used to drive the high efficiency compressor?
    A. 50 to 75 %
    B. 60 to 85 %
    C. 45 to 70 %
    D. 30 to 55 %

    Answer: A

36. Depending on the turbine construction details, the temperature of the air entering the turbine will be between:
    A. 650 C to 1000 C
    B. 750 C to 1100 C
    C. 550 C to 950 C
    D. 850 C to 1200 C

    Answer: A

37. Which of the following engines are typically used by Turbojet and turboprop?
    A. Open combustors
    B. Closed combustors
    C. Turbo combustors
    D. High combustors

    Answer: A

38. The full load thermal efficiency of existing heavy duty combustion turbines in simple cycles is approximately:
    A. 34 to 36 %
    B. 30 to 32 %
    C. 40 to 42 %
    D. 26 to 28 %

    Answer: A

39. New combustion turbines on the cutting edge of technology (Advanced turbine systems) are able to achieve
    A. 38 to 38.5 %
    B. 36 to 36.5 %
    C. 40 to 40.5 %
    D. 34 to 34.5 %

    Answer: A

40. Aeroderivative turbines commonly achieve efficiencies up to:
    A. 42 %
    B. 38 %
    C. 45 %
    D. 35 %

    Answer: A

41. Which of the following is the typical backwork ratio of gas turbines?
    A. 50 to 75 %
    B. 40 to 65 %
    C. 30 to 55 %
    D. 35 to 60 %

    Answer: A

42. Which of the following is an example of a regenerator?
    A. A counterflow heat exchanger
    B. A cross flow heat exchanger
    C. A mixed flow heat exchanger
    D. A parallel flow heat exchanger

    Answer: B

43. Which of the following is an effect of having a regenerator?
    A. Less heat is added
    B. Compressor work is reduced
    C. Turbine work is increased
    D. Compressor work is increased

    Answer: A

44. A regenerator in a gas turbine has no effect in:
    A. Compressor and turbine work
    B. Heat added
    C. Thermal efficiency
    D. Combustor

    Answer: A

45. In a Brayton cycle multiple stages of compression and expansion will _____.
    A. Increase thermal efficiency
    B. Decrease thermal efficiency
    C. Limit thermal efficiency
    D. Control efficiency

    Answer: A

46. In a Brayton cycle, reheating and intercooling will _____.
    A. Increase thermal efficiency
    B. Decrease thermal efficiency
    C. Limit thermal efficiency
    D. Control efficiency

    Answer: A

47. In a Brayton cycle, reheating has no effect in:
    A. Heat added
    B. Thermal efficiency
    C. Backwork ratio
    D. Network

    Answer: A

48. In a Brayton cycle, intercooling has no effect in:
    A. Turbine work
    B. Thermal efficiency
    C. Backwork ratio
    D. Network

    Answer: A

49. If W_t is the turbine power and W_c is the compressor power then the backwork ratio is
    A. W_t / W_c
    B. W_c / W_t
    C. $\frac{W_t - W_c}{W_t}$
    D. $\frac{W_t - W_c}{}$

W_c

Answer: B

50. If W_t is the turbine power and W_c is the compressor power then the network is:
    A. W_t x W_c
    B. W_c / W_t
    C. W_t - W_c
    D. W_t + W_c

    Answer: C

51. Physical limitations usually preclude more than how many stages of intercooling and reheating?
    A. 2
    B. 3
    C. 4
    D. 5

    Answer: A

CHAPTER 5 – STEAM POWER PLANT

1. Which of the following factors does bursting pressure of boiler doesn't depend?
    A. Tensile strength of the shell
    B. Thickness of the shell
    C. Diameter of the shell
    D. Shear strength of shell material

    Answer: D

2. Which of the following factors does working pressure of boiler doesn't depend?
    A. Tensile strength of shell
    B. Thickness of shell
    C. Factor of safety
    D. Type of fuel being fired

    Answer: D

3. Total solid impurities in feed water for a boiler depend upon
    A. Boiler pressure
    B. Quantity of steam to be generated
    C. Type of fuel available
    D. Quantity of steam

    Answer: A

4. A high pressure chamber or a device in which the paths of rapidly moving particles can be observed and photographed.
    A. Cloud chamber
    B. Combustion chamber
    C. Fission chamber
    D. Air chamber

    Answer: A

5. The formation of gas bubbles in a liquid is called
    A. Bubbling
    B. Foaming
    C. Priming
    D. Carryover

    Answer: B

6. How many check valves should be provided between any feed pump and boiler?
    A. 1
    B. 2
    C. 3
    D. 4

    Answer: B

7. The water level inside the boiler is indicated by the
    A. Baffles
    B. Fusible plug
    C. Water walls
    D. Water column

    Answer: D

8. What is the highest pressure under which distinguishable liquid and vapor phases can exist in equilibrium?
    A. Maximum pressure
    B. Atmosphere
    C. Critical pressure
    D. Peak pressure

    Answer: C

9. What is the average fuel – oil temperature range of the oil in the discharge line to the boiler?
    A. 180 – 200 ℉
    B. 240 – 260 ℉
    C. 160 – 180 ℉
    D. 140 – 160 ℉

    Answer: A

10. The lowest permissible water level of a boiler without internal furnace is _____the height of the shell.
    A. 1/2
    B. 1/3
    C. 1/4
    D. 1/5

    Answer: B

11. In case of steam engine the cut off ratio is the ratio of:
    A. Pressure at cut off to supply pressure
    B. Pressure at cut off to exhaust pressure
    C. Pressure at cut off to mean effective pressure
    D. Fraction of piston stroke which the piston has traveled when cut off occurs

    Answer: D

12. In a condensing steam engine
    A. Condensed steam is supplied
    B. Steam condenses inside cylinder
    C. Steam condenses as soon as it leaves the cylinder
    D. Exhaust steam is condensed in a condenser

    Answer: D

13. Flows through the nozzles and diffusers with increasing fluid velocity will create an equivalent
    A. Decrease in the static enthalpy of fluid
    B. Increase in the static enthalpy of fluid
    C. Decrease in the internal energy of fluid
    D. Decrease in the dynamic enthalpy of fluid

    Answer: A

14. The term $V^2/2C_p$responds to the temperature rise during such a process and is called the
    A. Kinetic temperature
    B. High temperature
    C. Dynamic temperature
    D. Elevation temperature

    Answer: C

15. All of the following mechanism can supply heat to a thermodynamic system except

A. Conduction
B. Natural convection
C. Adiabatic expansion
D. Radiation

Answer: C

16. The flow through the nozzle is
A. Isentropic
B. Polytropic
C. Isobaric
D. Isovolumic

Answer: A

17. If the reservoir is sufficiently large, the nozzle inlet velocity is
A. Maximum
B. Negative
C. Positive
D. Zero

Answer: D

18. Which of the following is the pressure applied at the nozzle discharge section?
A. Stagnant pressure
B. Critical pressure
C. Back pressure
D. Atmospheric pressure

Answer: C

19. When the back pressure is reduced to lowest exit pressure, the mass flow reaches a maximum value and the flow is said to be:
A. Stacked
B. Choked
C. Stuck-up
D. Clog-up

Answer: B

20. An increase in stagnation pressure will increase the mass flux through the:
A. Diverging nozzle
B. Converging nozzle
C. Converging – diverging nozzle
D. None of these

Answer: B

21. A converging – diverging nozzle is the standard equipment in:
A. Subsonic aircraft
B. Supersonic aircraft
C. Hypersonic aircraft
D. Trisonic aircraft

Answer: B

22. For back pressure valves, abrupt changes in fluid properties occur in a very thin section of converging – diverging nozzle under supersonic flow conditions, creating
A. Sound wave
B. Tidal wave
C. Shock wave
D. None of these

Answer: C

23. Is the locus of states which have the same value of stagnation enthalpy and mass flux are called:
A. Fanno line
B. Straight line
C. Willan's line
D. Cross cut line

Answer: A

24. Combination of mass and momentum equations into a single equation and plotted in h-s plane yield a curve called:
A. Fair line
B. Freh line
C. Cutting line
D. Rayleigh line

Answer: D

25. Generally steam turbines in power station operate at
A. 3000 rpm
B. 1000 rpm
C. 4000 rpm
D. 575 rpm

Answer: A

26. Which of the following shows the relationship of the steam consumption and the load of steam turbine generator?
A. Dalton's line
B. Willan's line
C. Jonval's line
D. Rankine line

Answer: B

27. An inventor proposes to develop electrical power by withdrawing heat from the geyser fields of northern California and converting it all to work in power turbines. The scheme will not work because:
A. The geyser fields have only a limited lifetime
B. The salinity of the steam is too great
C. It violates the first law of thermodynamics
D. It violates the second law of thermodynamics

Answer: D

28. The isentropic efficiency of a turbine is given by
A. The ratio of actual to ideal energy extracted
B. The ratio of actual to ideal energy inputted
C. The ratio of ideal to actual energy extracted
D. None of the above

Answer: A

29. Past ME Board Question
Which of the following is not a main part of a typical coal burner?
A. Air registers
B. Nozzle
C. Atomizer
D. Ignitor

Answer: C

30. Past ME Board Question
Measure of ability of a boiler to transfer the heat given by the furnace to the water and steam is:
A. Grate efficiency
B. Stroke efficiency
C. Furnace efficiency
D. Boiler efficiency

Answer: D

31. Past ME Board Question
A goose neck is installed in the line connecting a steam gauge to a boiler to:
A. Maintain constant steam flow

B. Protect the gauge element
C. Prevent steam knocking
D. Maintain steam pressure

Answer: B

32. Past ME Board Question
Which of the following is a great advantage of a fire tube boiler?
A. Steam pressure is not ready
B. Contains a large volume of water and requires a long interval of time to raise steam and not so flexible as to changes in steam demand
C. Cannot use impure water
D. Radiation losses are higher because fire is inside the boiler and surrounded by water

Answer: B

33. Past ME Board Question
One of the following tasks which is an example of preventive maintenance is
A. Cleaning the cup on a rotary cup burner
B. Cleaning a completely clog oil strainer
C. Replacing a leaking valve
D. Replacing a blown fuse

Answer: A

34. Past ME Board Question
The carbon dioxide (CO_2) percentage in the flue gas of an efficiency fired boiler should be approximately
A. 1 %
B. 12 %
C. 18 %
D. 20 %

Answer: B

35. ME Board October 1993
When droplets of water are carried by steam in the boiler
A. Priming
B. Foaming
C. Carryover
D. Embrittlement

Answer: A

36. Past ME Board Question
The process in which heat energy is transferred to a thermal energy storage device is known as:
A. Adiabatic
B. Regeneration
C. Intercooling
D. Isentropic

Answer: B

37. Past ME Board Question
When the boiler pressure increases or when the exhaust pressure decreases, the amount of moisture
A. Increases
B. Decreases
C. Constant
D. Zero

Answer: A

38. Past ME Board Question
When the number of reheat stages in a reheat cycle is increased, the average temperature
A. Increases
B. Decreases
C. Is constant
D. Is zero

Answer: A

39. Past ME Board Question
A heat transfer device that reduces a thermodynamic fluid from its vapor phase to its liquid phase such as in vapor compression refrigeration plant or in a condensing steam power plant
A. Flash vessel
B. Cooling tower
C. Condenser
D. Steam separator

Answer: C

40. Past ME Board Question
A simultaneous generation of electricity and steam (or heat) in a single power plant
A. Gas turbine
B. Steam turbine
C. Waste heat recovery
D. Cogeneration

Answer: D

41. Past ME Board Question
Is one whose pressure is higher than the saturation pressure corresponding to its temperature.
A. Compressed liquid
B. Saturated liquid
C. Saturated vapor
D. Superheated vapor

Answer: A

42. Past ME Board Question
In a steam generator with good combustion control, what occurs if the load is increased?
A. Air temperature leaving air heater decreases
B. Air temperature entering air heater increases
C. Furnace pressure is approximately constant
D. Economizer gas outlet temperature decreases

Answer: C

43. Past ME Board Question
Total solid impurities in feed water for a boiler depend upon
A. Boiler pressure
B. Type of fuel available
C. Quantity of steam to be generated
D. Quantity of steam

Answer: A

44. Past ME Board Question
The gaseous state of water
A. Water gas
B. Blue gas
C. Water vapor
D. Yellow gas

Answer: C

45. A liquid boils when it vapor pressure equals
A. The gage pressure
B. The critical pressure
C. The ambient pressure
D. One standard atmosphere

Answer: C

46. Past ME Board Question
What are the main components in a combined cycle power plant?
A. Diesel engine and air compressor
B. Gas engine and waste heat boiler
C. Steam boiler and turbine
D. Nuclear reactor and steam boiler

Answer: B

47. Past ME Board Question
A change in the efficiency of combustion in a boiler can usually be determined by comparing the previously recorded readings with the current readings of the _____.
A. Stack temperature and CO
B. Over the fire draft and CO
C. Ringleman chart and CO_2
D. Stack temperature and CO_2

Answer: D

48. Past ME Board Question
A boiler steam gauge should have a range of at least
A. One half the working steam pressure
B. 1 and ½ times the maximum allowable working pressure
C. The working steam pressure
D. Twice the maximum allowable working pressure

Answer: B

49. Past ME Board Question
In a water tube boiler, heat and gases of combustion passed:
A. Through the combustion chamber only
B. Through the tubes
C. Away from tubes
D. Around the tubes

Answer: D

50. Past ME Board Question
A chemical method of feedwater treatment which uses calcium hydroxide and sodium carbonate as reagents
A. Thermal treatment
B. Lime soda treatment
C. Demineralization process
D. Ion exchange treatment

Answer: B

51. Past ME Board Question
The thermal efficiency of gas-vapor cycle as compared to steam turbine or gas turbine is
A. Greater than
B. Less than
C. Lower than
D. Equal to

Answer: A

52. Past ME Board Question
A rapid increase in boiler pressure occurs when there is:
A. Moderate drop in steam load
B. Constant drop in steam load
C. Abrupt drop in steam load
D. Gradual drop in steam load

Answer: C

53. Past ME Board Question
The most economical and low maintenance cost condenser.
A. Water – cooled
B. Air – cooled
C. Evaporative
D. Sub – cooled

Answer: B

54. Past ME Board Question
What is commonly done to system when the turbine has excessive moisture?
A. Frosting
B. Diffusing
C. Reheating
D. Dehumidifying

Answer: C

55. Past ME Board Question
What is the result when the fluid's kinetic energy during a stagnation process is transformed to enthalpy?
A. Decrease in fluids volume
B. Rise in the temp. and pressure of the fluid
C. Rise in fluid's volume
D. Decrease in the temp. and pressure of fluid

Answer: B

56. Past ME Board Question
How can the average temperature during heat rejection process of a Rankine cycle be decreased?
A. Increase boiler pressure
B. Increase turbine pressure
C. Increase condenser pressure
D. Reduce turbine exit pressure

Answer: D

57. Past ME Board Question
Which of the following ascertains the effectiveness and the size of a condenser?
A. Number of passes
B. Thickness of the shell
C. Tube sizes
D. Heat transfer

Answer: D

58. Past ME Board Question
A boiler has a bursing pressure, BP of 600 kPa and a factor of safety, FS of 8 is employed in design. As an engineer, would you advice to have a working pressure, WP of 500 kPa?
A. No. WP must be higher than 500 kPa
B. No. WP is only 75 kPa at FS of 8
C. Yes. Since BP is 600 Pa
D. Yes. To attain better efficiency

Answer: B

59. Past ME Board Question
What cycle is used in vapor cycle of steam power plant?
A. Brayton cycle
B. Diesel cycle
C. Ericsson cycle
D. Rankine cycle

Answer: D

60. Past ME Board Question
Gauge cock in the boiler is designed to determine:

A. Level of steam
B. Specific heat
C. Level of water
D. Pressure

Answer: C

CHAPTER 6 – GEOTHERMAL PLANT

1. Refers to the internal heat from the earth.
   A. Geothermal
   B. Thermal energy
   C. Molten heat
   D. Tectonic heat

   Answer: A

2. A rock – forming crystalline mixed silicate which constitute about 60% of the earth's surface.
   A. Soil
   B. Feldspar
   C. Flux
   D. Flint

   Answer: B

3. A compound rock, a crypto – crystalline form of silica, which is dens, tough, breaking with a conchoidal fracture.
   A. Gravel
   B. Stalactite
   C. Flint
   D. Flux

   Answer: C

4. Is the process of using injection wells to bubble air through groundwater.
   A. Air stripping
   B. Staged combustion
   C. Sparging
   D. Soil washing

   Answer: C

5. A popular term used by utilities to mean upgrading existing plant.
   A. Replanting
   B. Repowering
   C. Recharging
   D. Reorganizing

   Answer: B

6. A dense, fine grained, light colored igneous rock which is rich in silica.
   A. Felsite
   B. Feldspar
   C. Flint
   D. Flux

   Answer: A

7. An opening in lava or in volcanic area through which steam and other hot gases are escaping into the air is called:
   A. Fumarole
   B. Volcanic leaks
   C. Seismic outlets
   D. Seismic leaks

   Answer: A

8. Tidal power is the power generated from:
   A. Waves of the ocean
   B. Rise and fall tides
   C. Thermal energy of ocean water
   D. Raw sea water

   Answer: B

9. Converts chemical energy directly into electrical energy.
   A. Fuel cell
   B. Magnetohydrodynamic generator
   C. Battery
   D. Thermoelectric generator

   Answer: A

10. Generates a voltage from incident light, usually light in the visible region.
    A. Photovoltaic cell
    B. Solar cell
    C. Dry cell
    D. A or B

    Answer: D

11. All of the following terms are synonymous with quanta of electromagnetic theory except:
    A. Packets
    B. Corpuscles
    C. X-rays
    D. Photons

    Answer: C

12. In geothermal power plants waste water is:
    A. Recirculated after cooling in cooling lowers
    B. Discharged into sea
    C. Evaporated in ponds
    D. Discharged back to earth

    Answer: D

13. Past ME Board Question
    In a liquid-dominated geothermal plant, what process occurs when the saturated steam passes through the turbine?
    A. Isobaric
    B. Polytropic
    C. Isometric
    D. Isentropic

    Answer: B

14. Past ME Board Question
    What do you call a conversion technology that yields electricity straight from sunlight without the aid of a working substance like gas or steam without the use of any mechanical cycle?
    A. Power conversion
    B. Stirling cycle conversion
    C. Solar thermal conversion
    D. Photovoltaic-energy conversion

    Answer: D

15. Past ME Board Question
    Tidal power plant is attractive because it has:
    A. Low head and intermittent power
    B. High head
    C. Cheap energy source
    D. Expensive energy source

    Answer: C

16. Past ME Board Question
    What do you call a conversion technology that yields electricity straight from sunlight without the aid of a working substance like gas or steam without the use of any mechanical cycle?
    A. Power conversion

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

Answer: D

17. Past ME Board Question
Tidal power plant is attractive because it has:
A. Low head and intermittent power
B. High head
C. Cheap energy source
D. Expensive energy source

Answer: C

18. Tidal power is the power generated from:
A. Waves of the ocean
B. Rise and fall tides
C. Thermal energy of ocean water
D. Raw sea water

Answer: B

19. Converts chemical energy directly into electrical energy.
A. Fuel cell
B. Magnetohydrodynamic generator
C. Battery
D. Thermoelectric generator

Answer: A

20. Generates a voltage from incident light, usually light in visible region.
A. Photovoltaic cell
B. Solar cell
C. Dry cell
D. A or B

Answer: D

21. The statement that the product of the error in the measured determination of a particle's position and its momentum is of the order of Planck's constant h is known as:
A. Bohr's theory
B. D'Alembert's paradox
C. The Heisenberg uncertainty principle
D. Planck's law

Answer: C

22. The flow process through shock waves is highly irreversible and cannot be approximated as being:
A. Polytropic
B. Isometric
C. Hyperbolic
D. Isentropic

Answer: D

23. Beaufort scale is used for measuring what?
A. Beta and gamma radiations
B. Wind speed
C. Insolation
D. Depth of sea

Answer: B

24. Betz law is widely used in:
A. MHD systems
B. Solar cells
C. Geothermal power plants
D. Wind mills

Answer: D

25. Rocks having excessive internal stresses may produce spalling. These rocks are called as ____
A. Stratified rocks
B. Popping rocks
C. Crushed rocks
D. Swelling rocks

Answer: A

26. Solar energy arrives at the outside of the earth's atmosphere at an average rate of _____.
A. 1.354 kW/m^2
B. 1.543 kW/m^2
C. 2.354 kW/m^2
D. 2.543 kW/m^2

Answer: A

27. How many percent of solar energy survives absorption and reflection?
A. 40 to 70 %
B. 30 to 60 %
C. 50 to 80 %
D. 20 to 50 %

Answer: A

28. Solar energy is captured in:
A. Sun capturer
B. Solar collector
C. Sun collector
D. Greenhouse capturer

Answer: B

29. Which of the following solar collectors are essentially wide, flat boxes with clear plastic or glass coverings known as the glazing.
A. Flat plate collectors
B. Concentrating collectors
C. Focusing collectors
D. Evacuated tube collectors

Answer: A

30. Which of the following collectors use mirrors and/or lenses to focus the suns energy on a small absorber area.
A. Flat plate collectors
B. Concentrating collectors
C. Non focusing collectors
D. Evacuated tube collectors

Answer: B

31. Which of the following collectors are more complex but their efficiencies are higher?
A. Flat plate collectors
B. Concentrating collectors
C. Focusing collectors
D. Evacuated tube collectors

Answer: D

32. Which of the following collectors are useful when extremely hot transfer fluid is needed and are generally limited to commercial projects?
A. Flat plate collectors
B. Concentrating collectors
C. Focusing collectors
D. Evacuated tube collectors

Answer: D

33. The shading factor in calculating the heat absorbed by the solar collector has a value of approximately:
A. 0.95 to 0.97

B. 0.85 to 0.87
C. 0.75 to 0.77
D. 0.65 to 0.67

Answer: A

34. The ratio of energy absorbed by the transfer fluid to the original incident energy striking the collector.
A. Collector efficiency
B. Sun efficiency
C. Shading factor
D. Absorptance

Answer: A

35. As the difference between the ambient air and average plate (or inlet) temperatures increases, what happens to the collector efficiency?
A. Increases
B. Decreases
C. Constant
D. No effect

Answer: B

36. Distributed collector system is also known as:
A. Trough electric system
B. Central receiver system
C. Power tower system
D. Dish/Stirling system

Answer: A

37. Central receiver system is also known as:
A. Trough electric system
B. Distributed collector system
C. Power tower system
D. Dish/Stirling system

Answer: C

38. Which of the following main approaches to solar energy generating systems describes that parabolic tracking trough concentrators focus sunlight on evacuated glass tubes that run along the collectors focal lines.
A. Trough electric system
B. Central receiver system
C. Power tower system
D. Dish/Stirling system

Answer: A

39. Trough electric technology is relatively mature but due to the low temperatures, average annual thermal efficiencies are only:
A. 10 to 15 %
B. 5 to 10 %
C. 15 to 20 %
D. 25 to 30 %

Answer: A

40. A field of heliostats or tracking mirrors concentrates solar energy onto a receiver on a central tower.
A. Trough electric system
B. Distributed collector system
C. Power tower system
D. Dish/Stirling system

Answer: C

41. In a power tower system typical thermal efficiencies is in the range:
A. 10 to 15 %
B. 5 to 10 %
C. 15 to 20 %
D. 25 to 30 %

Answer: C

42. A dish engine system has an efficiency of
A. 10 to 15 %
B. 5 to 10 %
C. 14 to 19 %
D. 24 to 28 %

Answer: D

43. Practical and economic issues limit trough electric systems to about:
A. 200 MW
B. 100 MW
C. 300 MW
D. 400 MW

Answer: A

44. Practical and economic issues limit tower electric systems to approximately:
A. 100 to 200 MW
B. 150 to 250 MW
C. 100 to 300 MW
D. 150 to 400 MW

Answer: C

45. Thermal efficiency of a geothermal power plant is approximately:
A. 30 %
B. 22 %
C. 35 %
D. 15 %

Answer: B

46. A flash steam cycle can be used if the hot water temperature is approximately:
A. 165 C or higher
B. 150 C or higher
C. 145 C to 200 C
D. Below 200 C

Answer: A

47. A binary cycle using a separate heat transfer fluid if the temperature of the hot water is between approximately _____.
A. 165 C and 120 C
B. 200 C and 150 C
C. 225 C and 175 C
D. 300 C and higher

Answer: A

48. For every kilometer of depth, the temperature of the earth' s crust increase by:
A. 30 F
B. 40 F
C. 50 F
D. 20 F

Answer: A

49. Multiple wells produce steam at 690 to 820 kPa and temperature of _____.
A. 205 C
B. 155 C
C. 250 C
D. 175 C

Answer: A

50. In a hot rock systems, water is injected through injection wells into artificially made fractured rock beds of how many kilometers below the surface?
    A. 1 to 6 km
    B. 3 to 9 km
    C. 4 to 10 km
    D. 6 to 11 km

    Answer: A

CHAPTER 7 – NUCLEAR PLANT

1. Past ME Board Question
   What is the suggested maximum permissible dose (MPD) of gamma ray exposure for general individuals not working in a nuclear setting, by choice, in rem/year?
   A. 1
   B. 5
   C. ½
   D. 3

   Answer: C

2. Past ME Board Question
   The number of protons in the nucleus of an atom of the number of electrons in the orbit of an atom
   A. Atomic volume
   B. Atomic number
   C. Atomic weight
   D. Atomic mass

   Answer: B

3. The process in which a nucleus splits into smaller fragments.
   A. Fusion
   B. Fission
   C. Photoelectric effect
   D. Compton's effect

   Answer: B

4. The ability of a substance to absorb neurons is dependent upon which parameter?
   A. Absorption cross section
   B. Scattering cross section
   C. Total cross section
   D. Atomic number

   Answer: A

5. What kind of bonding do common gases that exist in free as diatomic molecules experiences?
   A. Ionic bonds
   B. Convalent bonds
   C. Metallic bonds
   D. Nuclear bonds

   Answer: B

6. Which of the following is NOT a unit of energy?
   A. Atomic unit
   B. MeV
   C. Dynes
   D. Ergs

   Answer: C

7. The process in which a nucleus splits into smaller fragments.
   A. Fusion
   B. Fission
   C. Photoelectric effect
   D. Compton's effect

   Answer: B

8. Which of the following is NOT a unit of energy?
   A. Calories
   B. Joules
   C. Pascals
   D. MeV

   Answer: C

9. The ability of a substance to absorb neurons is dependent upon which parameter?
   A. Absorption cross section
   B. Scattering cross section
   C. Total cross section
   D. Atomic number

   Answer: A

10. Which of the following is NOT a unit of energy?
    A. Atomic unit
    B. MeV
    C. Dynes
    D. Ergs

    Answer: C

11. An electricity charged atom or radical which carries electricity through an electrolyte is called:
    A. Ion
    B. Isotope
    C. Molecule
    D. Hole

    Answer: A

12. What is the smallest particle of an element that can enter into a chemical reaction?
    A. Molecule
    B. Ion
    C. Atom
    D. Isotope

    Answer: C

13. Beryllium, magnesium, and calcium all belong to which elemental grouping?
    A. Noble elements
    B. Halogens
    C. Lanthanons
    D. Alkaline earth metals

    Answer: D

14. The thickness of material required to attenuate radiation to a particular level depends on
    A. The particle
    B. The particle energy
    C. The shielding material
    D. The particle, its energy, and the shielding material

    Answer: D

15. Particles that are easily stopped within a few millimeter because their double charges generate path ionization and because they are susceptible to electrostatic interaction are:
    A. Alpha neurons
    B. Alpha radiations
    C. Beta radiations
    D. Gamma radiations

    Answer: B

16. Radiation consisting of singly charged particles that generate to intermediate distances are called:
    A. Fast neurons

B. Alpha radiations
C. Beta radiations
D. Gamma radiations

Answer: C

17. Radiation with no charge, which produces no ionization , and which is difficult to attenuate thus posing a major health threat is
A. Slow neutrons
B. Alpha radiations
C. Beta radiations
D. Gamma radiations

Answer: D

18. The property of fluid at a location when the Mach number is unity (at the throat) are called:
A. Critical properties
B. Sonic properties
C. Dynamic properties
D. Stagnation properties

Answer: A

19. Gamma attenuation is affected by:
A. Their photoelectric effect
B. Pair production
C. Compton scattering
D. The photoelectric effect, pair production and Compton scattering

Answer: D

20. The amount of a radiation shield's dimensional geometry that reduces radiation to half of its original value is called the _____.
A. Half-value mass
B. Half-value thickness
C. Semi-cross section
D. logarithmic decrement

Answer: B

21. The amount of a radiation shield's density that reduces radiation to half of its original value is called the _____.
A. Half-value mass
B. Half-value thickness
C. Semi-cross section
D. logarithmic decrement

Answer: A

22. Radiation exposure, the measure of gamma radiation at the surface of an object is measured in:
A. Rems
B. Rads
C. Roentegens
D. Roentegens per second

Answer: C

23. Radiation exposure rate, the rate of gamma radiation at the surface of an object is measured in
A. Rems
B. Rads
C. Roentegens
D. Roentegens per second

Answer: D

24. Exposure is a measure of ionization surrounding a person, but biological damage is dependent on the amount of energy.
A. Striking the surface
B. Passing through the body
C. Absorbed
D. Reflected by the surface

Answer: C

25. All of the following are practical applications of Einstein's principle of special relativity except _____.
A. Mass increase
B. Length contraction
C. Time dilation
D. Space warping

Answer: D

26. The postulate that no signal or energy can be transmitted with a speed greater than the speed of light is consistent with _____.
A. The Heisenburg uncertainty principle
B. The Compton effect
C. Einstein's law
D. Newton's second law

Answer: C

27. The total energy of an electron in the same shell is defined by the _____.
A. Principal quantum number
B. Azimuthal quantum number
C. Magnetic quantum number
D. Hund rule

Answer: A

28. The direction of an electron's angular momentum vector is defined by the
A. Principal quantum number
B. Azimuthal quantum number
C. Magnetic quantum number
D. Electron spin quantum number

Answer: C

29. The electron's spin angular momentum vector is defined by the
A. Azimuthal quantum number
B. Magnetic quantum number
C. Electron spin quantum number
D. Hund rule

Answer: C

30. The magnitude of an electron's angular momentum vector is defined by the
A. Principal quantum number
B. Azimuthal quantum number
C. Electron spin quantum number
D. Hund rule

Answer: B

31. The fact that each orbital of a set of equal-energy orbitals must be occupied with an electron before any orbitals has two electrons is specified by which of the following?
A. Principal quantum number
B. Azimuthal quantum number
C. Magnetic quantum number
D. Hund rule

Answer: D

32. The statement that no two electrons can have the same set of four quantum numbers is known as the
A. Hund rule

B. Heisenburg uncertainty principle
C. Pauli exclusion principle
D. Schrodinger equation

Answer: C

33. All of the following terms describe the radiation lines from transitions of electrons in an atom except
A. Sharp
B. Principal
C. Obtuse
D. Fundamental

Answer: C

34. When electrons are not shared equally between two elements, the electrons spend more time with one element than with the other, the bonding is called:
A. Ionic bonding
B. Polar covalent bonding
C. Non-polar covalent bonding
D. Metallic bonding

Answer: B

35. When electrons are shared equally(e.g. when the atoms are the same as in diatomic gases) the bonding is called:
A. Ionic bonding
B. Polar covalent bonding
C. Non-polar covalent bonding
D. Resonance bonding

Answer: C

36. All of the following are units of energy except:
A. Atomic units
B. MeV
C. Dynes
D. Ergs

Answer: C

37. Einstein reasoned there was a discrete amount of energy needed to remove an electron from a surface , with the rest of the incident photon's energy contributing to the kinetic energy of the photon, the amount of energy is called:
A. Binding energy
B. Work function
C. Coulomb energy
D. Fermi energy

Answer: B

38. Which of the following is not a postulate of Bohr's theory of the hydrogen atom?
A. Electron orbits are discrete and non-radiating and an electron may not remain between these orbits
B. The energy change experienced by an electron changing from one orbit to another is quantized
C. Light waves exist simultaneously as high frequency electrical and magnetic waves
D. Angular momentum is quantized

Answer: C

CHAPTER 8 – BOILERS

1. Which of the following is necessary to generate steam in a boiler?
A. A container
B. Heat
C. Water
D. All of the above

Answer: D

2. It is the part of the boiler with water on one side and heat on the other side
A. Furnace volume
B. Fire side
C. Heating surface
D. Water side

Answer: C

3. A _____boiler has heat and gases of combustion that pass through tubes surrounded by water
A. Fire tube
B. Cast iron sectional
C. Water tube
D. Straight tube

Answer: A

4. A _____boiler has water in the tubes and heat gases of combustion passing around the tubes.
A. Fire tube
B. Cast iron sectional
C. Water tube
D. Firebox

Answer: C

5. Which of the following are used in boilers to direct the gases of combustion over the boiler heating surface?
A. Combustion control
B. Baffles
C. Fire tubes
D. Zone controls

Answer: B

6. The three basic type of low pressure heating boilers are _____, _____ and _____.
A. Firebox; vertical; locomotive
B. Scotch marine; wet-top; dry top
C. Straight-tube; bent tube; multiple pass
D. Fire-tube; water tube; cast iron sectional

Answer: D

7. In a low pressure gas system, the gas regulator reduces that city gas pressure to ____psi.
A. 0
B. 2
C. 1
D. 3

Answer: A

8. In the _____air mixes with the fuel and burns.
A. Fire tubes
B. Combustion chamber
C. Water tubes
D. Breeching

Answer: B

9. The function of the steam boiler is to _____.
A. Produce condensate
B. Create heat
C. Produce steam
D. Burn fuel

Answer: C

10. Which of the following is the most common type of water tube boiler?
    A. Firebox
    B. Scotch marine
    C. Vertical
    D. Straight-tube multiple pass

    Answer: D

11. Excess fuel oil in the fuel oil system returns to the:
    A. Combustion chamber
    B. Fuel oil tank
    C. Burner
    D. Suction line

    Answer: B

12. It is the system that provides the air necessary for combustion.
    A. Feedwater
    B. Steam
    C. Draft
    D. Fuel

    Answer: C

13. The gases of combustion leave the boiler through the:
    A. Chimney
    B. Blower
    C. Air vent
    D. Breeching

    Answer: D

14. Which of the following boiler does not use tubes?
    A. Cast iron sectional
    B. Water tube
    C. Scotch marine
    D. Firebox

    Answer: A

15. Which of the following will make a boiler work more efficiently?
    A. More fuel is added
    B. Fire tubes are decrease in size
    C. The heating surface is increased
    D. All of the above

    Answer: C

16. What are the four systems necessary to operate a boiler?
    A. Combustion; draft; steam; boiler water
    B. Water; steam; combustion; stoker
    C. Boiler water; fuel; draft; condense
    D. Feedwater; fuel; draft; steam

    Answer: D

17. The _____forms a vacuum that draws out of the condensate return line and into the vacuum tank.
    A. Suction line
    B. Main header
    C. Vacuum pump
    D. Heating equipment

    Answer: C

18. Which of the following can be a function of the container in a boiler?
    A. Holds the water
    B. Collects the steam that is produced
    C. Transfers heat to the water to produce steam
    D. All of the above

    Answer: D

19. At what temperature will water normally turns to steam?
    A. 100 ℉
    B. 200 ℉
    C. 150 ℉
    D. 212 ℉

    Answer: D

20. Which of the following statements is true for cast iron sectional boilers?
    A. Cast iron sectional boilers have fire tubes
    B. These boilers do not require water
    C. Can be expanded in size
    D. None of the above

    Answer: D

21. Which of the following is the most important valve on a boiler?
    A. Main steam stop valve
    B. Automatic nonreturn valve
    C. Safety valve
    D. Feedwater stop valve

    Answer: C

22. The MAWP on a low pressure steam boiler is _____ psi.
    A. 10
    B. 20
    C. 15
    D. 30

    Answer: C

23. Which of the following best defines a total force acting on a boiler?
    A. Area times diameter
    B. Area times pressure
    C. Area times distance
    D. The MAWP times pressure

    Answer: B

24. The ASME code states that boilers with over _____square feet heating surface must have two or more safety valve.
    A. 200
    B. 400
    C. 400
    D. 500

    Answer: D

25. The area of a safety valve 4” in diameter is how many square inches?
    A. 2.3562
    B. 6.2832
    C. 3.1416
    D. 12.5664

    Answer: D

26. Which of the following is the only valve permitted between the safety valve and the boiler?
    A. Os&y gate
    B. Os&y globe
    C. Automatic nonreturn
    D. No valves are permitted between the boiler and the safety valve

Answer: D

27. The range of the pressure gauge should be _____times the MAWP of the boiler.
    A. 1 to 2
    B. 2 to 3
    C. 1 ½ to 2
    D. 2 ½ to 3

    Answer: C

28. The ASME code only allows _____safety valve on boiler.
    A. Deadweight
    B. Spring-loaded pop-type
    C. Lever
    D. None of the above

    Answer: B

29. How much is the total force on a safety valve 2 ½ in diameter and with a steam pressure of 15 psi?
    A. 19.5413
    B. 73.63125
    C. 29.4525
    D. 93.7512

    Answer: B

30. The steam pressure gauge on the boiler is calibrated to read in:
    A. Inches of vacuum
    B. Absolute pressure
    C. Pounds per square inch
    D. Pressure below atmospheric pressure

    Answer: C

31. Live steam is prevented from entering the Bourdon tube of the pressure gauge by which of the following?
    A. Automatic nenreturn valve
    B. Os&y valve
    C. Inspector's test cock
    D. Siphon

    Answer: D

32. What pressure gauge that can read whether vacuum pressure or not.
    A. Compound
    B. Suction
    C. Duplex
    D. Vacuum

    Answer: A

33. Which of the following best defines a vacuum?
    A. A pressure above gauge
    B. A pressure below atmospheric
    C. A pressure below gauge
    D. A pressure equal to gauge

    Answer: B

34. Safety valves are designed to pop open and stay until there is a ___psi drop in pressure.
    A. 0 to 1
    B. 5 to 15
    C. 2 to 4
    D. Over 15

    Answer: C

35. What type of boiler that uses safety valves?
    A. Fire tube
    B. Cast iron sectional
    C. Water tube
    D. All of the above

    Answer: D

36. The water column is located at the NOWL so the lowest visible part of the gauge glass is _____above the highest surface.
    A. 2" to 3"
    B. Just
    C. 4" to 5"
    D. Never

    Answer: A

37. Blowback of a safety valve is to prevent:
    A. Burner cycling
    B. Premature popping
    C. Chattering
    D. Feathering

    Answer: C

38. The boiler bottom blowdown line should discharge to a(n)_____.
    A. Sewer
    B. Atmospheric tank
    C. Blowdown tank
    D. Return tank or open sump

    Answer: C

39. If the desired cut-in pressure of the boiler is 6 psi and the desired cut-out pressure is 10 psi, the differential pressure setting must be _____psi.
    A. 2
    B. 6
    C. 4
    D. 8

    Answer: C

40. Impurities that build up on the surface of the water in the boiler prevent _____from breaking through the surface of the water.
    A. Air
    B. CO_2
    C. Oxygen
    D. Steam

    Answer: D

41. To prevent air pressure from building up in the boiler when filling the boiler with water, the ____ must be open.
    A. Safety valve
    B. Boiler vent
    C. Main steam stop valve
    D. Manhole cover

    Answer: B

42. To prevent a vacuum from forming when taking the boiler off-line, which of the following must be opened when pressure is still on the boiler?
    A. Safety valve
    B. Boiler vent
    C. Main steam stop valve
    D. Man hole cover

    Answer: B

43. The operating range of the boiler is controlled by:
    A. Squastat
    B. Pressure control
    C. Vaporstat

D. Modulating pressure control

Answer: B

44. The _____ regulates the high and low fire of the burner.
    A. Aquastat
    B. Pressure control
    C. Vaporstat
    D. Modulating pressure control

    Answer: D

45. The best time to blow down the boiler to remove sludge and sediment is when the boiler is at:
    A. Its highest load
    B. Half its load
    C. Its lightest load
    D. Anytime

    Answer: C

46. The level of the water in the _____ indicates the water level in the boiler.
    A. Condensate return tank
    B. Gauge glass
    C. Try cocks
    D. Blowdown tank

    Answer: B

47. When blowing down a boiler, the quick-opening valve should always be opened _____and closed _____.
    A. First; first
    B. Last; first
    C. First; last
    D. Last; last

    Answer: C

48. Which of the following is added to boiler so that water changes scale-forming salts into a non-adhering sludge?
    A. Oxygen
    B. Slag
    C. Minerals
    D. Chemicals

    Answer: D

49. A _____valve is installed before the _____ to allow the steam pressure gauge to be changed if a malfunction occurs.
    A. Globe; safety valve
    B. Globe; U-tube siphon
    C. Gate; siphon
    D. Globe; pigtail siphon

    Answer: C

50. What pressure gauge that reads more pressure than is actually in the boiler.
    A. Broken
    B. Uncalibrated
    C. Slow
    D. Fast

    Answer: D

51. According to the ASME code, safety valves on low pressure boilers should be tested by hand at least:
    A. Once a month
    B. Once a year
    C. Once a shift
    D. Twice a year

    Answer: A

52. The purpose of the safety valve is prevent the pressure in the boiler from:
    A. Exceeding its MAWP
    B. Causing a boiler explosion
    C. Dropping below its MAWP
    D. Relieving water pressure

    Answer: A

53. The term applied when a safety valve opens and closes rapidly.
    A. Feathering
    B. Chattering
    C. Pressuring
    D. Huddling

    Answer: B

54. The safety valve on a low pressure boiler opens when pressure in the boiler exceeds how many psi?
    A. 5
    B. 15
    C. 10
    D. 30

    Answer: B

55. After the total force of the steam has lifted the safety valve off its seat, the steam enters the _____.
    A. Huddling chamber
    B. Steam holding tank
    C. Combustion chamber
    D. Main steam line

    Answer: A

56. What causes false water level readings in the gauge glass?
    A. Priming
    B. Foaming
    C. Carryover
    D. Blowing down

    Answer: B

57. Fusible plugs are required on _____ boilers by the ASME code.
    A. Coal-fired
    B. Gas-fired
    C. Fuel oil-fired
    D. All of the above

    Answer: D

58. On a pressure control, _____ pressure plus _____pressure equals _____ pressure.
    A. Differential; cut-out; cut-in
    B. Cut-in; cut-out; differential
    C. Cut-in; differential; cut-in
    D. Cut-in pressures equals cut-out pressure

    Answer: C

59. A burner should always start up in _____ fire and shut down in _____ fire.
    A. Low; low
    B. High; low
    C. Low; high
    D. High; high

    Answer: A

60. The water in the boiler is heated, turns to steam, and leaves the boiler through the:
    A. Feedwater line
    B. Main steam line
    C. Main header
    D. Main branch line

    Answer: B

61. When steams gives up its heat in a heat exchanger it turns to:
    A. Low pressure steam
    B. Makeup water
    C. Condensate
    D. Exhaust steam

    Answer: C

62. A _____ pump discharges the return water back to the boiler.
    A. Feed
    B. Gear
    C. Return
    D. Vacuum

    Answer: D

63. How do you call a valve that controls the flow of water in one direction only?
    A. Gate
    B. Os&y
    C. Globe
    D. Check

    Answer: D

64. The feedwater _____ valve should be located as close to the shell of the boiler as practical.
    A. Check
    B. Nonreturn
    C. Stop
    D. Regulating

    Answer: C

65. A _____ after each radiator allows _____ to pass through to the return line.
    A. Steam tarp; steam
    B. Water trap; steam
    C. Steam trap; condensate
    D. Water trap; condensate

    Answer: C

66. A _____ valve should be located between the boiler and the valve on the feedwater line.
    A. Stop; check
    B. Stop; regulator
    C. Check; stop
    D. Check; regulator

    Answer: A

67. The feedwater _____ valve opens and closes automatically.
    A. Return
    B. Check
    C. Bypass
    D. Equalizing

    Answer: B

68. The vacuum pump pumps water and discharges air to the:
    A. Expansion tank
    B. Return tank
    C. Compression tank
    D. Atmosphere

    Answer: D

69. The range of pressure on the vacuum switch is usually:
    A. 2 to 6 psi
    B. 2” to 8”
    C. 6 to 12 psi
    D. 8” to 12”

    Answer: B

70. Top test the vacuum pump, the operator puts the elector switch in the _____ position.
    A. Float
    B. Float or vacuum
    C. Vacuum
    D. Continuous

    Answer: D

71. Water added to the boiler to replace water lost due to leaks and blowing down is known as _____ water.
    A. Extra
    B. Boiler
    C. Makeup
    D. Feed

    Answer: C

72. Excessive use of cold city water makeup reduces overall efficiency because the water must be _____ before use in the boiler.
    A. Vented
    B. Filtered
    C. Heated
    D. Recirculated

    Answer: C

73. The vacuum pump selector switch is normally in the position during the heating season.
    A. Float or vacuum
    B. Vacuum only
    C. Float only
    D. Continuous

    Answer: A

74. The _____ shuts off the burner in the event of low water.
    A. Low water alarm
    B. Low water fuel cut-off
    C. Feedwater regulator
    D. Automatic low water feeder

    Answer: B

75. Water is supplied to the condensate return tank by the _____ pump.
    A. Vacuum
    B. Feedwater
    C. Condensate
    D. Return

    Answer: A

76. The feedwater regulator is located at the _____ and is connected to the boiler in the same manner as the _____.
    A. Right side; gauge glass
    B. NOWL; water column
    C. Bottom; blowdown
    D. NOWL; safety valve

Answer: B

77. What maintains a constant water level in the boiler?
    A. Gauge glass
    B. Automatic city water makeup feeder
    C. Water column
    D. Feedwater regulator

    Answer: D

78. The low water fuel cut-off should be tested:
    A. Daily
    B. Semiannually
    C. Monthly
    D. Annually

    Answer: A

79. The burner should be _____ when the low water fuel cut-off is blown down.
    A. Off
    B. Tagged out
    C. Firing
    D. Tested

    Answer: C

80. Which of the following valves must be used as boiler main steam stop valve?
    A. Globe
    B. Check
    C. Gate
    D. Os&y gate

    Answer: D

81. Gate valves should always be _____ or _____ closed.
    A. Partially open; completely
    B. Completely open; completely
    C. Wide open; partly
    D. Throttled; completely

    Answer: B

82. Steam header valves should be _____ valves.
    A. Globe
    B. Check
    C. Gate
    D. Os&y gate

    Answer: C

83. When open os&y valve offers _____ to the flow of steam.
    A. No resistance
    B. Velocity
    C. Throttling action
    D. Full resistance

    Answer: A

84. Steam traps are _____ devices.
    A. Manual
    B. Automatic
    C. Electrical
    D. Semiautomatic

    Answer: B

85. What valve should be used for throttling flow of material?
    A. Gate
    B. Check
    C. Globe
    D. Non-return

    Answer: C

86. Steam traps removed _____ and _____ from the steam lines.
    A. Air; water
    B. Water; oil
    C. Air; oil
    D. Air; steam

    Answer: A

87. Condensate in the steam lines can result in:
    A. Carryover
    B. Foaming
    C. Priming
    D. Water hammer

    Answer: D

88. Two types of steam traps are the _____ steam trap and the _____ steam trap.
    A. Return; float
    B. Nonreturn; thermostatic
    C. Return; nonreturn
    D. Nonreturn; float

    Answer: C

89. The _____ steam trap is the most common steam trap used.
    A. Thermostatic
    B. Inverted bucket
    C. Return
    D. Nonreturn; float

    Answer: A

90. Condensate from the nonreturn steam trap is pumped from the condensate return tank of the:
    A. Return tank
    B. Feedwater heater
    C. Vacuum tank
    D. Boiler

    Answer: D

91. Steam returning to the vacuum tank could cause the condensate pump to become:
    A. Waterbound
    B. Waterlogged
    C. Steambound
    D. Steamlogged

    Answer: C

92. Steam strainers should be located on the line _____ the steam trap.
    A. In front of
    B. Above
    C. After
    D. Along sides of

    Answer: A

93. As the steam pressure increases the steam temperature:
    A. Decreased
    B. Remains the same
    C. Increases
    D. Fluctuates

    Answer: C

94. When the os&y valve is open the stem is in the _____ position.
    A. Floating
    B. Up

C. Locked
D. Down

Answer: B

95. The thermostatic steam trap opens and closes by a(n):
A. Float
B. Electric sensor
C. Inverted bucket
D. Flexible bellows

Answer: D

96. In the float the thermostatic trap the float rises to discharge:
A. Condensate
B. Feedwater chemicals
C. Steam
D. Water and steam

Answer: A

97. A steam trap that failed to open would cause the heating unit to become:
A. Steambound
B. Very hot
C. Waterlogged
D. All of the above

Answer: C

98. Which of the following whose main function is to remove dirt and impurities that may cause the steam trap to malfunction?
A. Vacuum pumps
B. Steam strainers
C. Globe valves
D. Steam separators

Answer: B

99. When a steam trap is functioning properly there is a _____ difference in temperature between the trap inlet and discharge.
A. 5 ℉ to 10 ℉
B. 20 ℉ to 30 ℉
C. 10 ℉ to 20 ℉
D. No

Answer: C

100. When burning No. 6 fuel oil strainers should be cleaned at least once every _____ hours.
A. 8
B. 12
C. 10
D. 24

Answer: D

101. When cleaning the fuel oil strainers the _____ must be carefully replaced to prevent _____ from getting into the system.
A. Gaskets; fuel oil
B. Cover; water
C. Gaskets; air
D. Cover; fuel oil

Answer: C

102. The _____ pump draws fuel oil from the fuel oil tank.
A. Transfer
B. Condensate
C. Fuel oil
D. Circulating

Answer: C

103. The _____ valve protects the fuel lines and pump from excessive pressure.
A. Safety
B. Relief
C. Bypass
D. Stop

Answer: B

104. A high vacuum on the fuel oil suction gauge normally indicates either _____ or _____.
A. Low viscosity; a clogged vent
B. A closed discharged valve; hot fuel oil
C. Cold fuel oil; a dirty suction strainer
D. Water in the fuel oil; a warm pump

Answer: C

105. Fuel oil burners deliver the fuel oil to the furnace in a:
A. Steady stream
B. Half spray, half steam
C. Fine spray
D. None of the above

Answer: C

106. The rotary cup burner uses _____ and _____ to atomize the fuel oil.
A. High temperature; pressure
B. High temperature; air
C. High pressure; steam
D. A spinning cup; high velocity air

Answer: D

107. In a low pressure gas burner gas is mixed with air in the _____.
A. Burner register
B. Combustion chamber
C. Mixing chamber before the burner register
D. Boiler furnace

Answer: C

108. In a high pressure gas mixes with the air on the inside of the:
A. Burner register
B. Combustion chamber
C. Mixing chamber
D. Boiler furnace

Answer: A

109. Regardless of the type of fuel oil used the fuel oil must be _____ before it enters the boilers furnace.
A. Pressurized
B. Treated
C. Atomized
D. Measured

Answer: C

110. On the low pressure gas system the manual reset cannot be opened until the:
A. Vaporstat proves pressure
B. Pilot is lighted
C. Boiler is vented
D. All of the above

Answer: B

111. Before any repair work is attempted on any gas-fired boiler the:

A. Insurance inspector must be notified
B. Main gas cock must be secured
C. State inspector must be notified
D. Main solenoid valve should be secured

Answer: B

112. In a low pressure gas system when the vaporstat proves gas pressure up to the zero- reducing governor the _____ starts up.
A. Induced draft fan
B. Pressure
C. Forced draft blower
D. Gas pump

Answer: C

113. The butterfly on the low pressure gas system is a _____ valve.
A. Slow-opening
B. Screw
C. Quick-opening
D. Globe

Answer: A

114. The amount of gas supplied to the burner in the low pressure gas system is controlled by:
A. Gas pressure
B. Steam pressure
C. The boiler operator
D. The amount of air passing through the butterfly valve

Answer: D

115. If low water develops in the boiler having a low pressure gas system the _____ will secure the gas to the burner.
A. Whistle valve
B. Manual reset valve
C. Vaporstat
D. Main gas solenoid

Answer: D

116. Combination gas/fuel oil burners permit the operator to switch from one fuel to another _____.
A. For economy
B. Because of a shortage of fuel being used
C. Because of a failure in the fuel system being used
D. All of the above

Answer: D

117. Hard coal, known as _____, has a _____ content.
A. Bituminous; high carbon
B. Anthracite; high volatile
C. Bituminous; high volatile
D. Anthracite; high carbon

Answer: D

118. Soft coal; known as _____, has a _____ content.
A. Bituminous; high carbon
B. Anthracite; high volatile
C. Bituminous; high volatile
D. Anthracite; high carbon

Answer: C

119. Boilers using soft coal must have _____ furnace volume to reduce the danger of _____.
A. Small; overfiring
B. Large; smoking
C. Small; smoking
D. Large; overfiring

Answer: B

120. When burning soft coal, if the volatile gases reach the heating surface before they have burned completely _____ and _____ develop.
A. Smoke; soot
B. Clinkers; ash
C. Uneven heat; ash
D. High temperature; smoke

Answer: A

121. The _____ of fuels oil is the lowest temperature at which it will flow as a liquid.
A. Fire point
B. Pour point
C. Flash point
D. Viscosity

Answer: B

122. The _____ is the temperature at which fuel oil gives off vapor that flashes when exposed to an open flame.
A. Fire point
B. Pour point
C. Flash point
D. Viscosity

Answer: C

123. The _____ is the temperature at which fuel oil will burn continuously when exposed to an open flame.
A. Fire point
B. Pour point
C. Flash point
D. Viscosity

Answer: A

124. It is defined as the internal resistance of fuel oil flow.
A. Fire point
B. Pour point
C. Flash point
D. Viscosity

Answer: D

125. What must be done in order to lower the viscosity of the fuel oil?
A. Lower its temperature
B. Increase its temperature
C. Lower its pour point
D. Increase its pour point

Answer: B

126. A leak on the fuel oil suction line between the tank and the suction side of the fuel oil pump would result in:
A. The suction gauge pulsating
B. Air entering the suction line
C. Pulsating of the fire in the boiler
D. All of the above

Answer: B

127. Stokers were developed to:
A. Increase efficiency of burning coal

B. Keep furnace temperature constant to protect brickwork
C. Allow for development of larger coal-fired boiler
D. All of the above

Answer: D

128. Any foreign matter in the coal feed mechanism of the screw-feed stoker is best removed by:
A. Emptying the coal hopper
B. Reversing the stoker
C. Forcing it through with a heavy shear pin
D. Using the cutoff gate at the bottom of the hopper

Answer: D

129. In the event of an obstruction clogging the feed screw a _____ is used to prevent damage to transmission.
A. Slip clutch
B. Shear pin or key
C. Fuse
D. None of the above

Answer: B

130. In order to bank the stoker it is necessary to secure the _____ while the _____ continuous to operate.
A. Combination fan; coal feeder
B. Coal feeder; forced draft fan
C. Feedwater; induced draft fan
D. Boiler stop valve; coal feeder

Answer: B

131. In a screw-feed stoker, what draft fan supplies air for combustion?
A. Induced
B. Forced
C. Combination
D. Natural

Answer: B

132. To prevent smoke and to aid in complete combustion in the screw-feed stoker, _____ is provided using a separate damper control.
A. Underfire air
B. Retort air
C. Overfire air
D. Grate zone air

Answer: C

133. The ram-feed stoker is a(n) _____ stoker.
A. Overfeed
B. Side feed
C. Travelling grate
D. Underfeed

Answer: D

134. The ram-feed stoker provides:
A. Uniform feed
B. Quick ash discharge
C. Even coal distribution
D. All of the above

Answer: D

135. Combustion is the rapid burning of fuel and oxygen resulting in:
A. Release of heat
B. Oxidation
C. Release of steam
D. Nitrogen and oxygen

Answer: A

136. What combustion occurs when all the fuel is burned using the theoretical amount of air?
A. Incomplete
B. Perfect
C. Complete
D. Imperfect

Answer: B

137. It is the burning of all the fuel using the minimum amount of excess air.
A. Incomplete combustion
B. Complete combustion
C. Perfect combustion
D. Imperfect combustion

Answer: B

138. _____ combustion occurs when all the fuel is not burned resulting in formation of soot and smoke.
A. Incomplete
B. Perfect
C. Complete
D. Imperfect

Answer: A

139. Which of the following is required to achieve complete combustion?
A. Proper atomization
B. Proper temperature of fuel
C. Time of complete combustion
D. All of the above

Answer: D

140. The combustion process must be complete before the gases combustion come in contact with the:
A. Atmosphere
B. Superheater
C. Heating surface
D. Main steam outlet

Answer: C

141. Soot buildup on heating surface:
A. Acts as an insulation
B. Prevents heat transfer
C. Increases temperature of gases of combustion
D. All of the above

Answer: D

142. The purpose of automatic combustion controls is to control _____ and _____.
A. High fire; low fire
B. Stoker firing; fuel rate
C. Overfire air; fuel mixture
D. Proper air to fuel mixture; firing rate

Answer: D

143. At 0 psig, how many BTU are necessary to change 1 lb of water at 212 ℉ of steam?
A. 144
B. 970
C. 180
D. 1190

Answer: B

144. Radiation is:
    A. The movement of liquids or gases created by a temperature difference
    B. The transfer of heat by direct molecular contact
    C. The weight of the substance compared to unity
    D. A form of heat transfer

    Answer: D

145. Steam at 100 psi and 400 ℉ is:
    A. Saturated
    B. Superheated
    C. Wet
    D. None of the above

    Answer: B

146. Which of the following most closely defines sensible heat?
    A. An established relationship comparing any substance to the heat content of water
    B. Heat quantity that can be felt or measured by a thermometer
    C. Heat quantity above the point of saturation
    D. Measure of heat intensity

    Answer: B

147. What is required to raise the temperature of 1 lb of water from 32 ˚to 212 ℉?
    A. 144 Btu
    B. 970.3 Btu
    C. 180 Btu
    D. Saturated heat

    Answer: C

148. Increasing the pressure has what effect of the boiling point of water?
    A. No change
    B. Temperature will be raised
    C. Temperature will be lowered
    D. Temperature will increase 2 ℉ for every psi

    Answer: B

149. Heat absorbed by water when it changes from liquid to steam at the boiling point is called:
    A. Sensible heat
    B. Specific heat
    C. Latent heat
    D. Superheat

    Answer: C

150. Heat may be transferred in how many ways?
    A. One
    B. Three
    C. Two
    D. Four

    Answer: B

CHAPTER 9 – HYDROELECTRIC PLANT

1. In turbine installation, the air is removed from the condenser by _____.
    A. Air pump
    B. Air injector
    C. Air ejector
    D. Air jet

    Answer: C

2. The primary purpose of a turbine in a fluid loop is to:
    A. Add energy to the flow
    B. Add mass to the flow
    C. Extract energy from the flow
    D. None of the above

    Answer: C

3. A vena contracta in a fluid jet issuing through a hole in a plate is located approximately:
    A. 10 diameters downstream of the hole
    B. At jet's minimum diameter
    C. At the orifice minimum diameter
    D. At the orifice maximum diameter

    Answer: B

4. The following are all examples of indirect (secondary) miscellaneous methods to measure flow except:
    A. Turbine and propeller meters
    B. Magnetic flow meters
    C. Positive displacement meters
    D. Hot-wire anemometers

    Answer: C

5. One could expect the possibility of Reynolds number similarity in all of the following cases except:
    A. Pumps
    B. Fans
    C. Turbines
    D. Weirs

    Answer: D

6. One could expect the possibility of Froude number similarity in all of the following cases except:
    A. Surface ships
    B. Surface wave motion
    C. Flow over weirs
    D. Closed-pipe turbulent pipe flow

    Answer: D

7. One could expect the possibility of Froude number similarity in all of the following cases except:
    A. Motion of a fluid jet
    B. Flow over spillways
    C. Surge and flood waves
    D. Subsonic airfoils

    Answer: D

8. In fluid flow, linear momentum is:
    A. A vector quantity equal to the product of mass and velocity
    B. A scalar quantity equal to the product mass and velocity
    C. A scalar quantity equal to the product of force and length of time is applied
    D. The change in impulse

    Answer: A

9. All of the following fluid phenomena are based on the force momentum principle of a flowing fluid except:
    A. Turbines
    B. Pelton wheels
    C. Diesel automobile engines
    D. Jet engines

    Answer: C

10. The fact that a fluid's velocity increases as the cross sectional area of the pipe through which it flow decreases is due to:
    A. Bernoull's equation
    B. The continuity equation
    C. The momentum equation
    D. The perfect gas law

    Answer: B

11. In the absence of any heat and work interactions and any changes in potential energy, the stagnation enthalpy of a fluid remains constant during _____.
    A. Unsteady flow
    B. Steady flow
    C. Turbulent flow
    D. Variable flow

    Answer: B

12. When a falling object reaches a speed at which the drag force equals its weight, it has achieved:
    A. Mach one
    B. A laminar boundary layer
    C. A turbulent boundary layer
    D. Terminal velocity

    Answer: C

13. The coefficient of contraction is the ratio of the:
    A. Area of vena contracta to the orifice area
    B. Actual discharge to the theoretical discharge
    C. Actual velocity to the theoretical velocity
    D. Effective head to the actual head

    Answer: A

14. The coefficient of discharge is the ratio of the:
    A. Area of vena contracta to the orifice area
    B. Actual discharge to the theoretical discharge
    C. Actual velocity to the theoretical velocity
    D. Effective head to the actual head

    Answer: B

15. The coefficient of velocity is equal to the:
    A. Product of the coefficient of discharge and the coefficient of contraction
    B. Actual velocity divided by the theoretical velocity
    C. Sum of the coefficient of discharge and the coefficient of contraction
    D. Difference of the coefficient of discharge and the coefficient of contraction

    Answer: B

16. Which of the following is not a similarity between a submerged culvert and a siphon?
    A. They both operate full
    B. Toricelli's equation holds
    C. Both can experience entrance and exit losses
    D. In both, the water flows downhill

    Answer: B

17. In parallel pipe system originating and terminating in common junctions,
    A. Mass flows through each branch are equal
    B. Pressure drops through each branch are equal
    C. Lengths of each branch are equal
    D. Flow areas of each branch are equal

    Answer: B

18. Flows through multi-loop systems maybe computed by:
    A. Any closed-form solution of simultaneous equations
    B. The Hardy-Cross method
    C. Trial and error
    D. All of the above

    Answer: D

19. Flow measuring devices include all of the following except:
    A. Venturi meters
    B. Static pressure probes
    C. Turbine and propeller meters
    D. Magnetic dynamometers

    Answer: D

20. Flow measuring devices include all of the following except:
    A. Orifice plate meters
    B. Hot-wire anemometers
    C. Magnetic flow meters
    D. Mercury barometers

    Answer: D

21. Flow measuring devices include all of the following except:
    A. Flow nozzles
    B. Venture area meters
    C. Pilot tubes
    D. Precision tachometers

    Answer: D

22. The following are examples of indirect (secondary) measurements to measure flow rates using obstruction meters except:
    A. Variable area meters
    B. Venture meters
    C. Volume tanks
    D. Flow nozzles

    Answer: C

23. The following are examples of indirect (secondary) measurements to measure flow rates using obstruction meters except:
    A. Pilot static meters
    B. Static pressure probes
    C. Weight and mass scales
    D. Direction-sensing probes

    Answer: C

24. In series pipe system, all of the following parameters vary from section to section except:
    A. Pressure drop
    B. Friction loss
    C. Head loss
    D. Mass flow

    Answer: D

25. Venturi meters, pitot static gauges, orifice meters, flow nozzles, and differential manometers all depend upon the relationship between:
    A. Flow velocity and friction
    B. Flow velocity and pressure
    C. Friction and pressure
    D. Pressure and mass flow

    Answer: B

26. The combination of enthalpy and kinetic energy of fluid is termed as:
    A. Latent enthalpy
    B. Heat enthalpy
    C. Throttling enthalpy
    D. Stagnation enthalpy

    Answer: D

27. The coefficient of velocity, C_v, accounts for the:
    A. Effects on the flow area of contraction, friction and turbulence
    B. Small effect of friction and turbulence of the orifice
    C. Changes in diameters of a converging pipe
    D. Effects of compressibility

    Answer: B

28. Expansion factors take into account the:
    A. Area of the vena contracta
    B. Small effect of friction and turbulence of the orifice
    C. Changes in diameters of a converging pipe
    D. Effects of compressibility

    Answer: D

29. The matching of scale model and full-scale results for a fluid dynamic phenomena with a free surface requires equality of:
    A. Reynolds number
    B. Weber number
    C. Froude number
    D. Cauchy number

    Answer: C

30. The matching of scale model and full-scale results for a fluid dynamic phenomena involving compressible fluids requires equality of:
    A. Reynolds number
    B. Froude number
    C. Cauchy number
    D. Mach number

    Answer: D

31. The matching of scale model and full-scale prototype results for a fluid dynamic phenomena involving surface tension requires equality of:
    A. Reynolds number
    B. Weber number
    C. Froude number
    D. Cauchy number

    Answer: B

32. The matching of scale model and full-scale prototype results for a fluid dynamic phenomena involving a fully submerged body requires equality of:
    A. Reynolds number
    B. Weber number
    C. Froude number
    D. Mach number

    Answer: A

33. The water hammer phenomenon is primarily what kind of fluid mechanics?
    A. Static (a phenomena independent of time)
    B. Dynamic (a time-dependent phenomena)
    C. Compressible
    D. Incompressible

    Answer: B

34. All of the following are forms of drag on a body moving through a fluid except:
    A. Skin friction
    B. Wake drag
    C. Profile drag
    D. D'Alembert's paradox drag

    Answer: D

35. The magnitude of the drag coefficient of a sphere in water is dependent upon all of the following except:
    A. Fluid density
    B. Fluid velocity
    C. Units of measure (SI or English Engineering System)
    D. Drag force

    Answer: C

36. The fact that there is no resistance to bodies moving through an ideal (non-viscous) fluids is known as:
    A. Reynold's analogy
    B. D'Alembert's paradox
    C. Newton's second law
    D. The second law of thermodynamics

    Answer: B

37. One could expect the possibility of Reynold's number similarity in all of the following cases except:
    A. Submarines
    B. Torpedoes
    C. Seaplane hulls
    D. Supersonic aircraft

    Answer: C

38. The function of a turbine is to:
    A. Transfer heat from one fluid to another
    B. Increase the total energy content of the flow
    C. Extract energy from the flow
    D. Exchange heat to increase energy to the flow

    Answer: C

39. Pitot tube is use to measure the:
    A. Velocity of mass
    B. Velocity of pipe
    C. Flow
    D. Velocity of flow

    Answer: D

40. Orifice coefficients are used to determine:
    A. Energy losses
    B. Energy gains
    C. Mass losses
    D. Energy losses and mass gains

    Answer: A

41. The coefficient of velocity is the ratio of the:
    A. Area of vena contracta to the orifice area
    B. Actual discharge to the theoretical discharge
    C. Actual discharge velocity to the theoretical discharge velocity
    D. Effective head to the actual head

    Answer: C

42. The volume flow passes through a venturimeter is:
    A. Increasing

B. Decreasing
C. Constant
D. Varying

Answer: C

43. What must be done to change the direction of rotation of a 440-volt, 3-phase induction motor?
A. Reverse lines to start winding
B. Interchange any two power leads
C. Replace any two wires to the rotor
D. Remove any power leads

Answer: B

44. A draft tube is a part of which power plants?
A. Diesel engine power plant
B. Gas turbine power plant
C. Steam power plant
D. Hydro-electric power plant

Answer: D

45. Past ME Board Question
In the hydro-electric plant having a medium head and using a Francis turbine, the turbine speed may be regulated through:
A. Deflector gate
B. Nozzle
C. Wicket gate
D. Forebay

Answer: C

46. Past ME Board Question
A Francis turbine has what flow?
A. Inward flow reaction
B. Outward flow impulse
C. Outward flow reaction
D. Inward flow impulse

Answer: A

47. Past ME Board Question
Which of the following is a type of water turbine?
A. Parson
B. Hero
C. Pelton
D. Bankl

Answer: C

48. Past ME Board Question
What is the use of a Hydraulic jump?
A. Increase the flow rate
B. Reduce the flow rate
C. Reduce the velocity of flow
D. Reduce the energy of flow

Answer: D

49. Past ME Board Question
A Kaplan turbine is:
A. A high head mixed flow turbine
B. An inward flow impulse turbine
C. An outward flow reaction turbine
D. Low head axial flow turbine

Answer: D

50. Past ME Board Question
The locus of elevation is:
A. Critical point
B. Hydraulic gradient
C. Energy gradient
D. Friction gradient

Answer: B

51. Past ME Board Question
The locus of elevation to which water will rise in the piezometer tube is termed:
A. Energy gradient
B. Friction head
C. Hydraulic gradient
D. Critical path

Answer: C

52. Past ME Board Question
The intake pipe to a hydraulic turbinefrom a dam is:
A. Tailrace
B. Spiral casing
C. Surge tank
D. Penstock

Answer: D

53. Past ME Board Question
A type of water turbine where a jet of water is made to fall on the blades or buckets and due to the impulse of water, the turbine starts to move.
A. Pelton wheel
B. Steam turbine
C. Francis turbine
D. Reaction turbine

Answer: A

54. Past ME Board Question
The lowest portion to storage basin from where the water is not drawn is:
A. Bottom storage
B. Sub-soil storage
C. Spring reserve
D. Dead storage

Answer: D

55. Past ME Board Question
In a hydro-electric plant using a Francis turbine with medium head, the speed can be regulated using the:
A. Deflector gate
B. Nozzle
C. Wicket gate
D. Weir

Answer: C

56. Past ME Board Question
In the deep well installation or operation, the difference between static water level and operating water level is known as _____.
A. Suction lift
B. Drawdown
C. Priming level
D. Clogging

Answer: B

57. Past ME Board Question
Which of the following is a characteristic of an impulse turbine?
A. Steam striking blades on angle
B. No steam reaction to velocity
C. Steam striking blades at zero angle
D. Steam reversing direction

Answer: C

58. Past ME Board Question

What is the pressure at the exit of a draft tube in a turbine?
A. Below atmospheric
B. Vacuum
C. Atmospheric
D. Gage

Answer: C

59. Past ME Board Question
An impulse turbine are used for:
A. Low head
B. Medium head
C. High head
D. Very low head

Answer: C

60. Past ME Board Question
Which of the following is used as high head turbine?
A. Impulse
B. Francis
C. Reaction
D. Propeller

Answer: A

61. In pumped storage plant
A. Power is produced by pumps
B. Water is stored by pumping to high pressures
C. Pressure accumulators are used
D. Downstream water is pumped upstream during offload periods

Answer: D

62. Past ME Board Question
What is the pressure at the exit of a draft tube in a turbine?
A. Below atmospheric
B. Vacuum
C. Atmospheric
D. Gage

Answer: C

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An impulse turbine has:
A. Low head
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Answer: C

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High head turbine is a/an:
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B. Francis
C. Reaction
D. Propeller

Answer: A

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The lowest portion to storage basin from where the water is not drawn is:
A. Bottom storage
B. Sub-soil storage
C. Spring reserve
D. Dead storage

Answer: D

66. Past ME Board Question
In a hydro-electric plant using a Francis turbine with medium head, the speed can be regulated using the
A. Deflector gate
B. Nozzle
C. Wicket gate
D. Weir

Answer: C

67. Past ME Board Question
In the deep well installation or operation, the difference between static water level and operating water level is called _____.
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B. Drawdown
C. Priming level
D. Clogging

Answer: B

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D. Steam reversing direction

Answer: C

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A type of water turbine where a jet of water is made to fall on the blades or buckets and due to the impulse of water, the turbine starts to move.
A. Pelton wheel
B. Steam turbine
C. Francis turbine
D. Reaction turbine

Answer: A

70. Past ME Board Question
The intake pipe to a hydraulic turbine from a dam is:
A. Tailrace
B. Spiral casing
C. Surge tank
D. Penstock

Answer: D

71. Past ME Board Question
In the hydro-electric plant having a medium head and using a Francis turbine, the turbine speed may be regulated through:
A. Deflector gate
B. Nozzle
C. Wicket gate
D. Forebay

Answer: C

72. Past ME Board Question
A Francis turbine has what flow?
A. Inward flow reaction
B. Outward flow impulse
C. Outward flow reaction
D. Inward flow impulse

Answer: A

73. Past ME Board Question
Which of the following is a type of water turbine?
A. Parson
B. Hero
C. Pelton

D. Bankl

Answer: C

74. Past ME Board Question
Hydraulic jump is used to:
A. Increase the flow rate
B. Reduce the flow rate
C. Reduce the velocity of flow
D. Reduce the energy of flow

Answer: D

75. Past ME Board Question
A Kaplan turbine is:
A. A high head mixed flow turbine
B. An inward flow impulse turbine
C. An outward flow reaction turbine
D. Low head axial flow turbine

Answer: D

76. Past ME Board Question
The locus of elevation is:
A. Critical point
B. Hydraulic gradient
C. Energy gradient
D. Friction gradient

Answer: B

77. Past ME Board Question
The locus of elevations to which water will rise in the piezometer tube is termed:
A. Energy gradient
B. Friction head
C. Hydraulic gradient
D. Critical path

Answer: C

78. In turbine installation, the air is removed from the condenser by:
A. Air pump
B. Air injector
C. Air ejector
D. Air jet

Answer: C

79. The primary purpose of a turbine in a fluid loop is to:
A. Add energy to the flow
B. Add mass to the flow
C. Extract energy from the flow
D. None of the above

Answer: C

80. A vena contracta in a fluid jet issuing through a hole in a plate is located approximately:
A. 10 diameters downstream of the hole
B. At jet's minimum diameter
C. At the orifice minimum diameter
D. At the orifice maximum diameter

Answer: B

81. The following are all examples of indirect (secondary) miscellaneous methods to measure flow except:
A. Turbine and propeller meters
B. Magnetic flow meters
C. Positive displacement meters
D. Hot-wire anemometers

Answer: C

82. One could expect the possibility of Reynolds number similarity in all of the following cases except:
A. Pumps
B. Fans
C. Turbines
D. Weirs

Answer: D

83. One could expect the possibility of Froude number similarity in all of the following cases except:
A. Surface ships
B. Surface wave motion
C. Flow over weirs
D. Closed-pipe turbulent pipe flow

Answer: D

84. One could expect the possibility of Froude number similarity in all of the following cases except:
A. Motion of a fluid jet
B. Flow over spillways
C. Surge and flood waves
D. Subsonic airfoils

Answer: D

85. In fluid flow, linear momentum is:
A. A vector quantity equal to the product of mass and velocity
B. A scalar quantity equal to the product mass and velocity
C. A scalar quantity equal to the product of force and length of time is applied
D. The change in impulse

Answer: A

86. All of the following fluid phenomena are based on the force momentum principle of a flowing fluid except:
A. Turbines
B. Pelton wheels
C. Diesel automobile engines
D. Jet engines

Answer: C

87. The fact that a fluid's velocity increases as the cross sectional area of the pipe through which it flow decreases is due to:
A. Bernoull's equation
B. The continuity equation
C. The momentum equation
D. The perfect gas law

Answer: B

88. In the absence of any heat and work interactions and any changes in potential energy, the stagnation enthalpy of a fluid remains constant during:
A. Unsteady flow
B. Steady flow
C. Turbulent flow
D. Variable flow

Answer: B

89. When a falling object reaches a speed at which the drag force equals its weight, it has achieved:
A. Mach one
B. A laminar boundary layer

C. A turbulent boundary layer
D. Terminal velocity

Answer: C

90. The coefficient of contraction is the ratio of the:
    A. Area of vena contracta to the orifice area
    B. Actual discharge to the theoretical discharge
    C. Actual velocity to the theoretical velocity
    D. Effective head to the actual head

    Answer: A

91. The coefficient of discharge is the ratio of the:
    A. Area of vena contracta to the orifice area
    B. Actual discharge to the theoretical discharge
    C. Actual velocity to the theoretical velocity
    D. Effective head to the actual head

    Answer: B

92. The coefficient of velocity is equal to the:
    A. Product of the coefficient of discharge and the coefficient of contraction
    B. Actual velocity divided by the theoretical velocity
    C. Sum of the coefficient of discharge and the coefficient of contraction
    D. Difference of the coefficient of discharge and the coefficient of contraction

    Answer: B

93. Which of the following is not a similarity betweena submerged culvert and a siphon?
    A. They both operate full
    B. Torricelli's equation holds
    C. Both can experience entrance and exit losses
    D. In both, the water flows downhill

    Answer: B

94. In parallel pipe system originating and terminating in common junctions:
    A. Mass flows through each branch are equal
    B. Pressure drops through each branch are equal
    C. Lengths of each branch are equal
    D. Flow areas of each branch are equal

    Answer: B

95. Flows through multi-loop systems may be computed by:
    A. Any closed-form solution of simultaneous equations
    B. The Hardy-Cross method
    C. Trial and error
    D. All of the above

    Answer: D

96. Flow measuring devices include all of the following except:
    A. Venturi meters
    B. Static pressure probes
    C. Turbine and propeller meters
    D. Magnetic dynamometers

    Answer: D

97. Flow measuring devices include all of the following except:
    A. Orifice plat meters
    B. Hot-wire anemometers
    C. Magnetic flow meters
    D. Mercury barometers

    Answer: D

98. Flow measuring devices include all of the following except:
    A. Flow nozzles
    B. Venture area meters
    C. Pitot tubes
    D. Precision tachometers

    Answer: D

99. The following are examples of indirect (secondary) measurements to measure flow rates using obstruction meters except:
    A. Variable area meters
    B. Venture meters
    C. Volume tanks
    D. Flow nozzles

    Answer: C

100. The following are examples of indirect (secondary) measurements to measure flow rates using obstruction meters except:
    A. Pitot static meters
    B. Static pressure probes
    C. Weight and mass scales
    D. Direction-sensing probes

    Answer: C

101. In series pipe systems, all of the following parameters vary from section to section except:
    A. Pressure drop
    B. Friction loss
    C. Head loss
    D. Mass flow

    Answer: D

102. Venturi meters, pitot static gauges, orifice meters, flow nozzles, and differential manometers all depend upon the relationship between:
    A. Flow velocity and friction
    B. Flow velocity and pressure
    C. Friction and pressure
    D. Pressure and mass flow

    Answer: B

103. The combination of enthalpy and kinetic energy of fluid is termed as:
    A. Latent enthalpy
    B. Heat enthalpy
    C. Throttling enthalpy
    D. Stagnation enthalpy

    Answer: D

104. The coefficient of velocity, C_v accounts for the:
    A. Effects on the flow area of contraction, friction and turbulence
    B. Small effect of friction and turbulence of the orifice
    C. Changes in diameter of a converging pipe
    D. Effects of compressibility

    Answer: B

105. Expansion factors take into account the:
    A. Area of the vena contracta
    B. Small effect of friction and turbulence of the orifice
    C. Changes in diameter of a converging pipe
    D. Effects of compressibility

Answer: D

106. The matching of scale model and full-scale results for a fluid dynamic phenomena with a free surface rquires equality of:
   A. Reynolds number
   B. Weber number
   C. Froude number
   D. Cauchy number

   Answer: C

107. The matching of scale model and full-scale results for a fluid dynamic phenomena involving compressible fluids requires equality of:
   A. Reynolds number
   B. Froude number
   C. Cauchy number
   D. Mach number

   Answer: D

108. The matching of scale model and full-scale prototype results for a fluid dynamic phenomena involving surface tension requires equality of:
   A. Reynolds number
   B. Weber number
   C. Froude number
   D. Cauchy number

   Answer: B

109. The matching of scale model and full-scale prototype results for a fluid dynamic phenomena involving a fully submerged body requires equality of:
   A. Reynolds number
   B. Weber number
   C. Froude number
   D. Mach number

   Answer: A

110. The water hammer phenomenon is primarily what kind of fluid mechanics?
   A. Static (a phenomena independent of time)
   B. Dynamic (a time-dependent phenomena)
   C. Compressible
   D. Incompressible

   Answer: B

111. All of the following are forms of drag on a body moving through a fluid except:
   A. Skin friction
   B. Wake drag
   C. Profile drag
   D. D'Alembert's paradox drag

   Answer: D

112. The magnitude of the drag coefficient of a sphere in water is dependent upon all of the following except:
   A. Fluid density
   B. Fluid velocity
   C. Units of measure (SI or English Engineering System)
   D. Drag force

   Answer: C

113. The fact that there is no resistance to bodies moving through an ideal (non-viscous) fluids is known as:
   A. Reynold's analogy
   B. D'Alembert's paradox
   C. Newton's second law
   D. The second law of thermodynamics

   Answer: B

114. One could expect the possibility of Reynolds number similarity in all of the following cases except:
   A. Submarines
   B. Torpedoes
   C. Seaplane hulls
   D. Supersonic aircraft

   Answer: C

115. The function of a turbine is to:
   A. Transfer heat from one liquid to another
   B. Increase the total energy content of the flow
   C. Extract energy from the flow
   D. Exchange heat to increase energy to the flow

   Answer: C

116. Pitot tube is use to measure the:
   A. Velocity of mass
   B. Velocity of pipe
   C. Flow
   D. Velocity of flow

   Answer: D

117. Orifice coefficients are used to determine
   A. Energy losses
   B. Energy gains
   C. Mass losses
   D. Energy losses and mass gains

   Answer: A

118. The coefficient of velocity is the ratio of the:
   A. Area of vena contracta to the orifice area
   B. Actual discharge to the theoretical discharge
   C. Actual discharge velocity to the theoretical discharge velocity
   D. Effective head to the actual head

   Answer: C

119. The volume flow passes through a venturimeter is:
   A. Increasing
   B. Decreasing
   C. Constant
   D. Varying

   Answer: C

120. Which of the following devices used to measure the discharge of outflow from a vessel?
   A. Pitot tube
   B. Orifice
   C. Pump head
   D. Obstruction meter

   Answer: B

CHAPTER 10 – VARIABLE LOAD & ENVIRONMENTAL ENG'G.

1. The maximum continuous power available from a hydro-electric power plant under the most adverse hydraulic conditions is called _____.
   A. Base power
   B. Firm power
   C. Primary power
   D. Secondary power

   Answer: B

2. The area under load curve divided by maximum demand represents:
   A. Load factor
   B. Connected load
   C. Average load
   D. Diversity factor

   Answer: D

3. What is the reverse capacity of a plant?
   A. Maximum demand – average demand
   B. Plant capacity – maximum demand
   C. Plant capacity – average demand
   D. Plant capacity x (1 – load factor)

   Answer: B

4. Load curve refers to the plot of:
   A. Load versus generating capacity
   B. Load versus current
   C. Load versus time
   D. Load versus cost of power

   Answer: C

5. The ratio of maximum load to the rated plant capacity is called _____.
   A. Load factor
   B. Utilization factor
   C. Maximum load factor
   D. Capacity

   Answer: B

6. Past ME Board Question
   Peak load for a period of time divided by installed capacity is:
   A. Capacity factor
   B. Demand factor
   C. Utilization factor
   D. Load factor

   Answer: C

7. Past ME Board Question
   The ratio of the sum of individual maximum demands of the system to the maximum demand of the whole system is:
   A. Diversity factor
   B. Utilization factor
   C. Power factor
   D. Demand factor

   Answer: A

8. Past ME Board Question
   The ratio between the actual power and the apparent power in any circuit is known as the _____ of that circuit.
   A. Measured power
   B. Capacity
   C. Power factor
   D. KVAR

   Answer: C

9. Past ME Board Question
   The ratio of maximum load to the rated plant capacity
   A. Load factor
   B. Utilization factor
   C. Maximum load factor
   D. Capacity factor

   Answer: B

10. Past ME Board Question
    The ratio of the average load to the peak load over a designated period of time is called
    A. Load factor
    B. Reactive factor
    C. Diversity factor
    D. Plant use factor

    Answer: A

11. Past ME Board Question
    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

    Answer: B

12. Load curve refers to the plot of:
    A. Load versus generating capacity
    B. Load versus current
    C. Load versus time
    D. Load versus cost of power

    Answer: C

13. Load curve refers to the plot of:
    A. Load versus generating capacity
    B. Load versus current
    C. Load versus time
    D. Load versus cost of power

    Answer: C

14. The ratio of maximum load to the rated plant capacity
    A. Load factor
    B. Utilization factor
    C. Maximum load factor
    D. Capacity factor

    Answer: B

15. The ratio of the average load to the peak load over a designated period of time is called _____.
    A. Load factor
    B. Reactive factor
    C. Diversity factor
    D. Plant use factor

    Answer: A

16. Past ME Board Question
    Peak load for a period of time divided by installed capacity is _____.
    A. Capacity factor
    B. Demand factor
    C. Utilization factor
    D. Load factor

    Answer: C

17. The area under load curve divided by maximum demand represents
    A. Load factor
    B. Connected load
    C. Average load
    D. Diversity factor

    Answer: D

18. Past ME Board Question
    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

Answer: B

19. Past ME Board Question
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

Answer: A

20. Past ME Board Question
The ratio between the actual power and the apparent power in any circuit is known as the _____ of that circuit.
A. Measured power
B. Capacity
C. Power factor
D. KVAR

Answer: C

21. Yeast as raw material for beer making is added to the equipment called:
A. Fermenters
B. Brew kettle
C. Cooler
D. Starting tube

Answer: A

22. A major cause of air pollution resulting from the burning of fuel oil is:
A. Nitrous
B. Hydrogen
C. Sulfur dioxide
D. Silicon

Answer: C

23. Heavy water is:
A. B_2O
B. H_2O
C. W_2O
D. D_2O

Answer: D

24. Scintillation counter are used to detect:
A. Beta rays
B. X-ray
C. Gamma rays
D. All of the above

Answer: D

25. All of the following are common types of chemical reactions except:
A. Direct combination
B. Fission
C. Decomposition
D. Double replacement

Answer: B

26. Redox reactions can often be type of:
A. Direct combination
B. Fission
C. Decomposition
D. Double replacement

Answer: D

27. The fact that the amount of slightly soluble gas absorbed in a liquid is proportional to the partial pressure of the gas is known as:
A. Dalton's law
B. Henry's law
C. Raoult's law
D. Boyle's law

Answer: B

28. All of the following pollutants are produced because of decaying organic matter except:
A. Ammonia
B. Sulfur dioxide
C. Methane
D. Hydrogen sulfide

Answer: B

29. The velocity of radiations (v) and the frequency of radiations (f) are related to the wavelength of radiations by:
A. v/f
B. f/v
C. vf
D. v^2f

Answer: A

30. Swimming pool water needs
A. Pre-chlorination
B. Super-chlorination
C. Dual-chlorination
D. De-chlorination

Answer: D

31. Aeration of water is done for all of the following purposes except for:
A. Removal of CO_2
B. Removal of bad taste
C. Increasing the amount of oxygen in water
D. Removal of temporary hardness

Answer: D

32. Which of the following area of work requires lowest noise level?
A. Gymnasiums
B. Library
C. Lecture halls
D. Kitchens

Answer: B

33. Mycotoxins are poisonous chemicals produced by:
A. Bacteria
B. Molds
C. Virus
D. Algae

Answer: B

34. Turbidity in water is due to:
A. Algae
B. Fungi
C. Organic salts
D. Finally divided particles of clay, silt and organic matter

Answer: D

35. Per capita consumption of water is generally taken as:
    A. 50 – 100 liters
    B. 150 – 300 liters
    C. 400 – 500 liters
    D. 750 – 1000 liters

    Answer: B

36. Which of the following industries have the highest consumption of water for processing?
    A. Foundry
    B. Automobile industry
    C. Paper mill
    D. Aluminum industry

    Answer: C

37. The ratio activity of water because of strontium can be removed by:
    A. Aeration
    B. Alum coagulation
    C. Phosphate coagulation
    D. Lime

    Answer: C

38. Chemical used for checking the growth of algae in reservoirs is
    A. Copper sulphate
    B. Alum
    C. Bleaching powder
    D. Brine

    Answer: C

39. Which of the following is not the pollutant from a sulfuric acid plants?
    A. Sulfur dioxide
    B. Sulfur trioxide
    C. Acid moist
    D. Hydrogen sulfide

    Answer: D

40. Which of the following is a cold cathode lamp?
    A. Sodium vapor lamp
    B. High pressure mercury vapor lamp
    C. Low pressure mercury vapor lamp
    D. Neon lamp

    Answer: D

41. Which has an octane rating of more than 100?
    A. Gobar gas
    B. Methyl alcohol
    C. Benzol
    D. Ethyl alcohol

    Answer: C

42. The part per million is identical to:
    A. Grains per gallon
    B. Pounds per cubic foot
    C. Milligrams per kg
    D. Tones per acre foot

    Answer: C

43. In power plant an electrostatic precipitators is installed between:
    A. Forced draft fan and induced draft fan
    B. Furnace and chimney
    C. Primary air and secondary air
    D. Furnace and forced draft fan

    Answer: B

44. At present, the number of true elementary particles, which include leptons and quarks, is thought to be:
    A. 4
    B. 8
    C. 10
    D. 12

    Answer: D

45. The effective size of a target atom that interacts with a moving particle is called its _____.
    A. Length
    B. Width
    C. Cross section
    D. Pseudo-area

    Answer: C

46. Most nuclear particles can react with atoms in several different ways including _____.
    A. Absorption
    B. Scattering
    C. Absorption and scattering
    D. Reflection and absorption

    Answer: C

47. The operation that produces highest noise level is :
    A. Welding
    B. Riveting
    C. Machining
    D. Pressing

    Answer: B

48. The ratio absorbed by the transfer fluid to the original incident energy striking the collector.
    A. Shading factor
    B. Collector efficiency
    C. Betz coefficient
    D. Transmittance

    Answer: B

49. A swinging support constructed as part of the vessel and that supports the manway cover when it is unbolted and moved aside.
    A. Davit
    B. Handhole
    C. Nozzle neck
    D. Manway arm

    Answer: A

50. Is the subjective method in which the smoke density is visually compared to five standardized white-black grids.
    A. Ringelman scale
    B. Dalton scale
    C. Smoke spot scale
    D. Dew point scale

    Answer: A

51. The ratio of fugacity at actual conditions to the fugacity at some reference state is known as:
    A. Compressibility
    B. Activity
    C. Gravimetric coefficient
    D. Saturation

    Answer: B

52. A type of polymer used for detergents, milk bottles, oil containers and toys.
    A. Polyvinyl chloride (PVC)
    B. Polystyrene (PS)
    C. High density polyethelene (HDPE)
    D. Polypropylene (PP)

    Answer: C

53. A type of polymer used for grocery bags a food wraps.
    A. Polyvinyl chloride (PVC)
    B. Polystyrene (PS)
    C. Low density polyethelene (LDPE)
    D. Polypropylene (PP)

    Answer: C

54. A radioactive gas produced from the decay of radium within the rocks beneath a building.
    A. Spills
    B. Radon
    C. Smoke
    D. Smog

    Answer: B

55. Consists of ground – level ozone and peroxyacyl nitrates (PAN)
    A. Smog
    B. Spills
    C. Sulfur oxide
    D. Smoke

    Answer: A

56. A term used to mean the corrective steps taken to return the environment to its original condition.
    A. Stabilization
    B. Remediation
    C. Greenhouse effect
    D. Opacity

    Answer: B

57. The burning of low – sulfur fuel is known as:
    A. Fuel switching
    B. Fuel adding
    C. Fuel binding
    D. Fuel swapping

    Answer: A

58. The removal of particulate matter from a gas flow by exposing the flow to a liquid or slurry is known as:
    A. Stripping
    B. Spraying
    C. Scrubbing
    D. Absorption

    Answer: C

59. The drop in a solvent's vapor pressure and the increase in mole fraction as solute is added is described by:
    A. Dalton's law
    B. Henry's law
    C. Raoult's law
    D. Boyle's law

    Answer: C

60. All of the following statements are characteristics of bases except _____.
    A. They conduct electricity in aqueous solutions
    B. They turn red litmus paper blue
    C. They have a pH between 0 to 7
    D. They neutralize acids forming salts and water

    Answer: C

61. All of the following statements about conjugate acids and bases are true except _____.
    A. A conjugate acid results when a base accept a proton
    B. A conjugate base results when a base accepts a proton
    C. Strong acids tend to give weak conjugate bases
    D. The Bronsted – Lowry theory defines bases as proton accepetors

    Answer: B

62. Are any solid particulate matter that becomes airborne, with the exception of particulate matter emitted from the exhaust stack of a combustion process.
    A. Dusts or fugitive dusts
    B. Dioxins
    C. Fugitive emissions
    D. CFCs

    Answer: A

63. Equipment leaks from plant equipments are known as _____.
    A. Fugitive leaks
    B. Fugitive dusts
    C. Fugitive exhausts
    D. Fugitive emissions

    Answer: D

64. What is a substance that absorbs or retains moisture?
    A. Surface acting agent
    B. Dry ultra-fine coal
    C. Fossil fuel
    D. Humectant

    Answer: D

65. Is a soluble compound that reduces a liquid's surface tension or reduces the interfacial tension between a liquid and a solid.
    A. Surface – acting agent or surfactant
    B. Humectant
    C. Oxygenated fuel
    D. CFC

    Answer: A

66. A material of substance that is accidentally or intentionally introduced to the environment in a quantity that exceeds what occurs naturally.
    A. Waste
    B. Sludge
    C. Pollutant
    D. Biosolids

    Answer: C

67. Refers to organic waste produced from biological waterwaste treatment processes.
    A. Toxic waste
    B. Biosolids
    C. Extrinsic waste
    D. Process waste

    Answer: B

68. A rule which states that any solid waste mixed with hazardous waste becomes hazardous.
    A. The mixture rule
    B. The derived from rule
    C. The environmental rule
    D. The hazard rule

    Answer: A

69. A rule which states that any waste derived from the treatment of a hazardous waste remains a hazardous waste.
    A. The mixture rule
    B. The treatment rule
    C. The derived from rule
    D. The hazard rule

    Answer: C

70. Generally refers to sulfur trioxide SO_3 in the flue gas.
    A. Acid rain
    B. Acid gas
    C. Hydrochloric acids
    D. Stack gas

    Answer: B

71. What consists of weak solutions of sulfuric, hydrochloric, and to a lesser extent, nitric acids?
    A. Stack gas
    B. Acid rain
    C. Acid compound
    D. Pollutant

    Answer: B

72. A fibrous silicate mineral material that is inert, strong and incombustible.
    A. Fiberglass
    B. Plastic
    C. Rubber
    D. Asbestos

    Answer: D

73. An insulator with superior tensile strength but low heat resistance.
    A. Rubber
    B. Plastic
    C. Fiberglass
    D. Asbestos

    Answer: C

74. Are highly concentrated liquid wastes produced in landfills.
    A. Aerosols
    B. Leachates
    C. Nitrogen dioxide
    D. Urea

    Answer: B

75. What is the primary cause of smog formation?
    A. Toxins
    B. Dioxins
    C. Oxidants
    D. Nitrogen oxides

    Answer: D

76. Is a water soluble organic compound prepared from ammonia. It has significant biological and industrial usefulness.
    A. Urea or carbamide urea
    B. Nitrite
    C. Chlorinated organics
    D. Oxidants

    Answer: A

77. Are by products of reaction between combustion products
    A. Photochemicals
    B. Oxidants
    C. Organics
    D. Sediments

    Answer: B

78. “Particulate matter” is defined as all particles that are emitted by a combustion source. What is another term for particulate matter?
    A. Dust
    B. Aerosol
    C. Biosolids
    D. Sediments

    Answer: B

79. Are organic compounds manufactured in oily liquid and solid forms through the late 1970s and subsequently prohibited.
    A. Polychlorinated biphenyls (PCBs)
    B. Polyvinyl chloride (PVC)
    C. Trihalomethanes
    D. Plastic

    Answer: A

80. A type of polymer used for Styrofoam cups and “clam shell” food containers.
    A. Polyvinyl chloride (PVC)
    B. Polystyrene (PS)
    C. Low density polyethelene (LDPE)
    D. Polypropylene (PP)

    Answer: B

81. A type of polymer used for labels, bottles and housewares.
    A. Polyvinyl chloride (PVC)
    B. Polystyrene (PS)
    C. Low density polyethelene (LDPE)
    D. Polypropylene (PP)

    Answer: D

82. A type of polymer used for clear bottles.
    A. Polyvinyl chloride (PVC)
    B. Polystyrene (PS)
    C. Low density polyethelene (LDPE)
    D. Polypropylene (PP)

    Answer: A

83. Refers to the high – temperature removal of tarry substances from the interior of the carbon granule, leaving a highly porous structure.
    A. Absorbent
    B. Activated
    C. Breakthrough
    D. Adsorbent

    Answer: B

84. A substance with high surface area per unit weight, and intricate pore structure, and a hydrophobic surface.
    A. Adsorbent substance
    B. Adsorbent substance

C. Homogenous substance
D. Activated substance

Answer: A

85. Is a high – temperature process that turns incinerator ash into a safe glass-like material.
A. Advance oxidation
B. Biofitration
C. Vitrification
D. Bioventing

Answer: C

86. Refers to the use of composting and soil beds.
A. Biofiltration
B. Biomediation
C. Bioventing
D. Bioreactors

Answer: A

87. Are open or closed tanks containing dozens or hundreds of slowly rotating disks covered with a biological film of microorganisms.
A. Biofilter
B. Bioreactor
C. Biomediator
D. Bioinventor

Answer: B

88. Refers to the treatment of contaminated soil in a large plastic-covered tank.
A. Bioventing
B. Biological recycling
C. Biocycle
D. Bioremediation

Answer: A

89. All of the following occur during oxidation of a substance except _____.
A. Oxidation state increases
B. Loss of electrons
C. The substance becomes less negative
D. Oxidation of the oxidizing agent

Answer: D

90. All of the following occur during reduction of a substance except _____.
A. An increase in negative charge
B. Loss of electrons
C. An oxidation state decrease
D. Reduction of the oxidizing agent

Answer: B

91. All of the following are units of energy except:
A. Calories
B. Joules
C. Pascals
D. MeV

Answer: C

92. What do you call the mixture if the solute particles of a solid suspended in a liquid are larger than molecules?
A. Solution
B. Suspension
C. Hydration
D. Saturated solution

Answer: B

93. What do you call the mixture when a solvent has dissolved as much solute as it can?
A. Solution
B. Mild solution
C. Hydration
D. Saturated solution

Answer: D

94. The equilibrium constant for weak solution is known as
A. Ionization constant
B. Arrhenius exponent
C. Solubility product
D. La Chatelier's constant

Answer: A

95. What do you call the mixture if the solute particles of solid suspended in a liquid are larger than the molecules?
A. Solution
B. Suspension
C. Hydration
D. Saturated solution

Answer: B

96. What do you call the mixture when a solvent has dissolved as much solute as it can?
A. Solution
B. Mild solution
C. Hydration
D. Saturated solution

Answer: D

97. The equilibrium constant for weak solution is known as:
A. Ionization constant
B. Arrhenius exponent
C. Solubility product
D. La Chatelier's constant

Answer: A

98. If the solute particles of a solid suspended in a liquid are larger than the molecules, the mixture is known as:
A. Solution
B. Suspension
C. Hydration
D. Saturated solution

Answer: B

99. When a solvent has dissolved as much solute as it can, the mixture is called:
A. Solution
B. Suspension
C. Hydration
D. Saturated solution

Answer: D

100. When excess solute in a solution settles to the bottom of the container, the process is called:
A. Salvation
B. Deemulsification
C. Precipitation
D. Equation

Answer: C

101. All of the following express units of concentration except:
    A. Normality
    B. Molarity
    C. Formality
    D. Isotropy

    Answer: D

102. The desirable temperature inside an air conditioned auditorium is:
    A. 0 ℃
    B. 5 ℃
    C. 10 ℃
    D. 20 ℃

    Answer: D

103. Which of the following acts as ignition accelerator for internal combustion engine fuels?
    A. Acetone peroxide
    B. Hydrogen peroxide
    C. Aromatic compounds
    D. N-heptane

    Answer: A

104. Which of the following does not use ambient air for propulsion?
    A. Turbo jet
    B. Turbo-prop
    C. Pulse jet
    D. Rocket

    Answer: B

105. Most observed properties of light and other radiant energy are consistent with waves in nature, but in interactions with matter, electromagnetic energy behaves as though it consists of discrete pieces or
    A. Blocks
    B. Balls
    C. Quanta
    D. Atomic masses

    Answer: C

106. The amount of energy absorbed when a substance enters a solution is called the:
    A. Heat of fusion
    B. Heat of sublimation
    C. Endothermic heat solution
    D. Exothermic heat solution

    Answer: C

107. The absorption of water by a dessicant often demonstrates:
    A. Heat of fusion
    B. Heat of vaporization
    C. Endothermic heat of solution
    D. Exothermic heat of solution

    Answer: D

108. A substance that absorbs moisture from the air is:
    A. Deliquescent
    B. Efflorescent
    C. Effervescent
    D. A precipitant

    Answer: A

109. The removal of a dissolved gas or other volatile component from liquid by exposing the liquid to air or steam is known as:
    A. Stripping
    B. Gas absorption
    C. Spraying
    D. Scrubbing

    Answer: A

110. Which of the following contribute to the deterioration of the Earth's ozone layer?
    A. Carbon monoxide
    B. Chlorofluorocarbons
    C. Carbon dioxide
    D. Refrigerants

    Answer: B

111. Ozone filters out what type of radiation that damages crops and causes skin cancer?
    A. Tropospheric radiation
    B. Atmospheric radiation
    C. X-rays
    D. Ultraviolet radiation

    Answer: D

112. All of the following factors affect rates of reaction except:
    A. Exposed surface area
    B. Concentrations
    C. Temperature
    D. Pressure

    Answer: D

113. Le Chatelier's principle predicts the direction of a state of chemical equilibrium based on all of the following factors except:
    A. Temperature
    B. Specific volume
    C. Pressure
    D. Concentration

    Answer: B

114. The amount of energy necessary to cause a reaction to occur is called the _____.
    A. Heat of formation
    B. Heat of solution
    C. Activation of energy
    D. Heat of fusion

    Answer: C

115. The equilibrium constant for weak solutions is known as _____.
    A. The ionization constant
    B. The Arrhenius exponent
    C. The solubility product
    D. Le Chatelier's principle

    Answer: A

116. The speed at which a reaction proceeds to equilibrium is the purview of _____.
    A. Reaction kinetics
    B. Le Chatelier's principle
    C. Neutralization
    D. Ionization

    Answer: A

117. The color of water is measured:
    A. In terms of pH value
    B. In terms of degree of hardness
    C. In terms of platinum cobalt scale
    D. Ppm of dissolved solids

Answer: C

118. What turbidimeter that gives direct readings in ppm?
    A. Jackson turbidimeter
    B. Hellige turbidimeter
    C. Baylis turbidimeter
    D. All of the above

    Answer: A

119. Which of the following is not a sound absorptive material?
    A. Rugs
    B. Mirrors
    C. Carpets
    D. Heavy drapes

    Answer: B

120. The total cross section of a target atom is made up of _____.
    A. The absorption cross section
    B. The scattering cross section
    C. The absorption and scattering cross sections
    D. The reflection and absorption cross sections

    Answer: C

121. Which of the following cannot be a phenomenon of neutron interactions?
    A. Inelastic scattering
    B. Elastic scattering
    C. Fission
    D. Fusion

    Answer: D

122. Which of the following cannot be used to describe neutron kinetic energy levels?
    A. Cold
    B. Thermal
    C. Slow
    D. Freezing

    Answer: D

123. All of the following are words used to describe neutron kinetic energy levels except:
    A. Slow (resonant)
    B. Fast
    C. Supersonic
    D. Relativistic

    Answer: C

124. The reduction of nuclear radiation intensity (called attenuation) is accomplished by:
    A. Matter
    B. Antimatter
    C. Shielding
    D. Neurons

    Answer: C

125. The ability of substance to absorb neurons depends upon its _____.
    A. Absorption cross section
    B. Scattering cross section
    C. Total cross section
    D. Atomic number

    Answer: A

CHAPTER 11 – FLUID MECHANICS

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

    Answer: C

2. For supersonic flow, the pressure of fluid must decrease as the fluid flow area of the duct.
    A. Increases
    B. Decreases
    C. Remain the same
    D. None of these

    Answer: A

3. Density in term of viscosity is:
    A. Kinematic viscosity / dynamic viscosity
    B. Dynamic viscosity / kinematic viscosity
    C. Kinematic viscosity x dynamic viscosity
    D. None of the above

    Answer: B

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

    Answer: B

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

    Answer: C

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

    Answer: D

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

    Answer: B

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

    Answer: C

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

   Answer: D

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

   Answer: D

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

   Answer: D

12. the speed of sound in all fluid is most closely related to all of the following properties except_____.
   A. Compressibility
   B. Density
   C. Bulk module
   D. Thermal conductivity

   Answer: D

13. Under which condition, the specific weight of water is 1000 kg/m^3?
   A. At normal pressure of 760 mm
   B. At 4 ℃ temperature
   C. At mean sea level
   D. All of the above

   Answer: D

14. All of the following can be characteristics of fluids except_____.
   A. kinematic viscosity
   B. surface tension
   C. bulk modulus
   D. hysteresis

   Answer: D

15. Which of the following can be used to measure the flow of water in a pipe of diameter 3000 mm?
   A. Venturimeter
   B. Rotameter
   C. Nozzle
   D. Pilot tube

   Answer: D

16. The pressure at a given depth due to several immiscible liquids is:
   A. The average of the individual pressures
   B. The sum of the individual pressures
   C. Independent of the individual pressures
   D. Unknown

   Answer: B

17. The equation of continuity of flow is applicable if:
   A. The flow is one dimensional
   B. The flow is steady
   C. The velocity is uniform over the cross – section
   D. All of the above conditions are together

   Answer: D

18. Uniform flow takes place when:
   A. Conditions remain unchanged with time at any point
   B. Rate of change of velocity of fluid is zero
   C. At every point the velocity vector is identical in magnitude and direction for any given instant
   D. The change in transverse direction is zero

   Answer: C

19. The continuity equation of an ideal fluid flow.
   A. States that the net rate in – flow into any small volume must be zero
   B. Applies to irrotational flow only
   C. States that the energy remains constant along streamline
   D. States that energy is constant everywhere in the fluid

   Answer: D

20. A pilot tube can be used to measure fluid velocity as described by the Bernoulli's equation and the relationship between:
   A. Kinetic energy and static pressure
   B. Fluid pressure and height of the fluid
   C. Fluid pressure and impact energy
   D. Pressure and momentum

   Answer: A

21. In order to avoid vaporization in the pipe line, the pipe line over the ridge is laid in such a way that it is not more than:
   A. 2.4 m above the hydraulic gradient
   B. 6.4 m above the hydraulic gradient
   C. 10.0 m above the hydraulic gradient
   D. 5.0 m above the hydraulic gradient

   Answer: B

22. The stream function is a useful parameter in describing_____.
   A. The conservation of mass
   B. The conservation of momentum
   C. The conservation of energy
   D. The equation of state

   Answer: A

23. For high speed flows, the potential energy of fluids are:
   A. Positive
   B. Negative
   C. Negligible
   D. None of these

   Answer: C

24. McLeod gauge used for low pressure measurement operates on the principle of _____.
   A. Gas law
   B. Boyle's law
   C. Charles law
   D. Pascal's law

Answer: B

25. A Kaplan turbine is
    A. A high head mixed flow turbine
    B. An impulse turbine, inward flow
    C. A reaction turbine, outward flow
    D. Low head axial flow turbine

    Answer: D

26. The most common method for calculating frictional energy loss for laminar flowing fluids in noncircular pipe is:
    A. The Darcy equation
    B. The Hagan – Poisevill equation
    C. The Hazen - Williams equation
    D. The Swamee – Jin equation

    Answer: A

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

    Answer: B

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

    Answer: C

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

    Answer: D

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

    Answer: A

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

    Answer: D

32. Center of pressure on an inclined plane has ___.
    A. At the centroid
    B. Above the centroid
    C. Below the centroid
    D. At metacenter

    Answer: C

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

    Answer: D

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

    Answer: D

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

    Answer: A

36. The presence of friction in the energy grade line will always cause the line to slope
    A. Down in the direction of the flow
    B. Upward in the direction of the flow
    C. Level (no slope)
    D. There is no effect of friction on the energy grade line

    Answer: A

37. The pilot tube is a device used for measurement of
    A. Pressure
    B. Flow
    C. Velocity
    D. Discharge

    Answer: C

38. Hydrometer is used to find out
    A. Specific gravity liquids
    B. Specific gravity solids
    C. Specific gravity gases
    D. Relative humidity

    Answer: A

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

    Answer: A

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

    Answer: A

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

    Answer: D

42. The value of coefficient of discharge in comparison to coefficient of velocity is found to be_____.
    A. More
    B. Less
    C. Same
    D. More/less depending on flow

    Answer: B

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

    Answer: C

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

    Answer: C

45. Power transmitted through a pipe is maximum when the loss of head due to friction is:
    A. One-half of the total head supplied
    B. One-third of the total head supplied
    C. One-fourth of the total head supplied
    D. Equal to the total head supplied

    Answer: B

46. In a nozzle if back pressure is same as inlet pressure; then_____.
    A. No flow takes place
    B. Maximum flow takes place
    C. Flow becomes subsonic in diverging section
    D. Flow becomes supersonic in converging as well as supersonic section

    Answer: A

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

    Answer: D

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

    Answer: B

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

    Answer: A

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

    Answer: D

51. A pilot tube can be used to measure fluid velocity as described by the Bernoulli's equation and the relationship between:
    A. Kinetic energy and static pressure
    B. Fluid pressure and static pressure
    C. Fluid pressure and impact energy
    D. Pressure and momentum

    Answer: A

52. The ratio of the area to the wetted penmeter is known as _____.
    A. Flow factor
    B. Hydraulic radius
    C. Kutter's C
    D. Value of k in Darcy - Weisbach formula

    Answer: B

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

    Answer: A

54. Where is vena contracta most likely loacated?
    A. At the orifice
    B. At a distance approximately ½ the diameter of the orifice
    C. At a distance approximately equal to the diameter of the orifice
    D. At a distance approximately twice the diameter of the orifice

    Answer: B

55. A substance that is able to flow and yields to any force tending to change its shape without changing its volume such as water and air.
    A. Fluid
    B. Flux
    C. Gas oil
    D. Water gas

    Answer: A

56. The velocity of a fluid particle at the center of the pipe section is_____.
    A. Maximum
    B. Minimum
    C. Average
    D. Logarithmic average

    Answer: A

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

C. Constant
D. None of these

Answer: B

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

    Answer: D

59. The time required for half a quantity of radioactive particles to decay (disintegrate) is called its_____.
    A. Average life
    B. Median life
    C. Time constant
    D. Half time

    Answer: D

60. SI unit of viscosity is:
    A. 10 times poise
    B. 9.81 times poise
    C. 1/9.81 time poise
    D. 1/10 times poise

    Answer: A

61. For computation convenience, fluids are usually classed as:
    A. Rotational or irrotational
    B. Real or ideal
    C. Laminar or turbulent
    D. Newtonian or non-newtonian

    Answer: B

62. Which of the following is not a dimensionless parameter?
    A. Kinetic viscosity
    B. Weber number
    C. Darcy Weisbach friction factor
    D. Froude number

    Answer: A

63. Which of the following is not a characteristic of real fluids?
    A. Finite viscosity
    B. Non-uniform velocity distributions
    C. Compressibility
    D. Experience of eddy current and turbulence

    Answer: D

64. Which of the following is not the mass density of water?
    A. 62.5 lbm/ft^3
    B. 100 kg/m^3
    C. 1 g/cm^3
    D. 1 kg/L

    Answer: B

65. The upper critical Reynolds number for pipe flow is:
    A. Of no practical importance to designers
    B. Always used to design pipes for strength
    C. The number at which turbulent flow changes over to laminar flow
    D. The number at which laminar flow changes into turbulent flow

    Answer: A

66. Which of the following statements about gauge pressure is most correct? Gauge pressure are measured relative to _____.
    A. Atmospheric pressure
    B. A vacuum
    C. Each other
    D. The surface

    Answer: A

67. The volumetric change of the fluid caused by a resistance is called _____.
    A. Volumetric strain
    B. Volumetric index
    C. Compressibility
    D. Adhesion

    Answer: D

68. Compressibility of a fluid relates the fractional change in fluid volume per unit change in fluid.
    A. Temperature
    B. Density
    C. Pressure
    D. Viscosity

    Answer: C

69. Property of a fluid whereby its own molecules are attracted is known as _____.
    A. Adhesion
    B. Cohesion
    C. Surface tension
    D. Viscosity

    Answer: B

70. The term subsonic flow refers to a flowing gas with a speed:
    A. Less than the local speed of sound
    B. Equal to the speed of sound
    C. Greater than the speed of sound
    D. Much greater than the speed of sound

    Answer: A

71. The pressure at a point in a fluid will not be same in all the directions if the fluid is:
    A. Viscous
    B. Viscous and static
    C. Inviscous and in motion
    D. Viscous and is in motion

    Answer: D

72. The statement that “the hydrostatic pressure a fluid exerts on an immersed object or on container walls is a function only of fluid depth” is
    A. The perfect gas law
    B. D’Alembert’s paradox
    C. The hydrostatic paradox
    D. Boyle’s law

    Answer: C

73. Bernoulli’s equation is s/an _____.
    A. Momentum equation
    B. Conservation of energy equation
    C. Conservation of mass equation
    D. Equation of state

    Answer: B

74. An ideal fluid is one that:
    A. Is very viscous
    B. Obeys Newton's law of viscosity
    C. Is assumed in problems in conduit flow
    D. Is frictionless and incompressible

    Answer: D

75. The relationship between pressure and altitude in the atmosphere is given by the:
    A. Perfect gas law
    B. Conservation of mass
    C. Barometric height relationship
    D. First law of thermodynamics

    Answer: C

76. The fact the buoyant force on a floating object equal to the weight of the water displaced is:
    A. Bernoulli's law
    B. Archimedes' principle
    C. The law of diminishing returns
    D. The conservation of mass

    Answer: B

77. Which of the following terms does not appear in the steady flow energy equation (the extended Bernoulli's equation)?
    A. Kinetic energy
    B. Potential energy
    C. Friction losses
    D. Hysteresis losses

    Answer: D

78. Neglecting the forces due to inertia, gravity and frictional resistance, the design of a channel can be made by comparing
    A. Weber number
    B. Reynolds number
    C. Froude's number
    D. Prant'l number

    Answer: C

79. The difference between stagnation pressure and total pressure is:
    A. Due to height difference
    B. Due to fluid kinetic energy
    C. None of the terms are interchangeable
    D. Important only in supersonic flow

    Answer: C

80. Fully turbulent flow in a pipe is characterized by all of the following except:
    A. A parabolic velocity profile
    B. A momentum exchange due to fluid masses rather than molecules
    C. A maximum velocity at the fluid center line
    D. A 1/7 velocity profile

    Answer: A

81. The laminar friction factor of fluid flowing through a pipe is a function of all of the following except:
    A. Fluid velocity
    B. Pipe diameter
    C. Pipe roughness
    D. Reynolds number

    Answer: C

82. The continuity equation is applicable to:
    A. Viscous unviscous fluid
    B. Compressibility of fluids
    C. Conservation of mass
    D. Steady unsteady flow

    Answer: C

83. The rise or fall of head 'h' in a capillary tube of diameter 'd ' and liquid surface tension 's' and specific weight 'w' is given by:
    A. 4s/wd
    B. 4ds/w
    C. 4wd/s
    D. 4ws/d

    Answer: A

84. The study of the practical laws of fluid flow and the resistance of open pipes and channels.
    A. Fluid mechanics
    B. Hydraulics
    C. Aerodynamics
    D. Thermodynamics

    Answer: B

85. Which of the following turbine is different from the others?
    A. Fourneyron turbine
    B. Francis turbine
    C. Kaplan turbine
    D. Pelton wheel

    Answer: D

86. Running away speed of a Pelton wheel gives:
    A. Actual operating speed
    B. No load speed
    C. Full load speed
    D. No load speed when governor mechanism fails

    Answer: D

87. Which of the following turbine is different from the others?
    A. Pelton wheel
    B. Banki turbine
    C. Jonval turbine
    D. Kaplan turbine

    Answer: D

88. The characteristic length of the Reynold's number used to calculate the friction in noncircular full running pipes is based on the _____.
    A. Run length
    B. Pipe length
    C. Hydraulic diameter (the equivalent diameter)
    D. Wetted circumference

    Answer: C

89. The hydraulic radius of noncircular pipe is:
    A. The square root of the flow area
    B. The ratio of the area to the wetted perimeter
    C. The radius of a pipe of equivalent area
    D. None of the above

    Answer: B

90. The Darcy equation can be used for all liquids and flows except:
    A. Water
    B. Alcohol
    C. Gasoline
    D. Air flowing supersonically

Answer: D

91. The Hazen – Williams formula for head loss due to friction is based upon:
    A. Rigorous mathematical derivation
    B. Empirical data
    C. Semi-empirical analysis
    D. Screndipity

    Answer: B

92. The extended Bernoulli equation includes all of the following terms except:
    A. Potential energy
    B. Kinetic energy
    C. Nuclear energy
    D. Friction losses

    Answer: C

93. An equipotential line is one that:
    A. Has no velocity component tangent to it
    B. Has uniformly varying dynamic pressure
    C. Has no velocity component normal to it
    D. Exists in case of rotational flow

    Answer: A

94. What is the use of a Hydraulic jump?
    A. Increase the flow rate
    B. Reduce the flow rate
    C. Reduce the velocity of flow
    D. Reduce the energy of flow

    Answer: D

95. What do you call the lowest portion to storage basin from where the water is not drawn?
    A. Bottom storage
    B. Sub soil storage
    C. Spring reserve
    D. Dead storage

    Answer: D

96. The presence of friction in the hydraulic grade line will always cause the line to slope:
    A. Down in the direction of the flow
    B. Upward in the direction of the flow
    C. Level (no slope)
    D. There is no effect of friction on the energy grade line

    Answer: A

97. The presence of a minor loss in the energy grade line will cause the line to slope:
    A. Down in the direction of the flow
    B. Upward in the direction of the flow
    C. Vertically downward
    D. There is no effect of friction on the energy grade line

    Answer: A

98. What do you call the pressure which the fluid exerts on an immersed object or container walls?
    A. Normal pressure
    B. Standard liquid pressure
    C. Hydrostatic pressure
    D. Gage pressure

    Answer: C

99. Viscosity for a fluid is defined as the constant of proportionality between shear stress and what other variable?
    A. The spatial derivative of velocity
    B. The time derivative of pressure
    C. The time derivative of density
    D. The spatial derivative of density

    Answer: A

100. What is the classification of the fluid flow if the fluid travels parallel to the adjacent layers and the paths of the individual particles do not cross each other?
    A. Steady flow
    B. Laminar flow
    C. Uniform flow
    D. Turbulent flow

    Answer: B

101. Which of the following refers to the measure of a fluid's sensitivity to changes in viscosity with changes in temperature?
    A. Viscosity index
    B. Coefficient of viscosity
    C. Viscosity ratio
    D. Viscosity factor

    Answer: A

102. If the Mach number is greater than 1 but lesser than 5, what is the standard classification of the travel?
    A. Transonic travel
    B. Subsonic travel
    C. Hypersonic travel
    D. Supersonic travel

    Answer: D

103. What is measured by a Pitot tube?
    A. Volumetric discharge
    B. Mass flow
    C. Pressure
    D. Velocity

    Answer: D

104. What is the difference between the energy grade line and the hydraulic grade line?
    A. Potential energy
    B. Pressure energy
    C. Kinetic energy
    D. Friction losses

    Answer: C

105. Kinetic energy is not neglected in calculations of:
    A. High speed flow
    B. Low speed flow
    C. Steady flow
    D. Equilibrium flow

    Answer: A

106. Discharge losses through orifice are due to:
    A. Friction losses
    B. Minor losses
    C. Both friction and minor losses
    D. Pressure losses

    Answer: C

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

B. Speed of sound
C. Speed of light
D. Speed of fluid flow

Answer: B

108. Is the velocity at which an infinitesimal small pressure wave travels through a medium.
A. Subsonic velocity
B. Hypersonic velocity
C. Sonic velocity
D. Monatomic velocity

Answer: C

109. It is the ratio of the actual velocity of the fluid to the velocity of sound.
A. Mach number
B. Froude number
C. Sonic number
D. Euler number

Answer: A

110. The flow is called sonic when Mach number is:
A. Equal to 1
B. Less than 1
C. More than 1
D. None of these

Answer: A

111. The following flow is sub-sonic when Mach no. is:
A. Greater than 1
B. Less than 1
C. More than 1
D. None of these

Answer: B

112. The flow is supersonic when Mach no. is:
A. Greater than zero
B. Less than 1
C. Greater than 1
D. None of these

Answer: C

113. The flow is transonic when
A. M = 0
B. M < 1
C. M > 1
D. M = 1

Answer: D

114. The pressure decreases as the temperature and velocity increases while the fluid velocity and Mach number:
A. Increases
B. Decreases
C. Remains constant
D. None of these

Answer: A

115. The Mach number is unity or one at the location of smallest flow area, called the:
A. Decreasing are
B. Throat
C. Increasing area
D. None of these

Answer: B

116. What happens to the velocity of fluid after passing the throat although the flow area
A. Increases rapidly
B. Decreases rapidly
C. Remains constant
D. None of these

Answer: A

117. Which of the following is an example of Newtonian fluid?
A. Motor oils
B. Gas
C. Paints
D. Clay slurries

Answer: B

118. What is the critical pressure of water?
A. 150 kg/cm^3
B. Less than 200 kg/cm^2
C. More than 200 kg/cm^2
D. 100 kg/cm^2

Answer: C

119. Past ME Board Question
The volumetric change of the fluid caused by a resistance is called:
A. Volumetric change
B. Volumetric index
C. Compressibility
D. Adhesion

Answer: D

120. Past ME Board Question
The energy of a fluid flowing at any section in a pipeline is a function of:
A. Velocity of flow only
B. Pressure only
C. Height above a chosen datum, density, internal energy, pressure and velocity of flow
D. Pressure, height above a chosen datum, velocity of flow, density of fluid

Answer: C

121. Past ME Board Question
If the fluid travels parallel to the adjacent layers and the paths of individual particles do not cross, the fluid is said to be:
A. Turbulent
B. Critical
C. Dynamic
D. Laminar

Answer: D

122. Past ME Board Question
Center of pressure on an inclined plane lies:
A. At the centroid
B. Above the centroid
C. Below the centroid
D. At the metacenter

Answer: C

123. Past ME Board Question
At any instant, if the number of particles passing every cross-section of the stream is the same, the flow is said to be:
A. Steady flow
B. Uniform flow
C. Continuous flow
D. Laminar flow

Answer: A

124. Past ME Board Question
The ratio of cross-sectional area of flow to the wetted perimeter is:
A. Hydraulic lead
B. Hydraulic section
C. Hydraulic mean depth
D. Hydraulic gradient

Answer: C

125. Past ME Board Question
If A is the cross-sectional area of the flow and Pw is the wetted perimeter of a pipe, then what is the hydraulic depth. H_d?
A. Pw – A
B. Pw / A
C. A / Pw
D. Pw x A

Answer: C

126. Past ME Board Question
If Q is the volume in gallon; D is height or elevation in ft. and m is weight in lbs. per gallon, what is the desired energy to lift the water from lower to higher elevation?
A. E = mD/Q
B. E = mDQ
C. E = mQ/D
D. E = QD/m

Answer: B

127. Past ME Board Question
The flow of the convergent section of a nozzle is always subsonic. If the flow is subsonic then the Mach number is:
A. Greater than unity
B. Less than unity
C. Near unity
D. Unity

Answer: B

CHAPTER 12 – FLUID MACHINERY

1. The volumetric efficiency of a compressor having clearance factor is given by:
A. $1 + c - c(p_2/p_1)^{1/n}$
B. $1 + c + c(p_2/p_1)^{1-n}$
C. $1 + c - c(p_2/p_1)^{n}$
D. $1 + c + c(p_2/p_1)^{n+1}$

Answer: A

2. In case of axial flow compressors for minimum fluid friction and blade tip clearance losses, the blades of an axial flow compressor are designed for____
A. 80% reaction
B. 85% reaction
C. 60% reaction
D. 53% reaction

Answer: D

3. Centrifugal blowers can supply
A. Large volumes of air at low pressures
B. Small volumes of air at high pressures
C. Large volumes of air at high pressures
D. Small volumes of air at low pressures

Answer: A

4. Which of the following is a safety device on a compressor?
A. Relief valve
B. Strainer
C. Over speed shut down
D. Over pressure shut down

Answer: A

5. In a four stage compressor system, the first and third stage pressures are 1 and 9 kg/cm^2 respectively. What is the fourth stage delivery pressure?
A. 9 kg/cm^2
B. 81 kg/cm^2
C. 27 kg/cm^2
D. 243 kg/cm^2

Answer: C

6. For a six compression of air set, the minimum work conditions are:
A. Pressure rise per stage will be equal
B. Work done in successive stages will be in geometrical progression
C. Cylinder volumes will be same
D. Temperature rise in the cylinders will be the same

Answer: D

7. Which of the following give the optimum intermediate pressure in case of two stage compression?
A. $p_2 = \frac{p_1+p_2}{2}$
B. $p_2 = p_1 + \frac{p_1+p_2}{2}$
C. $p_2 = \sqrt{p_1 p_3}$
D. $p_2 = p_{1+}\sqrt{{p_1}^2 + {p_3}^2}$

Answer: C

8. In air compressor performance curve a surge line represents what?
A. Limit of compressor efficiency
B. Limit of compressor discharge
C. Limit of stable operation
D. Lower critical speed of shaft

Answer: C

9. Which of the following is a displacement compressor?
A. Reciprocating air compressor
B. Vane blower
C. Centrifugal blower
D. Axial flow compressors

Answer: B

10. Stalling of the blades of axial flow compressor is:
A. An unsteady periodic and reversal of flow
B. The fixed mass flow rate irrespective of pressure ratio
C. The reduction in lift force at higher angle of incidence
D. All of the above

Answer: C

11. Surging is
A. An unsteady, periodic and reversal of flow in the compressor
B. The fixed mass flow rate irrespective of pressure ratio
C. The reduction in lift force at higher angle of incidence
D. None of the above

Answer: A

12. In an axial flow compressor, the pressure rise takes place in:

A. Fixed blades only
B. Moving blades only
C. Both fixed and moving blades
D. None of the above

Answer: C

13. An axial flow compressor is suitable for:
    A. High volume flow rates with small pressure rise
    B. Low volume flow rates with low pressure rise
    C. High volume flow rates with high pressure rise
    D. Low volume flow rates with high pressure rise

    Answer: A

14. Which of the following is a positive displacement rotary compressor?
    A. Roots blower
    B. Centrifugal compressor
    C. Axial flow compressor
    D. None of the above

    Answer: A

15. Choking is
    A. Change of mass flow rate in proportion to pressure ratio
    B. Change of mass flow rate in inverse proportion to pressure ratio
    C. Fixed mass flow rate irrespective of pressure
    D. All of the above

    Answer: C

16. Crankshaft of a reciprocating compressor is basically made of what?
    A. Semi-steel
    B. Aluminum alloy
    C. Steel forging
    D. Cast iron

    Answer: D

17. Most plant air systems to operate the tools and machines which require 70 to 90 psig are maintained at_____.
    A. 90 to 110 psig
    B. 110 to 130 psig
    C. 130 to 150 psig
    D. 70 to 90 psig

    Answer: B

18. The capacity of portable air compressors used for construction, mining, road building, and painting ranges from _____.
    A. 1 ft^3/min to 2000 ft^3/min
    B. 30 ft^3/min to 2500 ft^3/min
    C. 1 ft^3/min to 2500 ft^3/min
    D. 30 ft^3/min to 2000 ft^3/min

    Answer: A

19. The power of portable air compressors used for construction, mining, road building, and painting ranges from:
    A. 1 hp to 500 hp
    B. ½ hp to 500 hp
    C. 1 hp to 1000 hp
    D. ½ hp to 1000 hp

    Answer: B

20. Most permanent installations use piston compressors available as stock items in size ranging from
    A. 1 ft^3/min to 2000 ft^3/min
    B. 30 ft^3/min to 2500 ft^3/min
    C. 1 ft^3/min to 2500 ft^3/min
    D. 30 ft^3/min to 2000 ft^3/min

    Answer: B

21. Most permanent installations use piston compressors available as stock items of what pressure?
    A. 150 psi
    B. 200 psi
    C. 250 psi
    D. 300 psi

    Answer: A

22. When the piston is top center of the cylinder in a double-acting reciprocating compressor:
    A. All suction valves are open and all discharge valves are closed
    B. All suction valves are closed and all discharge valves are closed
    C. All suction valves are closed and all discharge valves are open
    D. All suction valves are open and all discharge valves are open

    Answer: B

23. Past ME Board Question
    Pump used to increase air pressure above normal, air is then used as a motive power.
    A. Air cooled engine
    B. Air compressor
    C. Air condenser
    D. Air injection

    Answer: B

24. A device used for raising fluids from a lower to higher level.
    A. Compressor
    B. Pump
    C. Turbine
    D. Blowers

    Answer: B

25. When a pump is opening at a vacuum of 4 in Hg, which of the following is not correct?
    A. The pressure is 25.92 in Hg
    B. The pressure is 10.721 psia
    C. The pressure is 158.4 torr
    D. The pressure is 0.8663 atm

    Answer: C

26. The amount of energy actually entering the fluid from a pump is the
    A. Brake horsepower
    B. Hydraulic horsepower
    C. Theoretical horsepower
    D. Hydraulic, theoretical, or water horsepower

    Answer: D

27. Primary purpose of a pump in a fluid loop is to
    A. Add energy to the flow
    B. Add mass to the flow
    C. Extract energy from the flow
    D. None of the above

    Answer: A

28. The isentropic efficiency of a pump is given by the

A. Ratio of actual to ideal energy extracted
B. Ratio of ideal to actual energy supplied
C. Ratio of ideal to actual energy extracted
D. Ratio of actual to ideal energy supplied

Answer: B

29. The electrical efficiency of a device is the ratio of the :
A. Electrical energy output to the electrical energy input
B. Mechanical energy input to the mechanical energy output of the device
C. Actual energy extracted to the ideal energy extracted
D. Actual to the ideal energy input

Answer: C

30. The adiabatic pump efficiency is the ratio of the
A. Electrical energy output to the electrical energy input
B. Mechanical energy input to the electric energy output of the device
C. Ideal energy input to the pump to the actual energy input
D. Actual energy extracted to the ideal energy extracted

Answer: C

31. A condenser's water – circulating pump is belt-driven by an electric motor with an adjustable pitch motor sheave. This sheave
A. Permits adjustment of pump speed
B. Prevent overload abd/or burnout of the pump and motor
C. Prevents excessive wear on the belt and motor shaft bearings
D. Facilitates belt replacement

Answer: C

32. The function of a pump or compressor is to
A. Transfer heat from one fluid to another
B. Increase the total energy content of the flow
C. Extract energy from the flow
D. Exchange heat to increase energy to the flow

Answer: B

33. Past ME Board Question
An aftercooler on a reciprocating air compressor is used primarily to:
A. Cool the lubricating oil
B. Condense the moisture in the compressed air
C. Improve compressor efficiency
D. Increase compressor capacity

Answer: B

34. Past ME Board Question
A receiver in an air compression system is used to
A. Avoid cooling air before using
B. Increase the air discharge pressure
C. Collect water and grease suspended in the air
D. Reduce the work needed during compression

Answer: C

35. Past ME Board Question
Crankshaft of reciprocating compressor is basically made of:
A. Semi-steel
B. Aluminum alloy
C. Cast iron
D. Steel forging

Answer: C

36. Past ME Board Question
Cooling water system consists of equipment to dissipate heat absorbed by the engine jacket water, lube oil and the heat to be removed from air intercooler is measurable to keep the engine outlet water temperature constant and the differential of the cooling water at a minimum preferably not to exceed:
A. 10 to 30 ℉
B. 10 to 50 ℉
C. 10 to 20 ℉
D. 10 to 40 ℉

Answer: C

37. Past ME Board Question
Which of the following is one of the most popular types of compressor utilized for supercharging engine?
A. Roots type blower
B. Pulse turbo charger
C. Constant pressure turbo charger
D. Turbo compressor

Answer: A

38. Past ME Board Question
The power required to deliver a given quantity of fluid against a given head with no losses in the pump is called:
A. Wheel power
B. Brake power
C. Hydraulic power
D. Indicated power

Answer: C

39. Past ME Board Question
Fluids that are pumped in processing work are frequently more viscous than water. Which of the following statement is correct?
A. Reynolds number varies directly as the viscosity
B. Efficiency of a pump increases as the viscosity increases
C. Increased fluid friction between the pump parts and the passing fluid increased useful work.
D. Working head increases as the viscosity

Answer: C

40. Past ME Board Question
A reciprocating pump is considered positive displacement pump because
A. Displacement of the liquid is affected by the displacement of the piston
B. Positive pressure is given to the liquid
C. Liquid is discharge with positive pressure
D. Liquid is lifted due to the vacuum created inside the cylinder

Answer: A

41. Past ME Board Question
To protect adequately the engine bearings, what type and better arrangement of lubricating oil filter is most practical?
A. Full-flow type filter installed between the lubricating oil pump and the bearings
B. Duplex filter installed before the lubricating pump
C. Bypass filter with cleanable and replaceable elements
D. Splash lubricating system in the crank case

Answer: A

42. Past ME Board Question
Medium pressure when applied to valves and fittings are suitable for a working pressure of:
A. 862 to 1200 kPa
B. 758 to 1000 kPa
C. 500 to 1000 kPa
D. 658 to 1050 kPa

Answer: A

43. Past ME Board Question
The function of an unloader on an electric motor-driven compressor is to:
A. Reduce the speed of the motor when the maximum pressure is reached
B. Drain the condensate from the cylinder
C. Release the pressure in the cylinder in order to reduce the starting load
D. Prevent excess pressure in the receiver

Answer: C

44. Past ME Board Question
An unloader is used on air compressor to:
A. Relieve air pressure
B. Start easier
C. Stop easier
D. Run faster

Answer: A

45. Past ME Board Question
The performance of a reciprocating compressor is expressed as:
A. Adiabatic work divided by adiabatic input
B. Adiabatic work divided by indicated work
C. Isothermal work divided by indicated work
D. Isothermal work divided by adiabatic work

Answer: B

46. Past ME Board Question
For reciprocating compressor slip at positive or negative displacement:
A. $C_d = 1$
B. $C_d > 1$
C. $C_d < 1$
D. $C_d = 0$

Answer: C

47. Past ME Board Question
In order that cavitation will not take place in the suction line of a pump, what should be the sum of the velocity head and pressure head at suction compared to the vapor pressure of the liquid?
A. sufficiently lower
B. constant
C. adequately greater
D. equal

Answer: C

48. Past ME Board Question
Which of the following components of a pump converts mechanical energy to pressure energy?
A. Impeller
B. Valve
C. Shaft
D. Delivery pipe

Answer: A

49. Past ME Board Question
Mr. De La Cruz wanted to buy a pump for his farm. What is suitable for deepwell?
A. Reciprocating
B. Airlift
C. Hand lift
D. Centrifugal

Answer: D

50. Past ME Board Question
A tank contains H2O. what is the intensity of pressure at a depth of 6 meters?
A. 68 kPa
B. 58.8 kPa
C. 78.0 kPa
D. 48.7 kPa

Answer: B

51. Past ME Board Question
In order to avoid cavitation the NPSH of an installation should be:
A. At least equal or greater than the NPSH of the pump
B. At least equal or less than the NPSH of the pump
C. Equal to the NPSH of the pump only
D. Greater than the NPSH of the pump only

Answer: A

52. Past ME Board Question
The actual head, neglecting the kinetic energy in which the pump work against.
A. Delivery head
B. Pressure head
C. Velocity head
D. Suction head

Answer: B

53. Past ME Board Question
Flow of water in a pipe have a velocity at 10 meters per second. Determine the velocity head of the water
A. 50.1 meters
B. 5.1 meters
C. 8.2 meters
D. 100 meters

Answer: B

54. Past ME Board Question
Find the velocity head for a velocity of 18 m/s
A. 33.0 m
B. 0.92 m
C. 1.8 m
D. 16.5 m

Answer: D

55. Past ME Board Question
The size of a steam reciprocating pumps is generally designated by a three-digit number size as 646. The first digit designates.
A. Stroke of the pump in inches
B. Inside diameter of the steam cylinder measured in inches
C. Percent clearance
D. Number of cylinders

Answer: B

56. Past ME Board Question
If $Q_a$is the actual discharge flow and Q_b is the theoretical discharge flow, what will the coefficient of discharge be equal to during positive displacement slip?
A. Q_a x Q_b
B. Q_b/Q_a
C. Q_a/Q_b

D. $1 - Q_a/Q_b$

Answer: C

57. Past ME Board Question
Two pumps are connected in series. If $Q_1$is the discharge of pump 1 and Q_2 is the discharge of pump 2 where $Q_1<Q_2$. What is the discharge?
A. Q_2
B. Q_1
C. Q_1+Q_2
D. Q_1/Q_2

Answer: A

58. A pump in which the pressure is developed principally by the action of centrifugal force
A. Centrifugal pump
B. End suction pump
C. In line pump
D. Horizontal pump

Answer: A

59. A single suction pump having its suction nozzle on the opposite side of the casing from the stuffing box and having the face of the suction nozzle perpendicular to the longitudinal axis of the shaft.
A. Centrifugal pump
B. End suction pump
C. In line pump
D. Horizontal pump

Answer: B

60. A pump with the shaft normally in a horizontal position
A. Centrifugal pump
B. End suction pump
C. In line pump
D. Horizontal pump

Answer: D

61. A centrifugal pump whose drive unit is supported by the pump having its suction and discharge flanges on approximately the same center.
A. Horizontal split case pump
B. End suction pump
C. In line pump
D. Vertical shaft turbine pump

Answer: C

62. A centrifugal pump characterized by a housing which is split parallel to the shaft
A. Horizontal split case pump
B. End suction pump
C. In line pump
D. Vertical shaft turbine pump

Answer: A

63. A centrifugal pump with one or more impellers discharging into one or more bowls and a vertical eductor or column pipe used to connect the bowls to the discharge head on which the pump driver is mounted.
A. Horizontal split case pump
B. End suction pump
C. In line pump
D. Vertical shaft turbine pump

Answer: D

64. A pump that takes suction from a public service main or private use water system for the purpose of increasing the effective water pressure.
A. Horizontal split case pump
B. Submersible pump
C. Booster pump
D. Vertical shaft turbine pump

Answer: C

65. A vertical turbine pump with the pump and motor closed coupled and design to be installed underground, as in the case of a deepwell pump.
A. Horizontal split case pump
B. Submersible pump
C. Booster pump
D. Vertical shaft turbine pump

Answer: A

66. An underground formation that contains sufficient saturated permeable material to yield significant quantities of water.
A. Aquifer
B. Wet pit
C. Ground water
D. Well water

Answer: A

67. A timber, concrete or masonry enclosure having a screened inlet kept partially filled with water by an open body of water such as pond, lake, or steams.
A. Aquifer
B. Wet pit
C. Ground water
D. Well water

Answer: B

68. Water which is available from a well, driven into water bearing subsurface strata (aquifer)
A. Aquifer
B. Wet pit
C. Ground water
D. Well water

Answer: C

69. The level with respect to the pump, of the body of water from which it takes suction when the pump is not in operation.
A. Static water level
B. Pumping water level
C. Suction head
D. Discharge head

Answer: A

70. The level with respect to the pump, of the body of water from which it takes suction when the pump is in operation.
A. Static water level
B. Pumping water level
C. Suction head
D. Drawdown

Answer: B

71. The vertical difference between the pumping water level and the static water level.
A. Static water level
B. Pumping water level
C. Suction head
D. Drawdown

Answer: D

72. Imparts velocity to the liquid, resulting from centrifugal force as the impeller is rotated.
    A. Impeller
    B. Casing
    C. Stuffing box
    D. Shaft sleeve

    Answer: A

73. Gives direction to the flow from the impeller and converts this velocity energy into pressure energy.
    A. Impeller
    B. Casing
    C. Stuffing box
    D. Shaft sleeve

    Answer: B

74. A means of throttling the leakage which would otherwise occur at the point of entry of the shaft into the casing.
    A. Impeller
    B. Casing
    C. Stuffing box
    D. Shaft sleeve

    Answer: B

75. Protects the shaft where it passes through the stuffing box.
    A. Impeller
    B. Casing
    C. Stuffing box
    D. Shaft sleeve

    Answer: D

76. Keeps internal recirculation down to a minimum.
    A. Wearing rings
    B. Bearings
    C. Frame
    D. Coupling

    Answer: A

77. Accurately locate shaft and carry radial and thrust loads.
    A. Wearing rings
    B. Bearings
    C. Frame
    D. Coupling

    Answer: B

78. Which of the following is used to mount unit rigidly and support bearings.
    A. Wearing rings
    B. Stuffing box
    C. Frame
    D. Coupling

    Answer: C

79. Connects the pump to the driver.
    A. Wearing rings
    B. Bearings
    C. Frame
    D. Coupling

    Answer: D

80. The most common means of throttling the leakage between the inside and outside of the casing.
    A. Packing
    B. Gland
    C. Seal gage
    D. Mechanical seal

    Answer: A

81. To position and adjust the packing pressure.
    A. Packing
    B. Gland
    C. Seal gage
    D. Mechanical seal

    Answer: B

82. Provides passage to distribute the sealing medium uniformly around the portion of the shaft that passes through the stuffing box. Also known as water seal of lantern ring.
    A. Packing
    B. Gland
    C. Seal gage
    D. Mechanical seal

    Answer: C

83. Provides a mechanical sealing arrangement that takes the place of the packing.
    A. Packing
    B. Gland
    C. Seal gage
    D. Mechanical seal

    Answer: D

84. A positive displacement pump consisting of a fixed casing containing gears, cams, screws, vanes, plungers or similar elements actuated by rotation of the drive shaft.
    A. Rotary pumps
    B. Reciprocating pumps
    C. Deep well pumps
    D. Centrifugal pumps

    Answer: A

85. A positive displacement unit wherein the pumping action is accomplished by the forward and backward movement of a piston or plunger inside a cylinder usually provided with valves.
    A. Rotary pumps
    B. Reciprocating pumps
    C. Deep well pumps
    D. Centrifugal pumps

    Answer: B

86. A type of rotary pump consists of an eccentrically bored cam rotated by a shaft concentric in a cylindrically bored casing, with an aburment or follower so arranged that with each rotation of the drive shaft a positive quantity of liquid is displaced from the space between the cam and the pump casing.
    A. Cam and piston pump
    B. Gear pump
    C. Screw pump
    D. Vane pump

    Answer: A

87. A type of rotary pump consists of two or more gears, operating in closely fitted casing so arranged that when the gear teeth unmesh on one side liquid fills the space between the gear teeth and is carried around in the tooth space to the opposite side and displaced as the teeth mesh again.
    A. Cam and piston pump
    B. Gear pump
    C. Screw pump
    D. Vane pump

Answer: B

88. A type of rotary pump consists of two or three screw rotors so arranged that as the rotors turn liquid fills the shape between the screw threads and is displaced axially as the rotor threads mesh.
    A. Cam and piston pump
    B. Gear pump
    C. Screw pump
    D. Vane pump

    Answer: C

89. A type of rotary pump consists of one rotor in a casing machined eccentrically to the drive shaft. The rotor is fitted with a series of vanes, blades or buckets which follow the bore of the casing thereby displacing the liquid with each revolution of the drive shaft.
    A. Cam and piston pump
    B. Gear pump
    C. Screw pump
    D. Vane pump

    Answer: D

90. A type reciprocating pump having a steam cylinder with no lap on valves, a water cylinder and a common piston rod.
    A. Direct acting steam pump
    B. Crank and flywheel reciprocating pump
    C. Power driven pump
    D. Piston pump

    Answer: A

91. A type of reciprocating pimp driven by compound, cross compound, or triple expansion steam engines.
    A. Direct acting steam pump
    B. Crank and flywheel reciprocating pump
    C. Power driven pump
    D. Piston pump

    Answer: B

92. A type of reciprocating pump that receives its forward and backward motion of the piston and plunger from the rotary motion of a revolving crankshaft by means of a crank and connecting rod.
    A. Direct acting steam pump
    B. Crank and flywheel reciprocating pump
    C. Power driven pump
    D. Piston pump

    Answer: C

93. A type of deep well pump which are refinement of the old hand pump that have played such an important role in country home and small town water supply from wells.
    A. Plunger pump
    B. Turbine pump
    C. Ejector centrifugal pump
    D. Air lift

    Answer: A

94. A type of deep well pump that represent the application of vertical centrifugal pump to deep well service and are built for heads up to 305 meters and for capacities up to 28,495 liters per minute.
    A. Plunger pump
    B. Turbine pump
    C. Ejector centrifugal pump
    D. Air lift

    Answer: B

95. A type of deep well pump that has come into wide use for small capacities combines a single stage centrifugal pump at the top of the well and an ejector or jet located down in the water.
    A. Plunger pump
    B. Turbine pump
    C. Ejector centrifugal pump
    D. Air lift

    Answer: C

96. A type of deep well pump wherein compressed air is admitted to the well to lift water to the surface, for successful operation of the system, the discharge pipe must have its lower end submerged in the well water.
    A. Plunger pump
    B. Turbine pump
    C. Ejector centrifugal pump
    D. Air lift

    Answer: D

CHAPTER 13 – HEAT TRANSFER

1. One of the reasons for insulating the pipes is:
    A. They may not break under pressure
    B. There is minimum corrosion
    C. Capacity to withstand pressure is increased
    D. Heat loss from the surface is minimized

    Answer: D

2. The rate of radiant energy, that is emitted by a surface at any temperature and in small wavelengths is found from the known rate of energy that under the same conditions will be emitted from a black surface, by multiplying with the absorptivity. The above enunciation is called:
    A. Lambert's law
    B. Kirchhoff's law
    C. Planck's law
    D. Stefan Boltzmann's law

    Answer: B

3. Which of the following is generally used to measure the temperature inside the furnace?
    A. Mercury thermometer
    B. Alcohol thermometer
    C. Ash thermometer
    D. Optical pyrometer

    Answer: D

4. All heat transfer processes:
    A. Involve transfer of energy
    B. Involve temperature difference between the bodies
    C. Obey first law of thermodynamics
    D. Obey second law of thermodynamics

    Answer: B

5. What is thermal diffusivity?
    A. A mathematical formula
    B. A physical property of the material
    C. A configuration for heat conduction
    D. A dimensionless parameter

    Answer: B

6. Which of the following is a unit of thermal diffusivity?
    A. m^2/hr
    B. kcal/m^2hr

C. kcal/m^2 hr ℃
D. m^2/hr ℃

Answer: A

7. Non-isotropic conductivity is shown by which of the following?
   A. Brass
   B. Copper
   C. Wood
   D. Steel

   Answer: C

8. For glass wool thermal conductivity changes from sample to sample due to changes in:
   A. Structure
   B. Density
   C. Composition
   D. All of the above

   Answer: D

9. Which of the following is the S.I. unit of thermal conductivity?
   A. W/m-hr- ℃
   B. W/m ℃
   C. KJ/m-hr- ℃
   D. W/m-hr- ℃

   Answer: B

10. What is the value of the Prandt'l number for air?
    A. 10
    B. 6.7
    C. 67
    D. 0.7

    Answer: D

11. According to Prevost theory of heat exchange,
    A. It is impossible to transfer heat from low temperature source to high temperature source
    B. Heat transfer by radiation needs no medium
    C. All bodies above absolute zero emit radiation
    D. Heat transfer in most of the cases occurs by combination of conduction, convection and radiation

    Answer: C

12. Thermal conductivity of wood depends on which of the following?
    A. Moisture
    B. Temperature
    C. Density
    D. All of the above

    Answer: D

13. A fur coat on an animal will help the animal to remain:
    A. Warm in winter
    B. Cool in winter
    C. Warm in summer
    D. Cool in summer

    Answer: A

14. The nature of flow of a fluid inside a tube, whether it is turbulent or laminar, can be ascertained by:
    A. Flow velocity
    B. Surface conditions
    C. Viscosity of fluid
    D. Reynolds number

    Answer: D

15. By which of the following modes of heat transfer is the Stefan-Boltzmann law applicable?
    A. Conduction
    B. Radiation
    C. Conduction and radiation combined
    D. Convection and radiation combined

    Answer: B

16. At all wave lengths and temperatures the monochromatic emissivity of a white body is equal to:
    A. Zero
    B. 0.5
    C. Unity
    D. 0.1 to 0.5

    Answer: A

17. The radiation from flames is having
    A. Continuous radiation from burning soot particles of microscopic and submicroscopic dimensions
    B. Radiation from suspended larger particles of coal, coke, or ash contributing to flame lumininossity
    C. Infared radiation from water vapor and carbon dioxide
    D. All of the above

    Answer: D

18. The statement that the emissivity and absorptivity of a surface is surrounded by its own temperature are the same for both monochromatic and total radiation is called:
    A. Lambert's law
    B. Kirchhoff's law
    C. D'Alambart's
    D. Law of emissivity

    Answer: B

19. A reservoir that supplies energy in the form of heat is called:
    A. Source
    B. Sink
    C. Cold reservoir
    D. Heat reservoir

    Answer: A

20. In regenerator type heat exchanger, heat transfer occurs by:
    A. Direct mixing of hot and cold fluids
    B. A complete separation between hot and cold fluids
    C. Flow of hot and cold fluids alternately over a surface
    D. Generation of heat again and again

    Answer: C

21. Least value of Prandt'l number can be expected in case of _____.
    A. Liquid metals
    B. Sugar solution
    C. Salt solution
    D. Water

    Answer: A

22. “The boiling point of a solution is a linear function of water at the same pressure.” The above statement is called _____.
    A. Dubring’s rule
    B. Petit and Dulong’s law
    C. Fick’s rule
    D. Reynolds law

    Answer: A

23. Floating heads are provided in heat exchangers to
    A. Increase the pressure drop
    B. Decrease the pressure drop
    C. Facilitate maintenance
    D. Avoid deformation of tubes because of thermal expansion

    Answer: D

24. What do you call the first stage of crystal formation?
    A. Nucleation
    B. Foaming
    C. Separation
    D. Vortexing

    Answer: A

25. In heat exchanger design, one transfer unit implies:
    A. One fluid which is exchanging with another fluid of the same chemical composition
    B. The section of heat exchanger which will cause temperature drop of one degree centigrade
    C. The section of heat exchanger where heat transfer surface area has been one square meter
    D. Condition when the change in temperature of one steam is numerically equal to the average driving force

    Answer: D

26. Dritus Boelter equation can be applied in case of fluids flowing in:
    A. Transition region
    B. Turbulent region
    C. Laminar region
    D. Any of the above

    Answer: B

27. In sugar mills can just is evaporation in:
    A. Zigzag tube evaporators
    B. Long vertical tube evaporators
    C. Short vertical tube evaporators
    D. Horizontal tube evaporators

    Answer: B

28. A 1-2 heat exchanger refers to which of the following?
    A. Single pass on shell side and double pass on tube side
    B. Single pass on tube side and double pass on shell side
    C. Single liquid cools two liquids at different temperature
    D. Two tubes of cold fluid pass through one tube of hot fluid

    Answer: A

29. A correction of LMTD is essential in case of:
    A. Parallel flow heat exchanger
    B. Counter current heat exchanger
    C. Cross flow heat exchanger
    D. None of the above

    Answer: C

30. Which of the following is used as entrainer in acetic acid – water separation?
    A. Methyl alcohol
    B. Phosphorous
    C. Butyl acetate
    D. Hexane

    Answer: C

31. A type of radiation consisting of singly charged particles that generate to intermediate distances.
    A. Nuclear radiation
    B. Alpha radiation
    C. Beta radiation
    D. Gamma radiation

    Answer: C

32. An electrically charged atom or radical which carries electricity through an electrolyte is called:
    A. Ion
    B. Isotope
    C. Molecule
    D. Hole

    Answer: A

33. The energy of a body that can be transmitted in the form of heat.
    A. Heat energy
    B. Thermal energy
    C. Entropy
    D. Internal energy

    Answer: B

34. In an isometric process, the heat transferred is equal to:
    A. Change in enthalpy
    B. Change in entropy
    C. Change in internal energy
    D. Work nonflow

    Answer: C

35. A substance that is able to absorb liquids or gases and is used for removing them from a given medium or region.
    A. Absorbent
    B. Cohesive
    C. Adsorbent
    D. Adhesive

    Answer: A

36. Radiant heat transfer is described by:
    A. Newton’s law
    B. Fourier’s law
    C. The logarithmic mean temperature
    D. Kirchhoff’s law

    Answer: D

37. A reservoir that absorbs energy in the form of heat is called _____.
    A. Source
    B. Sink
    C. Cold reservoir
    D. Heat reservoir

    Answer: B

38. When the entire heat exchanger is selected as control volume, heat becomes _____.
    A. Unity
    B. Zero
    C. Undefined
    D. Indeterminate

    Answer: B

39. Heat is conducted in the direction of:
    A. Increasing temperature
    B. Decreasing temperature
    C. Increasing and decreasing temperature
    D. Constant temperature

    Answer: B

40. The heat transfer term in the first law of thermodynamics may be due to any of the following except:
    A. Conduction
    B. Convection
    C. Radiation
    D. Internal heat generation (e.g., chemical reaction)

    Answer: D

41. All heat transfer processes require a medium of energy exchange except:
    A. Conduction
    B. Natural convection
    C. Forced convection
    D. Radiation

    Answer: D

42. Thermal conduction is described by:
    A. Newton's law
    B. The logarithmic mean temperature difference
    C. The Stefan-Boltzmann law
    D. Fourier's law

    Answer: D

43. Convection is described by which of the following laws?
    A. Newton's law
    B. The logarithmic mean temperature difference
    C. The Stefan-Boltzmann law
    D. Fourier's law

    Answer: A

44. Radiation heat transfer is described by
    A. Newton's law
    B. The logarithmic mean temperature difference
    C. Fourier's law
    D. Kirchoff's law

    Answer: D

45. The equivalent of ratio of emissive power to absorptivity for bodies in thermal equilibrium is described by:
    A. Newton's law
    B. The logarithmic mean temperature difference
    C. Fourier's law
    D. Kirchoff's law

    Answer: D

46. The temperature potential between temperature at the two ends of a heat exchanger are given by:
    A. The logarithmic mean temperature difference
    B. The Stefan-Boltzmann law
    C. Fourier's law
    D. Kirchoff's law

    Answer: A

47. The function of a heat exchanger is to:
    A. Increase the water temperature entering the boiler and decrease combustion requirements
    B. Transfer heat from one fluid to another
    C. Increase the total energy content of the flow
    D. Exchange heat to increase energy to the flow

    Answer: B

48. The function of a superheater is to:
    A. Increase the water temperature entering the boiler and decrease combustion requirements
    B. Transfer heat from one fluid to another
    C. Increase the total energy content of the flow
    D. Exchange heat to increase energy to the flow

    Answer: D

49. What is the series of processes that eventually bring the system back to its original condition?
    A. Reversible process
    B. Irreversible process
    C. Cycle
    D. Isentropic process

    Answer: C

50. Past ME Board Question
    A theoretical body which when heated to incandescence would emit a continuous light-ray spectrum.
    A. Black body radiation
    B. Black body
    C. Blue body
    D. White body

    Answer: B

51. Past ME Board Question
    Which of the following is the reason for insulating the pipes?
    A. They may not break under pressure
    B. There is minimum corrosion
    C. Capacity to withstand pressure
    D. Heat loss from the surface is minimized

    Answer: D

52. Past ME Board Question
    Heat transfer due to density differential
    A. Convection
    B. Nuclear
    C. Conduction
    D. Radiation

    Answer: A

53. Past ME Board Question
    The term "exposure" in radiological effects is used as a measure of a gamma ray or an X-ray field in the surface of an exposed object. Since this radiation produces ionization of the air surrounding the object, the exposure is obtained as
    A. Number of ions produced per mass of air x coulombs per kg
    B. Mass of air x surface area of an exposed object
    C. Mass of air over surface area of an exposed object
    D. Number of ions produced per mass of air + coulombs per kg

Answer: A

54. Past ME Board Question
The passing of heat energy from molecule to molecule through a substance
A. Conduction
B. Radiation
C. Conservation
D. Convection

Answer: A

55. Past ME Board Question
The radiant heat transfer depends on:
A. Temperature
B. Heat rays
C. Heat flow from cold to hot
D. Humidity

Answer: B

56. Past ME Board Question
What kind of heat exchanger where water is heated to a point that dissolved gases are liberated?
A. Evaporator
B. Condenser
C. Intercooler
D. Deaerator

Answer: D

57. Past ME Board Question
Heat transfer processes which include a change of phase of a fluid are considered _____.
A. Convection
B. Thermal radiation
C. Conduction
D. Radiation

Answer: A

58. Past ME Board Question
A hot block is cooled by blowing cool air over its top surface. The heat that is first transferred to the air layer close to the block is by conduction. It is eventually carried away from the surface by _____.
A. Convection
B. Radiation
C. Conduction
D. Thermal radiation

Answer: A

59. Past ME Board Question
A body that is hot compared to its surroundings illuminates more energy than it receives, while its surrounding absorbs more energy than they give. The heat is transferred from one to another by energy wave motion. What is this mode of heat transfer?
A. Radiation
B. Conduction
C. Convection
D. Condensation

Answer: A

60. What is the heat transfer due to density differential?
A. Convection
B. Conduction
C. Nuclear
D. Radiation

Answer: A

61. What do you call the passing of heat energy from molecule to molecule through a substance?
A. Conduction
B. Conservation
C. Radiation
D. Convection

Answer: A

62. The transmission of heat from one place to another by fluid circulation between the spots of different temperature is called _____.
A. Convection
B. Conservation
C. Radiation
D. Conduction

Answer: A

63. Which of the following requires the greatest amount of heat per kilogram for a given increase in temperature?
A. Ice
B. Water
C. Steam
D. Copper

Answer: B

64. What do you call the effectiveness of a body as a thermal radiator at a given temperature?
A. Absorptivity
B. Conductivity
C. Emissivity
D. Reflectivity

Answer: C

65. The natural direction of the heat flow between two reservoirs is dependent on which of the following?
A. Their temperature difference
B. Their internal energy
C. Their pressures
D. Their states, whether solid, liquid and gas

Answer: A

66. Why are metals good conductors of heat?
A. Because they contain free electrons
B. Because their atoms are relatively far apart
C. Because their atoms collide infrequently
D. Because they have reflecting surfaces

Answer: A

67. In natural convection a heated portion of a fluids moves because:
A. Its molecular motions become aligned
B. Of molecular collisions within it
C. Its density is less than that of the surrounding fluid
D. Of currents in surrounding fluid

Answer: C

68. In order to emit electromagnetic radiation, an object must be at a temperature:
A. Above 0 K
B. Above 0 ℃
C. Above that of its surrounding
D. High enough for it to glow

Answer: A

69. The rate at which an object radiates electromagnetic energy does not depend on its:
    A. Surface area
    B. Mass
    C. Temperature
    D. Ability to absorb radiation

    Answer: B

70. Sublimation refers to:
    A. The vaporization of solid without first becoming liquid
    B. The melting of a solid
    C. The vaporization of a liquid
    D. The condensation of a gas into liquid

    Answer: A

71. In the process of freeze drying, ice goes directly into water vapor. What is the temperature at which this process can take place?
    A. Below the triple point of water
    B. At the triple point of water
    C. Above the triple point of water
    D. Any of the above, depending on the pressure

    Answer: A

72. What usually happen when a vapor condenses into a liquid?
    A. It evolves heat
    B. It generates heat
    C. Its temperature increases
    D. It boils with temperature less than 100 ℃

    Answer: A

73. In a cooling tower, the water is cooled mainly by:
    A. Condensation
    B. Convection
    C. Evaporation
    D. Conduction

    Answer: C

74. How do you classify a body that has an emissivity factor of 0.7?
    A. Gray body
    B. Black body
    C. White body
    D. Theoretical body

    Answer: A

75. At what particular condition that no more heat can that be removed from a substance and the temperature can no longer be lowered?
    A. Freezing point
    B. Absolute zero
    C. Critical point
    D. Ground zero

    Answer: B

76. What refers to the heat transfer wherein the heat is transferred from one point to another by actual movement of substance?
    A. Conduction
    B. Radiation
    C. Convection
    D. Absorption

    Answer: C

77. The ratio of the radiation of actual body to the radiation of a blackbody is known as _____.
    A. Emittance
    B. Reflectance
    C. Absorptance
    D. Transmittance

    Answer: A

78. Which of the following is the usual geometric view factor for a black body?
    A. Zero
    B. Infinity
    C. One
    D. Indeterminate

    Answer: C

79. What happens to the heat transferred radially across insulated pipe per unit area?
    A. The heat will flow at constant rate
    B. Decreases with the increase in thermal conductivity
    C. Decrease from pipe wall to insulated surface
    D. Partially increases from pipe wall to insulated surface

    Answer: C

80. What do you call a change of phase directly from vapor to solid without passing through the liquid state?
    A. Sublimation
    B. Solidification
    C. Vaporization
    D. Deposition

    Answer: D

81. Which of the following is the Stefan-Boltzmann constant?
    A. 5.77 x 10^{-7} W/m^{2}K^4
    B. 7.67 x 10^{-9} W/m^{2}K^4
    C. 4.78 x 10^{-10} W/m^{2}K^4
    D. 5.67 x 10^{-8} W/m^{2}K^4

    Answer: D

82. What is the usual value of transmissivity for opaque materials?
    A. 0
    B. Indeterminate
    C. 1
    D. Infinity

    Answer: A

83. A body whose emissivity is less than 1 is known as a real body. What is the other term for real body?
    A. Gray body
    B. White body
    C. Black body
    D. Theoretical body

    Answer: A

84. What refers to an ideal body that absorbs all of the radiant energy that intrudes on it and also emits the maximum possible energy when acting as a source?
    A. White body
    B. Black body
    C. Gray body
    D. Red hot body

    Answer: B

85. The thermal resistance for one-dimensional steady conduction heat transfer through cylindrical wall in

the radial direction is expressed in which of the following functions?
A. Linear
B. Exponential
C. Logarithmic
D. Trigonometric

Answer: C

86. The law which states that “the ratio of the emissive powers to absorptivities are equal when the two bodies are in thermal equilibrium” is known as:
A. Stefan-Boltzmann law
B. Newton’s law of convection
C. Fourier’s law
D. Kirchhoff’s law of radiation

Answer: D

87. It refers to the ratio of the internal thermal resistance of a solid to the boundary layer thermal resistance (or external resistance of the body).
A. Biot number
B. Prandtl number
C. Nusselt number
D. Reynolds number

Answer: A

88. It refers to the ratio at the rate of heat transferred by conduction to the rate of energy stored.
A. Reynolds number
B. Fourier number
C. Biot number
D. Prandtl number

Answer: B

89. A hot block is cooled by blowing cool air over its top surface. The heat that is first transferred to the air layer close to the block is by conduction. It is eventually carried away from the surface by:
A. Conduction
B. Radiation
C. Thermal
D. Convection

Answer: D

90. It is the term used to describe the energy of a body that can be transmitted in the form of heat.
A. Enthalpy
B. Thermal energy
C. Entropy
D. Internal energy

Answer: B

91. Which of the following is the equivalent heat transferred of a gas undergoing isometric process?
A. Change in enthalpy
B. Change in entropy
C. Change in internal energy
D. Work nonflow

Answer: C

92. What do you call a substance that is able to absorb liquids or gases and is usually used for removing liquids (or gases) from a given medium or region?
A. Absorbent
B. Liquifier
C. Adsorbent
D. Adhesive

Answer: A

93. In which direction that heat is transferred through conduction?
A. Increasing temperature
B. Decreasing temperature
C. Increasing and decreasing temperature
D. Constant temperature

Answer: B

94. Which of the following statements is based on Prevost theory of heat exchange?
A. All bodies above absolute zero emit radiation
B. The substance moves because of the decrease in its density which is caused by increase in temperature
C. The substance moves because of the application of mechanical power such as that of a fan
D. Heat transfer in most of the cases occurs by combination of conduction, convection and radiation

Answer: A

95. Which of the following is the emissivity of white body?
A. Zero
B. 0.5
C. 1
D. $0 < e < 1$

Answer: A

96. The mechanism of heat transfer in which there is no medium (i.e. water, air, solid concrete) required for the heat energy to travel is:
A. Conduction
B. Radiation
C. Convection
D. Diffusion

Answer: B

97. The temperature potential between temperature at the two ends of a heat exchanger are given by:
A. The logarithmic mean temperature difference
B. The Stefan-Boltzmann law
C. Fourier’s law
D. Kirchoff’s law

Answer: A

98. Which of the following best describe function of heat exchanger?
A. Increase the water temperature entering the system
B. Transfer heat from one fluid to another
C. Evaluate the total energy of the flow
D. Exchange heat to increase energy to the flow

Answer: B

99. What refers to a form of energy associated with the kinetic random motion of large numbers of molecules?
A. Heat
B. Heat of fusion
C. Entropy
D. Internal energy

Answer: A

100. How much id the part of light that is absorbed by the body that transmits and reflects 80% and 10% respectively?

A. 10%
B. 30%
C. 20%
D. 5%

Answer: A

101. In convection heat transfer, what happens to the heat transfer coefficient if the viscosity of the fluid increases?
A. The heat transfer coefficient will increase
B. The heat transfer coefficient will decrease
C. The heat transfer coefficient remains constant
D. None of the above

Answer: B

102. How do you call a phenomenon wherein the heat is transferred by motion of fluid under the action of mechanical device?
A. Forced convection
B. Natural convection
C. Forced conduction
D. Thermal radiation

Answer: A

103. In conduction heat transfer, what happens to the heat transfer per unit time when the thermal conductivity decreases?
A. The heat flow will increase
B. The heat flow remains constant
C. The heat flow will decrease
D. The heat flow will partially increase and then will decrease

Answer: C

104. Which of the following is the driving force in heat transfer?
A. Temperature gradient
B. Thickness gradient
C. Viscosity gradient
D. Dielectric gradient

Answer: A

105. Which of the following is the measure of the relative effectiveness of momentum and energy transport by diffusion in the velocity and thermal boundary layer?
A. Nusselt's number
B. Prandtl number
C. Reynold's number
D. Dimensional measurement

Answer: B

106. Which of the following is the property of the solid that provides the measure of the rate of heat transfer to the energy storage?
A. Thermal efficiency
B. Thermal diffusivity
C. Thermal conductivity
D. Thermal radiography

Answer: B

107. Two metals were kept together at room temperature and it was found out that one is colder than the other. Which of the following is the best reason why one metal is colder than the other?
A. The heat transfer coefficient of one metal is of higher
B. One metal is of lower temperature as compared to the other
C. One metal is of higher temperature as compared to the other
D. The thermal conductivity of one metal is high as compared to the other

Answer: D

108. In convection heat transfer, what happens to the heat transfer coefficient if the viscosity of the fluid decreases?
A. The heat transfer coefficient also increases
B. The heat transfer coefficient will decrease
C. The heat transfer coefficient remains constant
D. The heat transfer coefficient partially increases then decreases

Answer: A

109. A body that is hot compared to its surroundings illuminates more energy than it receives, while its surrounding absorbs more energy than they give. The heat is transferred from one to another by energy of wave motion. What is this mode of heat transfer?
A. Radiation
B. Conduction
C. Convection
D. Condensation

Answer: A

110. What do you call theoretical body where absorptivity and emissivity are independent of the wavelength over the spectral region of the irradiation and the surface emission?
A. White body
B. Opaque body
C. Black body
D. Transparent body

Answer: D

111. Which of the following is the structure designed to prevent the spread of fire having a fire resistance rating of not less than four hours?
A. Fire escape
B. Fire exit
C. Fire shield
D. Fire wall

Answer: D

112. Which of the following heat exchange device used to provide heat transfer between the exhaust gases and air prior to the entrance of a combustor?
A. Regenerator
B. Economizer
C. Condenser
D. Reheater

Answer: A

113. Which of the following transfer of heat is involved in the changing of boiling water (at 100 ℃) to vapor at the same temperature?
A. Conduction
B. Convection
C. Radiation
D. Evaporation

Answer: B

114. Which of the following is the science of low temperatures?
    A. Cryogenics
    B. Thermo-kinetics
    C. Thermodynamics
    D. Ergonomics

    Answer: A

115. Which of the following thermal state of the body considered as reference to communicate heat to the other bodies?
    A. Temperature
    B. Pressure
    C. Internal energy
    D. Entropy

    Answer: A

116. The true mean temperature difference is also known as:
    A. The average mean temperature difference
    B. The logarithmic mean temperature difference
    C. The trigonometric mean temperature difference
    D. The exponential temperature difference

    Answer: B

117. Which of the following can be a geometric view factor of a gray body?
    A. Greater than one
    B. Less than one
    C. Equal to one
    D. Greater than zero but less than one

    Answer: D

118. The heat transfer by conduction occurs in which of the following?
    A. Only in liquids
    B. Only in solids
    C. Only in liquids and gases
    D. In solids, liquids and gases

    Answer: D

119. Which of the following reasons why one gram of steam at 100 ℃ causes more serious burn than one gram of water at 100 ℃?
    A. Steam is less dense than boiling water
    B. The steam has higher specific heat
    C. Steam contains more internal energy
    D. Steam is everywhere thus it strikes greater force

    Answer: C

120. What usually happens when vapor condenses into liquid?
    A. It absorbs heat
    B. It rejects heat
    C. Its temperature increases
    D. Its temperature decreases

    Answer: B

121. Which of the following has the highest thermal conductivity?
    A. Mercury
    B. Gasoline
    C. Water
    D. Alcohol

    Answer: A

122. Which of the following is the requirement of the temperature of a body for it to emit radiation?
    A. Above zero Celsius
    B. Above zero Kelvin
    C. Above of the temperature of the surroundings
    D. High enough for it to glow

    Answer: B

123. Which of the following is the color of iron when it is heated to a highest temperature?
    A. White
    B. Red
    C. Orange
    D. Yellow

    Answer: A

124. Which of the following is the reason why metals are good conductors of heat?
    A. Metals contain free electrons
    B. Metals have atoms the frequently collide another
    C. Metals have reflecting surfaces
    D. Atoms in metals are very far to each other

    Answer: A

125. The rate at which heat flows through a slab of some material does not depend on which of the following?
    A. The thickness of the slab
    B. The area of the slab
    C. The temperature difference between two faces
    D. The specific heat of the material

    Answer: D

126. Which of the following is the primary function of a thermal radiator?
    A. To transferring the heat by using moving fluids
    B. To transfer heat from hot to cold body by using a forced-draft fan
    C. To transfer heat by allowing molecules to vibrate one to another
    D. To transfer heat with or without a medium

    Answer: D

127. What is the reason why Styrofoam is a good insulating material?
    A. Because it contains many tiny pockets of air
    B. Styrofoam is a white object
    C. The structure of Styrofoam is very unstable and heat cannot flow
    D. Styrofoam structure is very dense

    Answer: A

128. What usually happens to the surrounding when water vapor condenses?
    A. It warms the surrounding
    B. The surrounding temperature decreases
    C. It neither warm nor cold the surrounding
    D. The surroundings will be dehumidified

    Answer: A

129. The rate of radiation does not depend on which of the following?
    A. Temperature of the radiating body
    B. The emissivity of the radiation surface
    C. The area of the radiating body
    D. The thickness of the radiating body

Answer: D

130. Which of the following is not a good conductor of heat?
    A. Metals
    B. Rocks
    C. Glass
    D. Asbestos

    Answer: D

131. Which of the following is not a unit of the rate of heat transfer?
    A. Watt
    B. Btu per hour
    C. Cal/s
    D. Btu/Hp-hr

    Answer: D

132. The thermal conductivity does not depend on which of the following?
    A. Chemical composition
    B. Physical state or texture
    C. Temperature and pressure
    D. Gravitational pull

    Answer: D

133. In Maxwell's theory for thermal conductivity of gases and vapors, which of the following is the value of "a" for triatomic gases?
    A. 1.7
    B. 2.4
    C. 1.3
    D. 2.4

    Answer: A

134. Which of the following conductivities where Sutherland equation is used?
    A. Thermal conductivities of solids
    B. Thermal conductivities of gases
    C. Thermal conductivities of metal
    D. Thermal conductivities of liquids

    Answer: B

135. For pure metals, what happens to the thermal conductivity if the temperature is extremely high?
    A. Approaches infinity
    B. Decreases except for ferrous metals
    C. Almost constant except for ferromagnetic materials
    D. Increases except for steel

    Answer: C

136. Which of the following liquids that has the highest thermal conductivity?
    A. Gasoline
    B. Glycerin
    C. Water
    D. Alcohol

    Answer: C

137. Which of the following is not a heat exchanger?
    A. Condenser
    B. Boilers
    C. Evaporators
    D. Water hammer

    Answer: D

138. Which of the following heat exchangers where fluid flow in the same direction and both are of changing temperatures?
    A. Parallel flow
    B. Cross flow
    C. Counter flow
    D. Mixed flow

    Answer: A

139. What happens to the thermal conductivity of diatomic gases if the temperature is increase?
    A. The thermal conductivity will also increase
    B. The thermal conductivity decreases
    C. The thermal conductivity remains constant
    D. The thermal conductivity partially increases then decreases

    Answer: A

140. What device is used to measure the amount of infrared radiation in each portion of a person's skin that is emitted?
    A. Thermograph
    B. Thermometer
    C. Pyrometer
    D. Potentiometer

    Answer: A

141. The heat transfer by convection occurs in which of the following?
    A. Only in gases
    B. Only in liquids
    C. Only in gases and liquids
    D. Only in gases and solids

    Answer: C

142. In convection heat transfer, what mechanism heat transfer where the fluid moves due to the decrease in its density caused by increase in temperature?
    A. Forced convection
    B. Natural convection
    C. Density convection
    D. Radial convection

    Answer: B

CHAPTER 14 – REFRIGERATION

1. Which of the following could be used to check a leak in an ammonia system?
    A. Litmus paper
    B. Halide torch
    C. Sulfur stick
    D. A and C

    Answer: D

2. Ammonia leaks in the condenser can be detected by:
    A. Smelling the discharge water
    B. Applying litmus paper to the circulating water discharge
    C. Adding oil of peppermint to the system and tracing the smell
    D. Applying a soapy solution to the condenser heads and looking for bubbles

    Answer: B

3. A sulfur stick burning in the presence of ammonia will give off a _____.
    A. Dense yellow smoke
    B. Dense red smoke
    C. Dense white smoke
    D. Dense green smoke

Answer: C

4. An ammonia leak will turn litmus paper _____.
   A. Blue
   B. Green
   C. Red
   D. Yellow

   Answer: A

5. In an ammonia system the oil gauge must be kept:
   A. Closed except when checking oil level
   B. Open at all times
   C. Close when machine is shut down
   D. Open when machine is shut down

   Answer: A

6. Valves and piping in an ammonia system are made of:
   A. Brass
   B. Bronze
   C. Iron
   D. Copper

   Answer: C

7. The relief valve on an ammonia machine is located:
   A. On the discharge pipe from the condenser
   B. On the discharge pipe from the compressor
   C. In the compressor head
   D. A and B

   Answer: C

8. When purging an ammonia condenser into a bucket of water, one can tell when the air is out and ammonia starts to come through by the:
   A. Smell of the ammonia being liberated from the water
   B. Color of the water turning green
   C. Color of the water turning bluish
   D. Change of bubbling sound of air to the crackling sound of ammonia

   Answer: D

9. The crossover connection in an ammonia system can be used to _____.
   A. Hot-gas defrost
   B. Pump air out of the system
   C. Add refrigerant to the system
   D. Reduce the pressure on the discharge side of the condenser

   Answer: A

10. How is an ammonia system purged so that operator will not be overcome by the fumes?
    A. Into a bucket of lube oil
    B. Back into the compressor
    C. Into a bucket of water
    D. Into the atmospheric line

    Answer: C

11. Thermal expansion valves are usually of the:
    A. Diaphragm
    B. Magnetic tape
    C. Bellows type
    D. A or C

    Answer: D

12. When checking zinc plates in a condenser, one should:
    A. Install all new plates
    B. Clean the plates and renew worn out ones
    C. Ground each plate to the shell
    D. Paint the plates with red lead

    Answer: B

13. The scale trap is located between the:
    A. Compressor and oil separator
    B. Expansion valve and evaporators coils
    C. King (liquid) valve and expansion valve
    D. Evaporator coils and compressor

    Answer: C

14. When the evaporator coils are located in the icebox, the system is known as:
    A. Indirect system
    B. Direct system
    C. High-pressure system
    D. Low-pressure system

    Answer: B

15. The purge valve is located:
    A. On the receiver discharge
    B. In the highest part of the system
    C. In the lowest part of the system
    D. On the evaporators coils

    Answer: B

16. The solenoid valve is:
    A. A pressure-controlled stop valve
    B. A temperature-controlled stop valve
    C. A Freon-controlled check valve
    D. None of the above

    Answer: B

17. The thermal expansion valve is located between the:
    A. Solenoid valve and the evaporator coils
    B. Charging valve and the solenoid valve
    C. Receiver and the king valve
    D. King valve and the solenoid valve

    Answer: A

18. The purpose of the scale trap is to:
    A. Dissolved scale and dirt in the system
    B. Remove insoluble gases from the refrigerant
    C. Remove dirt, scale and metal chips from the refrigerant
    D. Control the amount of scale going to the compressor

    Answer: C

19. The oil separator (trap) is located between the:
    A. Compressor discharge valve and condenser
    B. Receiver and the expansion valve
    C. Receiver and the king valve
    D. Condenser and the receiver

    Answer: A

20. The charging connection in a refrigerating system is located:
    A. Before the receiver
    B. Between the condenser and the receiver
    C. Between the receiver and the king valve
    D. Between the king valve and the solenoid valve

    Answer: D

21. The dehydrator is located between the
    A. Condenser and receiver
    B. Receiver and the expansion valve
    C. Condenser and the king valve
    D. Receiver and the king valve

    Answer: B

22. The charging valve is located between the:
    A. King valve and the expansion valve
    B. Evaporator coils and the compressor
    C. Compressor and the receiver
    D. Receiver and the condenser

    Answer: A

23. The solenoid valve is located between the _____.
    A. Thermal expansion valve and the evaporator
    B. Scale trap and the thermal expansion valve
    C. King valve and the scale trap
    D. Automatic and manual expansion valves

    Answer: B

24. A device used to keep moisture from passing through the system is called:
    A. Humidifier
    B. Dehydrator
    C. Aerator
    D. Trap

    Answer: B

25. The relief valve is located on the:
    A. Discharge side on the condenser
    B. Outlet of the evaporator coils
    C. Receiver tank
    D. Discharge side of the compressor

    Answer: D

26. The dehydrator is used:
    A. To remove moisture from the system
    B. When adding refrigerant to the system
    C. To remove air from the system
    D. A and B

    Answer: D

27. Which of the following is another name for the liquid valve?
    A. Freon valve
    B. King valve
    C. Shutoff valve
    D. Master valve

    Answer: B

28. If no gaskets are used in the piping joints of a Freon system, the joints must be:
    A. Welded joints
    B. Finished joints
    C. Ground joints
    D. Soldered joints

    Answer: C

29. A device for holding open the suction valve and drawing gas from the suction manifold and returning it to the suction line without compressing it is called _____.
    A. Relief valve
    B. Suction line by-pass
    C. Cylinder unloader
    D. Discharge line by-pass

    Answer: C

30. The solenoid valve can be typed as a _____.
    A. Bellows valve
    B. Bimetallic valve
    C. Thermal valve
    D. Magnetic stop valve

    Answer: D

31. The bulb for the thermal expansion valve is located
    A. Near the evaporator coil outlet
    B. In the middle of evaporator coils
    C. Near the evaporator coil inlet
    D. On the bottom row of evaporator coils

    Answer: A

32. The elements of a thermostat switch are usually of the _____
    A. Pilot-valve type
    B. Bimetal type
    C. Diaphragm type
    D. Valve type

    Answer: B

33. The expansion valve is located between the
    A. Compressor and condenser
    B. Evaporator and compressor
    C. Receiver and evaporator
    D. Condenser and receiver

    Answer: C

34. The oil separator is located between the:
    A. Condenser and dehydrator
    B. Compressor and condenser
    C. Evaporator and compressor
    D. Solenoid valve and thermal expansion valve

    Answer: B

35. Zinc rods are found in the:
    A. Salt-water side of condenser
    B. Compressor crankcase
    C. Evaporator coils
    D. Refrigerant side of condenser

    Answer: A

36. A double-trunk piston is used to
    A. Prevent oil from mixing with the refrigerant
    B. Absorb some of the side thrust
    C. Prevent gas from getting to crankcase
    D. All of the above

    Answer: D

37. Which of the following gasket materials should be used on a Freon system?
    A. Asbestos
    B. Metallic
    C. Rubber
    D. A and B

    Answer: D

38. Many pressure gauges on a Freon system have two dials or graduations on one gauge. The two dials represent
    A. Suction and discharge pressure
    B. Pressure and temperature
    C. Liquid and gas pressure

D. Cooling water inlet and outlet temperatures

Answer: B

39. A double-pipe condenser has _____.
    A. Two pipes for cooling water and one for refrigerant
    B. A small pipe inside a larger pipe, the cooling water passing through the small pipe and the refrigerant through the large pipe
    C. Two piping systems side by side, one with cooling water and one with refrigerant
    D. None of the above

    Answer: B

40. When there is a Freon leak, the halide torch will burn
    A. Orange
    B. Green
    C. Blue
    D. White

    Answer: B

41. Large leaks in a Freon system cannot always be detected with a halide torch because it changes color with the slightest amount of Freon present. A large leak can be detected easier by applying _____
    A. Sheets of litmus paper to all joints and watch for color change
    B. A soapsuds solution, mixed with a little glycerin to hold the solution together, and watch for bubbles
    C. A thin layer of mineral oil to all joints and watch for bubbles
    D. A lighted candle at the joints and watch for leaky spots blowing candle flame

    Answer: B

42. The relief valve on a CO_2 machine is located
    A. Next to the king valve
    B. In the compressor head
    C. On the discharge pipe between the compressor and the discharge valve
    D. On the discharge pipe from the condenser

    Answer: C

43. The discharge pressure of the compressor should be:
    A. The pressure which corresponds to a temperature from 5 °F to 15 °F below that of the condenser discharge
    B. The pressure which corresponds to a temperature equal to that of the condenser discharge
    C. The pressure which corresponds to a temperature from 5 °F to 15 °F higher than the condenser discharge
    D. None of the above

    Answer: C

44. The purpose of relief valves on refrigeration machines is to:
    A. By-pass the compressor when dehydrating
    B. Prevent overloading in the iceboxes
    C. Prevent excessive pressure in case of stoppage on the discharge side of the system
    D. A and B

    Answer: C

45. A leaky suction valve can usually be detected by
    A. A higher suction pressure
    B. A fluctuating suction pressure gauge
    C. Closing in on the suction valve having no effect on the suction pressure
    D. Any of the above

    Answer: D

46. Too low suction pressure could be caused by
    A. Too much oil in the system
    B. Shortage of refrigerant gas
    C. Dirty scale traps
    D. Any of the above

    Answer: D

47. What do you call a system in which the evaporator coils are located in a brine solution and the brine is pumped through the icebox?
    A. An indirect system
    B. A double-evaporator system
    C. A direct system
    D. A low-pressure system

    Answer: A

48. Before securing a compressor to do maintenance work on it, be sure to:
    A. Purge the system
    B. Have spare parts ready
    C. Pump down the system
    D. B and C

    Answer: D

49. Obstruction of the expansion valve is usually caused by
    A. Scale
    B. Congealed oil in the system
    C. Water in the system
    D. Any of the above

    Answer: D

50. Excess frost on the evaporator coils
    A. Does not affect the system
    B. Takes load off compressor
    C. Reduces efficiency of the plant
    D. Keeps the icebox cooler

    Answer: C

51. Air circulation in the icebox is accomplished by the use of which of the following?
    A. Hollow sidewalls
    B. Diffuser fans
    C. Louver doors
    D. Air vents to deck

    Answer: B

52. The cooling-water side of the condenser should be opened for inspection every
    A. Six months
    B. Two years
    C. Year
    D. Three months

    Answer: D

53. Some causes of a noisy compressor are
    A. Worn bearings, pins, etc.
    B. Slugging due to flooding back of refrigerant
    C. Too much oil in crankcase
    D. Any of the above

    Answer: D

54. If the thermal expansion valve becomes inoperative, the iceboxes will have to be controlled by the _____.
    A. King valve
    B. Manual expansion valve
    C. Manual solenoid valve
    D. Solenoid valve

    Answer: B

55. Sweating of the crankcase is caused by which of the following?
    A. Too much oil in the system
    B. Insufficient superheat
    C. Too much superheat
    D. Expansion valve hung up

    Answer: A

56. Which of the following is the usual cause of slugging?
    A. Too much refrigerant in the system
    B. Too much oil in the system
    C. Expansion valve not operating properly
    D. Too much cooling water to condenser

    Answer: C

57. What operates low-pressure cutout switch
    A. Bellows
    B. Spring tension
    C. A magnet
    D. Water pressure

    Answer: A

58. Which of the following must be checked up if an automatic Freon system will not start up?
    A. High-pressure cutout
    B. Reset mechanism
    C. Low-pressure cutout
    D. All of the above

    Answer: D

59. Which of the following is the probable cause of hot suction line?
    A. Insufficient lubrication
    B. Too much refrigerant
    C. Insufficient refrigerant
    D. Expansion valve closed too much

    Answer: C

60. What do you call the device that is used as a low-pressure control and high-pressure cutout on a compressor?
    A. Pressure controller
    B. Controller switch
    C. Cutout
    D. Cutout switch

    Answer: A

61. If the solenoid valve closed by accident, the compressor would be stopped by which of the following?
    A. Automatic trip
    B. Low-pressure cutout switch
    C. Low-water cutout switch
    D. High-pressure cutout switch

    Answer: B

62. The purpose of the low-pressure cutout switch is to:
    A. Cut out the compressor at a set pressure
    B. Maintain a preset suction pressure to the compressor
    C. Maintain liquid refrigerant at the suction of the compressor
    D. Cut compressor in and out at a preset pressure

    Answer: D

63. If the cooling water to the condenser suddenly fails?
    A. An alarm will ring to notify the engineer
    B. The compressor will shut down
    C. The expansion valve will close
    D. The solenoid valve will close

    Answer: B

64. The most likely cause of high superheat would be
    A. Too much refrigerant
    B. Expansion valve open too wide
    C. Expansion valve closed too much
    D. Back-pressure valve set too high

    Answer: C

65. What do you call the liquid reaching the compressor through the suction?
    A. Superheating
    B. Overflowing
    C. Flooding back
    D. Recycling

    Answer: C

66. The suction pressure switch is operated by which of the following?
    A. Electric current
    B. Pressure on a bellow
    C. A relay cutout
    D. Thermocouple

    Answer: B

67. If the compressor short-cycles on the high-pressure cutout, which of the following would you check?
    A. Check for too much refrigerant in the system
    B. If plenty of cooling water is running through but it is not picking up heat, the condenser tubes need cleaning
    C. Be sure system is getting cooling water
    D. All of the above

    Answer: D

68. A Freon unit will tend to short-cycle when operating under:
    A. Normal conditions
    B. Heavy loads
    C. Light loads
    D. All of the above

    Answer: C

69. Air is remove from the system by
    A. Opening the purge valve
    B. Increasing the amount of cooling water
    C. Running the refrigerant through an aerator
    D. Running the refrigerant through a deaerator

    Answer: A

70. Short-cycling means that the machine
    A. Runs to slow
    B. Stop and starts frequently
    C. Runs too fast

D. Grounds out frequently

Answer: B

71. The suction pressure in a Freon system should be
    A. The pressure which corresponds with a temperature about 20 ℉ above the temperature of the icebox
    B. The pressure which corresponds with a temperature about 20 ℉ below the temperature of the icebox
    C. The pressure which corresponds with a temperature equal to the temperature of the icebox
    D. None of the above

    Answer: B

72. If any of the electrically controlled devices in a Freon system malfunction, which of the following valve will also automatically shut off?
    A. King valve
    B. Condenser cooling-water inlet valve
    C. Expansion valve
    D. Solenoid valve

    Answer: D

73. A leaky discharge valve can usually be detected by
    A. A drop in icebox temperature
    B. A discharge pressure lower than normal
    C. A fluctuating high-pressure gauge
    D. Any of the above

    Answer: D

74. The dehydrating agent in a Freon system is usually
    A. Sodium chloride
    B. Calcium chloride
    C. Activated alumina
    D. Slaked lime

    Answer: C

75. If the compressor short-cycles on the low-pressure cutout, the trouble might be:
    A. Too much frost on the evaporator coils
    B. Dirty traps and strainers
    C. Lack of refrigerant
    D. Any of the above

    Answer: D

76. If an electrically operated compressor failed to start, the cause might be:
    A. A blown fuse
    B. Burned out holding coils in solenoid valve
    C. An open switch
    D. Any of the above

    Answer: D

77. The high-pressure side of the system is sometimes referred to as the
    A. Hot side
    B. Suction side
    C. Cold side
    D. Cooling side

    Answer: A

78. If the compressor were to run continuously without lowering the temperature, the trouble would probably be:
    A. Leaky discharge valves
    B. Insufficient refrigerant in the system
    C. Leaks in the system
    D. Any of the above

    Answer: D

79. Which of the following would cause a high head pressure?
    A. Suction valve not open enough
    B. Too much cooling water
    C. Insufficient cooling water
    D. Icebox door left open

    Answer: C

80. If frost forms on the cylinders, the cause would be
    A. Charging valve left open
    B. Expansion valve not open wide enough
    C. Expansion valve open too wide
    D. Dehydrator not working properly

    Answer: C

81. Which of the following would cause low head pressure?
    A. Insufficient cooling water
    B. Too much cooling water
    C. Insufficient refrigerant gas
    D. B and C

    Answer: D

82. Too high suction pressure could be cause by
    A. Leaky suction valves
    B. Expansion valve bulb not working properly
    C. Expansion valve open too wide
    D. Any of the above

    Answer: D

83. Which of the following would cause high head pressure?
    A. Air in the condenser
    B. Insufficient cooling water
    C. Dirty condenser
    D. Any of the above

    Answer: D

84. An excessively high head pressure could be caused by
    A. Insufficient cooling water to the condenser
    B. Insufficient cooling water to the evaporator coils
    C. Solenoid valve shutoff
    D. Too much cooling water to the condenser

    Answer: A

85. Which of the following would cause a high suction pressure?
    A. Expansion valve open too wide
    B. Dirty dehydrator
    C. King valve not open wide enough
    D. Expansion valve not open wide enough

    Answer: A

86. If a compressor runs continuously, the cause might be a
    A. Clogged scale trap
    B. Defective thermal bulb
    C. Stuck high-pressure switch
    D. Stuck low-pressure switch

    Answer: D

87. Low suction pressure is caused by
    A. Expansion valve causing flooding back
    B. Solenoid valve not functioning properly
    C. Leaky compressor suction valves
    D. Air in the system

    Answer: B

88. How is a Freon system purged?
    A. With a reefer pump
    B. The same as an ammonia system
    C. Back to the extra supply tank
    D. The same as a CO_2 system

    Answer: D

89. If the compressor discharge temperature is higher than the receiver temperature:
    A. Add more refrigerant to the system
    B. Decrease the amount of cooling water to the condenser
    C. Increase the amount of cooling water to the condenser
    D. Remove some of the refrigerant from the system

    Answer: B

90. How is a CO_2 system purged?
    A. When CO_2 comes out of the purge valve, frost will form on a piece of metal held near the outlet
    B. Through the king valve
    C. Pumped out with a suction pump
    D. The CO_2 will come out of the purge valve in liquid form

    Answer: A

91. If the head pressure is too high:
    A. The relief valve should open and let excess refrigerant pass to receiver
    B. Close in on the suction valve
    C. The relief should open before the high-pressure cutout
    D. The high-pressure cutout switch should operate before the relief valve opens

    Answer: D

92. The system should be purged
    A. While starting up
    B. After the system has been shut down for a few hours
    C. While system is operating
    D. Once a week

    Answer: B

93. If the compressor had been running satisfactorily for a long period of time but suddenly the compartment temperature started to rise, the trouble might be
    A. A refrigerant leak has developed
    B. The expansion valve may contain frozen water
    C. The solenoid valve has jammed shut
    D. Any of the above

    Answer: D

94. If the compressor had been running satisfactorily for a long period of time but the oil level was rising slowly, one should:
    A. Check the dehydrator cartridge
    B. Check to see if there is too much refrigerant in the system
    C. Shut down the compressor and check the oil level with the machine stopped
    D. Drain out sufficient oil to bring it down to the proper running level

    Answer: C

95. The purpose of the oil trap is :
    A. To add oil to the compressor
    B. To remove oil from the refrigerating gas
    C. To remove oil from the charging tank
    D. None of the above

    Answer: B

96. Too much oil in the compressor would :
    A. Absorb to much refrigerant from the system
    B. Deposit oil on the condenser tubes
    C. Damage the expansion valve
    D. Cause leakage through the shaft seals

    Answer: A

97. The oil level in the compressor should be check
    A. Just before starting the compressor
    B. After a long period of operation
    C. After an extend lay-up period
    D. While the compressor is in operation

    Answer: B

98. The agent used in an indirect reefer system is
    A. Calcium chloride
    B. Potassium chloride
    C. Sodium chloride
    D. A or C

    Answer: D

99. Air can be prevented from getting into the system by
    A. Running the refrigerant through an aerator
    B. Keeping the dehydrator clean at all times
    C. Keeping all glands and stuffing boxes on the high-pressure side tight
    D. Keeping all glands and stuffing boxes on the low-pressure side tight

    Answer: D

100. Which of the following would not cause high suction pressure?
    A. Suction valve not adjusted properly
    B. Expansion valve stuck open
    C. Leaky suction valves
    D. Insufficient refrigeration

    Answer: D

101. Water in the refrigerant is liable to
    A. Freeze on the expansion valve seat and cut the flow of refrigerant
    B. Clog the oil trap
    C. Freeze in the king (liquid) valve
    D. Emulsify the oil in the compressor

    Answer: A

102. The function of the expansion valve is to:
    A. Regulate the amount of liquid refrigerant to the expansion coils
    B. Change the gas refrigerant to a liquid
    C. Shut off the flow of refrigerant to the condenser
    D. Change the high-pressure liquid to a low-pressure liquid

Answer: A

103. When heavy electrical currents are involved, the thermostat will be operated by a:
    A. Pressure pipe
    B. Fusetron
    C. Relay
    D. Small circuit breaker

Answer: C

104. Before securing a compressor to do maintenance work on it, be sure to:
    A. Have gas mask handy
    B. Make arrangements to have perishables taken care of
    C. Notify the engineer
    D. A and B

Answer: D

105. When securing a Freon system for repairs
    A. Pump down to 1 or 2 pounds pressure
    B. Pump down to a slight vacuum
    C. Pump down to 10 to 15 pounds pressure
    D. Remove all refrigerant from the system

Answer: A

106. When charging Freon system, all the valves should be in their normal position except the:
    A. Solenoid valve
    B. Purge valve
    C. King (liquid) valve
    D. Expansion valve

Answer: C

107. The purpose of the receiver is to:
    A. Cool the refrigerant gas
    B. Separate the oil from the refrigerant
    C. Store the refrigerant
    D. Condense the refrigerant

Answer: C

108. The solenoid valve controls the
    A. Amount of refrigerant entering the evaporator coils
    B. Amount of refrigerant going to the expansion valve
    C. Amount of refrigerant going to the compressor
    D. Pressure of the refrigerant going to the evaporator coils

Answer: B

109. The purpose of the evaporator is to
    A. Absorb latent heat of vaporization
    B. Absorb latent heat fusion
    C. Transfer latent heat of vaporization
    D. Transfer latent heat of fusion

Answer: A

110. The purpose of the dehydrator is to
    A. Add more refrigerant to the system
    B. Remove oil from the refrigerant
    C. Remove moisture from the crankcase oil
    D. Remove moisture from the refrigerant

Answer: D

111. The principle of mechanical refrigeration is
    A. The conversion of a liquid to gas
    B. The absorption of temperature under heat, pressure, compression and expansion
    C. The compression of a liquid under temperature and expansion
    D. The absorption of heat under temperature, compression, pressure and expansion

Answer: D

112. A thermostat is a
    A. Temperature-operated switch
    B. Pressure-operated switch
    C. Superheat-operated switch
    D. Back-pressure-operated switch

Answer: A

113. The thermal expansion valve responds to the
    A. Amount of superheat in the vapor
    B. Amount of superheat in the liquid
    C. Temperature in the evaporator coils
    D. Pressure in the evaporator coils

Answer: A

114. The expansion valve on a Freon system controls the
    A. Superheat of the gas leaving the compressor
    B. Back pressure in the evaporator
    C. Temperature of the icebox
    D. Superheat of the gas leaving the evaporator

Answer: D

115. The purpose of the expansion valve by-pass is to:
    A. Increase the efficiency of the plant
    B. Increase the capacity of the evaporator
    C. Control the refrigerant to the evaporator in case the automatic valves fail
    D. Bypass the compressor

Answer: C

116. The thermal expansion valve
    A. Controls the amount of gas coming from the dehydrator
    B. Controls the quantity of liquid refrigerant going to the evaporator coils
    C. Controls the amount of gas going to the receiver
    D. Removes trapped oil from the refrigerant

Answer: B

117. The function of the compressor is to
    A. Pull the refrigerant gas through the system
    B. Increase the pressure of the refrigerant
    C. Discharge the refrigerant to the condenser
    D. All of the above

Answer: D

118. The solenoid valve is controlled by
    A. The amount of liquid in the system
    B. The amount of gas in the system
    C. The temperature in the condenser
    D. The temperature in the icebox

Answer: D

119. Oil is added to a Freon compressor by
    A. Shutting down the machine and pouring in through the crankcase inspection plate opening
    B. Pumping in with an electric-driven pump
    C. Pumping in with a hand pump

D. Pouring through oil hole in base

Answer: C

120. When adding oil to a Freon system, one must be sure that
    A. The condenser is shut down
    B. All air is removed from the pump and fitting
    C. There is not too high a suction pressure
    D. The discharge pressure is not too high

    Answer: B

121. To help a person who had been overexposed to ammonia gas, one would:
    A. Apply cold compresses
    B. Apply artificial respiration
    C. Douse with cold water
    D. Wrap in warm blankets

    Answer: B

122. Ammonia will corrode
    A. Brass
    B. Copper
    C. Bronze
    D. All of the above

    Answer: D

123. A refrigerating unit of one (1) ton capacity can remove:
    A. 100 Btu's per min.
    B. 288 Btu's per min.
    C. 200 Btu's per min.
    D. 500 Btu's per min.

    Answer: C

124. The refrigerant with the lowest boiling point is
    A. NH_3
    B. F_{12}
    C. CO_2
    D. F_{22}

    Answer: C

125. A ton of refrigeration is equal to the removal of
    A. 288,000 Btu per 24 hrs.
    B. 28,800 Btu per 24 hrs.
    C. 28,000 Btu per 24 hrs.
    D. 280,000 Btu per 24 hrs.

    Answer: A

126. The boiling point of Freon-12 at atmospheric pressure is:
    A. + 22 ℉
    B. - 22 ℉
    C. + 22 ℃
    D. - 22 ℃

    Answer: B

127. The boiling point of CO_2 at atmospheric pressure is
    A. – 110 ℉
    B. + 110 ℉
    C. + 110 ℃
    D. – 110 ℃

    Answer: A

128. The boiling point of NH_3 at atmospheric pressure is
    A. + 28 ℃
    B. + 28 ℉
    C. - 28 ℃
    D. - 28 ℉

    Answer: D

129. Which of the following would you apply if a person got Freon in his eyes?
    A. Clean water
    B. Soapy water
    C. Sodium bicarbonate
    D. Sterile mineral oil

    Answer: D

130. A double-seated valve allows the valve to be
    A. Packed only in the closed position
    B. Packed in the wide open or closed position
    C. Operated as a suction or discharge valve
    D. Removed for replacement without shutting down

    Answer: B

131. The amount of CO_2 or Freon in a cylinder is measured by
    A. Pressure
    B. Weight
    C. Volume
    D. Psi

    Answer: B

132. The latent heat of fusion of ice is:
    A. 500 Btu
    B. 188 Btu
    C. 144 Btu
    D. 970 Btu

    Answer: C

133. Latent heat
    A. Can be measured with a pyrometer
    B. Cannot be measured with a thermometer
    C. Changes as the refrigerant cools
    D. Can be measured with a thermometer

    Answer: B

134. Absolute zero is:
    A. 144 ° below zero on the Fahrenheit scale
    B. The same as zero on the Fahrenheit scale
    C. 970 ° below zero on the Fahrenheit scale
    D. 460 ° below zero on the Fahrenheit scale

    Answer: D

135. A ton of refrigeration is equal to the cooling effect of
    A. 2,000 lbs. of ice melting in 24 hrs.
    B. 2,000 lbs. of water being converted to ice
    C. 2,000 lbs. of ice melting in 12 hrs.
    D. 2,240 lbs. of ice melting in 24 hrs.

    Answer: A

136. Which of the following best described a Freon?
    A. Odorless
    B. Non-poisonous
    C. Colorless
    D. All of the above

    Answer: D

137. What is another name of discharge pressure?
    A. Absolute pressure
    B. Head pressure

C. Suction pressure
D. Condenser pressure

Answer: B

138. Which of the following is the oil used in a refrigeration system?
A. Vegetable oil
B. Straight mineral oil
C. Lube oil SAE 20
D. Lube oil SAE 10

Answer: B

139. One disadvantage of a CO_2 system is the fact that
A. It is difficult to condense the refrigerant if the circulating water temperature is too high.
B. It takes more refrigerant to keep the iceboxes cold
C. Due to high pressure it is difficult to keep oil from mixing with the refrigerant
D. It is difficult to condense the refrigerant if the circulating water temperature is too low

Answer: A

140. The disadvantage of CO_2 system over an ammonia system is the fact that _____
A. The pipes and fittings of a CO_2 system must be of high pressure type
B. The CO_2 system operates at a much higher pressure
C. The CO_2 system requires a larger prime mover
D. All of the above

Answer: D

141. A good refrigerant should be:
A. Non-inflammable
B. Non-poisonous
C. Non-explosive
D. All of the above

Answer: D

142. What tonnage of refrigerating machine is required if the refrigerating system extracted 48,000Btu per hour?
A. 2 tons
B. 5 tons
C. 4 tons
D. 3 tons

Answer: C

143. What is the combination of a wet and dry bulb thermometer is called a
A. Hygrometer
B. Psychrometer
C. Hydrometer
D. A or B

Answer: D

144. A pressure controller is usually operated by the movement of a
A. Bellows
B. Siphon
C. Diaphragm
D. A or C

Answer: D

145. The critical temperature of a refrigerant is:
A. The temperature at which it will freeze
B. The temperature above which it cannot be liquefied
C. The temperature below which it cannot be liquefied
D. None of the above

Answer: B

146. If the critical temperature of a refrigerant is too close to the desired condensing temperature, the equipment must necessarily be of:
A. Extra heavy construction
B. The direct expansion type
C. Light construction
D. The indirect expansion type

Answer: A

147. A good refrigerant should have a
A. High sensible heat
B. Low sensible heat
C. High latent heat
D. Latent heat

Answer: C

148. Which of the following is the most common method of heat flow in refrigeration?
A. Conduction
B. Expulsion
C. Radiation
D. Convection

Answer: D

149. From which of the following processes where the largest quantities of heat are available?
A. Vaporization
B. Melting
C. Fusion
D. Cooling

Answer: A

150. What is the most common Freon gas used in centrifugal compressors?
A. F – 12
B. F – 11
C. F – 22
D. F – 21

Answer: B

151. What is the most common Freon gas used in reciprocating compressors?
A. F – 12
B. F – 11
C. F – 22
D. F – 21

Answer: A

152. What is the other name of hygrometer?
A. Hydrometer
B. Manometer
C. Psychometer
D. A or C

Answer: C

153. The temperature in the meat and fish box should be approximately
A. 10˚to 20 ℉
B. - 10˚to 0 ℉
C. 0˚to -10 ℉
D. - 10˚to 10 ℉

Answer: A

154. The temperature in the vegetable box should be approximately:
    A. 35˚to 45 ˚F
    B. 10˚to 20 ˚F
    C. 40˚to 50 ˚F
    D. 15˚to 30 ˚F

Answer: A

155. The temperature in the dairy box should be approximately
    A. 20˚to 30 ˚F
    B. 0˚to 10 ˚F
    C. 10˚to 20 ˚F
    D. 30˚to 40 ˚F

Answer: D

156. Which of the following can be the cause of low head pressure?
    A. Too much or too cold condensing water
    B. Leaky discharge valves
    C. Insufficient charge of refrigerant
    D. Any of the above

Answer: D

157. If thermostatic expansion valve did not appear to be functioning properly, the cause could be:
    A. Foreign matter in the valve
    B. Ruptured control bulb tubing
    C. Moisture in the system
    D. Any of the above

Answer: D

158. Which of the following is used in measuring the density of a brine solution?
    A. Litmus paper
    B. A chemical test
    C. A hydrometer
    D. A or B

Answer: C

159. Which of the following would not be cause for a refrigerating system to short cycle on HP cutout?
    A. Discharge valve leaking
    B. Pressure cutout set incorrectly
    C. System overcharge with refrigerant
    D. Insufficient cooling water

Answer: A

160. Excessive head pressure is caused by:
    A. Air or noncondensable gas in the system
    B. Dirty condenser tubes
    C. Insufficient cooling water to condenser
    D. Any of the above

Answer: D

161. The capacity of a centrifugal type compressor controlled by which of the following?
    A. Regulating the discharge pressure
    B. Regulating the speed
    C. Regulating the suction pressure
    D. B or C

Answer: D

162. Where is solenoid coil installed?
    A. Vertically above the valve
    B. Horizontally above the valve
    C. Vertically below the valve
    D. Horizontally below the valve

Answer: A

163. What is the condition of the compressor when purging a refrigeration system?
    A. The compressor is running
    B. Compressor is running but the condenser is secured
    C. Shut down
    D. Running with the bypass open

Answer: C

164. What must be done first when opening a single packed stop valve?
    A. Loosen the packing before opening
    B. Tighten packing before opening
    C. Check to see that the seal is not scored
    D. None of the above

Answer: A

165. Excessive head pressure is caused by:
    A. Flooded condenser tubes
    B. Too much cooling water to condenser
    C. Cooling water temperature too high
    D. A or C

Answer: D

166. Everything is in its normal operating position when charging a system except the _____.
    A. Compressor discharge valve
    B. Purge valve
    C. Solenoid valve
    D. King (receiver discharge) valve

Answer: D

167. How often the condenser must be cleaned?
    A. Once a year
    B. Every month
    C. When pressure goes above normal
    D. Every 6 months

Answer: D

168. Which do you think is the cause of a hot suction line of a refrigerating compressor?
    A. Lack of refrigerant
    B. Insufficient condensing cooling water
    C. Excess refrigeration
    D. B or C

Answer: A

169. Which of the following vital components of the refrigeration system where both temperature and pressure are increased?
    A. Compressor
    B. Condenser
    C. Evaporator
    D. A and C

Answer: A

170. The refrigerant temperature is at its maximum just before it enters the _____.
    A. Expansion valve
    B. Compressor
    C. Condenser
    D. Evaporator

Answer: C

171. The greatest decrease in refrigerant temperature occurs in the _____.
    A. Evaporator
    B. Compressor
    C. Condenser
    D. A or C

    Answer: A

172. What do you call the storage tank for liquid refrigerant?
    A. Receiver tank
    B. Charging tank
    C. Purging
    D. Any of the above

    Answer: A

173. A precooler is sometimes installed between the _____.
    A. Compressor and condenser
    B. Condenser and expansion valve
    C. Expansion valve and evaporator
    D. Evaporator and compressor

    Answer: B

174. The solenoid valve controls which of the following?
    A. Pressure in the evaporator coils
    B. Amount of refrigerant entering the evaporator
    C. Flow of refrigerant to the expansion valve
    D. Amount of circulating water to the condenser

    Answer: C

175. Closing the solenoid valve will stop the compressor through the _____.
    A. Low water-pressure cutout switch
    B. Bypass relief valve
    C. Low-pressure cutout switch
    D. High-pressure cutout switch

    Answer: C

176. What are the four basic methods of determining whether the proper amount of refrigerant is being added to the system?
    A. Bull's-eye, weight, pressure and frost line
    B. Temperature, weight, pressure and frost line
    C. Bull's-eye, weight, pressure and dip stick
    D. Bull's-eye, weight, litmus test and frost line

    Answer: A

177. What is the cause of liquid "slugging"?
    A. Liquid in the compressor clearance space
    B. Excessive liquid refrigerant in the receiver
    C. The presence of liquid in the condenser causing excessive noise
    D. The pounding of liquid refrigerant in the suction line at a point of restriction

    Answer: A

178. All refrigerator compressor valves are opened and close by _____.
    A. A cam shaft
    B. Springs
    C. Manual
    D. B or C

    Answer: B

179. Which of the following is also known as the "hidden heat" in refrigeration work?
    A. Sensible heat
    B. Heat intensity
    C. Latent heat
    D. A or C

    Answer: C

180. A bull's eye in a full liquid line will appear _____.
    A. Cloudy
    B. Clear
    C. Latent
    D. A or C

    Answer: B

181. A compressor capacity reduction device reduces compressor capacity _____.
    A. By reducing the compressor speed
    B. By bypassing hot gas
    C. As the refrigerant load dictates
    D. By reducing compressor horsepower proportionately

    Answer: C

182. If a Freon -12 compressor trip out on "cut-out", the solenoid valve closes by which of the following?
    A. An electrical release
    B. Temperature and spring control
    C. Pressure and bellows control
    D. Bellows control

    Answer: A

183. The thickness of the head gasket is important because it may cause _____.
    A. Re-expansion
    B. Decreased efficiency due to increased clearance
    C. The piston to strike the head
    D. All of the above

    Answer: D

184. If the expansion valve capillary tube is pinched, which of the following must be replaced?
    A. Tube
    B. Diaphragm
    C. Bulb
    D. All of the above (called the power element unit)

    Answer: D

185. When removing reusable refrigerant from a system, the line to the storage drum must
    A. Be made of copper
    B. Have no bends in it
    C. Contain a strainer-dryer
    D. Be above the level of compressor

    Answer: C

186. Which of the following must be considered when adding or removing oil from a refrigerator unit?
    A. Use new oil
    B. Do not overcharge
    C. Watch crankcase pressure
    D. All of the above

    Answer: D

187. Where is the excess refrigerant removed?
    A. Suction side of the system
    B. Discharge side of the system
    C. Bypass
    D. Charging side of the system

Answer: D

188. A double trunk piston is used to _____.
    A. Absorb side thrust
    B. Seal off gas from crankcase
    C. Prevent oil from missing with gas
    D. All of the above

    Answer: D

189. How do you call the process of changing a solid to a liquid?
    A. Evaporation
    B. Vaporization
    C. Fusion
    D. Condensation

    Answer: C

190. If there is too much lube oil in the system, what must be done?
    A. Remove same at once
    B. Wait until next overhaul to remove
    C. Wait until next recharging to remove
    D. Any of the above

    Answer: A

191. The temperature bulb of the thermo-expansion valve is attached to which of the following?
    A. Icebox coil
    B. Evaporator coil outlet
    C. Evaporator coil inlet
    D. Wall of the icebox

    Answer: B

192. What is the use of the suction pressure regulating valve?
    A. Cuts in the compressor
    B. Maintains the back pressure in the evaporator coils
    C. Cuts out the compressor
    D. Controls the expansion valve

    Answer: B

193. How is a one-ton plant described?
    A. Remove one ton of heat from the reefer box
    B. Melt one ton of ice in 24 hours
    C. Make one ton of ice in 24 hours
    D. Remove the heat required to melt one ton of ice in 24 hours

    Answer: D

194. The temperature bulb of a solenoid valve is attached to the _____.
    A. Icebox coil
    B. Wall of the icebox
    C. Evaporator coil inlet
    D. Evaporator coil outlet

    Answer: B

195. What usually happens if the specific gravity of the brine is too low?
    A. The brine will freeze
    B. Solids will deposit
    C. It will be more heat-absorbing
    D. All of the above

    Answer: A

196. The cooling water regulator is automatically actuated by which of the following?
    A. The discharge pressure of the refrigerant
    B. The temperature of the refrigerant
    C. An electric relay
    D. A thermo relay

    Answer: A

197. What will happen to the capacity if the superheat is increased on the suction side?
    A. Increases
    B. Decreases
    C. Remains the same
    D. Will double

    Answer: B

198. Which do you think is very important in adjusting compressor “V” belts?
    A. Allow about ½” slack
    B. Make it as tight as possible
    C. Make belt just tight enough to turn pulley
    D. Keep belts parallel

    Answer: A

199. Which of the following is important for evaporator coils?
    A. It must be placed in the top of the compartment
    B. It must be secured to the sides
    C. It should have air completely surrounding them
    D. It must be placed in front of circulating fans

    Answer: C

200. If there were a 15℉ to 20℉ temperature differential between the temperature corresponding to the pressure at the compressor discharge and the temperature at the condenser outlet, it would probably indicate the need for _____.
    A. More refrigerant
    B. Purging the system
    C. More circulating water
    D. Less circulating water

    Answer: B

201. Which of the following is the most appropriate definition of Latent heat?
    A. Heat removed to melt ice
    B. Heat removed to change temperature of a substance
    C. Heat added to change temperature of a substance
    D. Heat added to change the state of substance

    Answer: D

202. If the compressor discharge becomes frosted, the probable cause would be _____.
    A. Refrigerant flooding back
    B. Expansion valve improperly set
    C. Too much cooling water
    D. Insufficient cooling water

    Answer: A

203. The low-pressure control switch:
    A. Is a safety device
    B. Actuates the cooling water
    C. Cuts out the compressor to maintain proper flow
    D. Regulates the King valve

Answer: C

204. Which of the following is an indications of faulty Freon compressor valves?
    A. Compressor runs continuously
    B. Low head pressure – high suction pressure
    C. Gradual or sudden decrease in capacity
    D. Any of the above

    Answer: D

205. What is the probable cause if a compressor runs continuously?
    A. A clogged condenser
    B. Insufficient refrigerant
    C. Faulty cooling water valve
    D. Any of the above

    Answer: D

206. To test a thermostatic valve, immerse the bulb in:
    A. Crushed ice
    B. Hot water
    C. Oil
    D. None of the above

    Answer: A

207. If a compartment requires the removal of 36,000 Btu per hour, how much is the necessary compressor capacity?
    A. 6 tons
    B. 3 tons
    C. 2 tons
    D. 1 ton

    Answer: B

208. Which of the following must be done to eliminate frost on the discharge pipe of the compressor?
    A. Open the expansion valve
    B. Regulate water to the condenser
    C. Crack bypass valve
    D. None of the above

    Answer: D

209. The following are standard characteristics of Freon -11 except:
    A. Non-toxic
    B. Separates from water
    C. Boiling point over 200 ℉
    D. Very volatile

    Answer: C

210. Which of the following type valves are not found on a Freon -12 system?
    A. Bellows
    B. Duplex
    C. Diaphragm
    D. Single packed

    Answer: B

211. How much will be removed by one-ton refrigeration unit?
    A. 200 Btu per min.
    B. 144 Btu per min.
    C. 400 Btu per min.
    D. 2000 Btu per min.

    Answer: A

212. Which of the following is the primary purpose of the evaporator?
    A. Transmit latent heat of fusion
    B. Transmit latent heat of evaporation
    C. Absorb latent heat of fusion
    D. Absorb latent heat of evaporation

    Answer: D

213. An automatically controlled Freon -12 compressor will start when the _____.
    A. Expansion valve opens
    B. Solenoid valve opens
    C. Expansion valve closes
    D. Solenoid valve closes

    Answer: B

214. A single trunk piston-type compressor is undesirable for a Freon unit because the:
    A. Lubricant mixes with the refrigerant
    B. Refrigerant reduces the crankcase pressure
    C. Lubricant temperature becomes excessive
    D. Refrigerant becomes superheated

    Answer: A

215. Calcium chloride is sometimes used in refrigeration system as a:
    A. Refrigerant
    B. Lubricant
    C. Primary coolant
    D. Secondary coolant

    Answer: D

216. When the outlet temperature of the evaporator exceeds the inlet temperature the condition is called _____.
    A. Boiling
    B. Superheating
    C. Melting
    D. Freezing

    Answer: B

217. Which of the following refrigerants would give the most trouble when operating with warm circulating water?
    A. Freon -12
    B. CO_2
    C. Ammonia
    D. Ethyl chloride

    Answer: B

218. As Freon leaves the expansion valve:
    A. Pressure increases – volume increases
    B. Pressure decreases – volume increases
    C. Pressure decreases – volume decreases
    D. Pressure increases – volume decreases

    Answer: B

219. The suction pressure switch is actuated by:
    A. Pressure on a bellows
    B. Temperature on a bellows
    C. A thermo-pressure regulator
    D. A thermostatic temperature device

    Answer: A

220. A thermometer senses which of the following?
    A. Latent heat
    B. Sensible heat
    C. Heat of fusion
    D. Specific heat

Answer: B

221. Five pounds of water heated to raise the temperature 2 ℉ requires how many Btu?
   A. 20 Btu
   B. 5 Btu
   C. 2 Btu
   D. 10 Btu

   Answer: D

222. Superheat is heat added _____.
   A. In changing liquid to vapor
   B. After all liquid has been changed to vapor
   C. To increase pressure
   D. To increase temperature

   Answer: B

223. The expansion valve does not seem to be operating properly. There is high superheat. Test by listening to the sound of Freon flooding through the tubes and _____.
   A. Warm bulb with hand
   B. Place bulb in cold water
   C. Place bulb in hot water
   D. Any of the above

   Answer: A

224. What do you call a material in a dryer?
   A. Drain
   B. Dryer
   C. Desiccant
   D. A or C

   Answer: C

225. What is the main function of a receiver?
   A. Separate the oil from the refrigerant
   B. Cool the hot gases
   C. Store the refrigerant
   D. Condense the refrigerant

   Answer: C

226. During the re-expansion portion of the refrigeration compressor cycle
   A. The suction valve is open
   B. The suction valve is closed
   C. The discharge valve is closed
   D. B and C

   Answer: D

227. Absolute zero on the Fahrenheit scale is equal to:
   A. -273 ˚
   B. -460 ˚
   C. 0 ˚
   D. -100 ˚

   Answer: B

228. A quick method of detecting a leaky condenser on a Freon system would be to _____.
   A. Compare temperatures and pressures
   B. Test circulating water with proper chemicals
   C. Open vent on head and test with halide torch
   D. Use soapsuds on condenser outlet fittings

   Answer: C

229. Which of the following is not a characteristic of Freon -12?
   A. Corrosive
   B. Non-inflammable
   C. Odorless
   D. Boiling point -21 ℉

   Answer: A

230. In the discharge line between the compressor and the condenser one would find:
   A. High pressure, high temperature gas
   B. High pressure, low temperature liquid
   C. High temperature, high pressure liquid
   D. High pressure, low temperature gas

   Answer: A

231. For a low speed compressor the belt drive is preferred to the direct drive because it:
   A. Eliminates the use of mineral lubricating oils
   B. Permits the use of a smaller high-speed motor
   C. Absorbs torsional vibration
   D. Reduces the number of automatic controls

   Answer: B

232. Refrigerant leakage from the compressor crankcase is prevented by
   A. Using skirt type pistons
   B. Maintaining a vacuum in the crankcase
   C. Using shaft seals
   D. Using lantern rings

   Answer: C

233. The heat used to change a liquid to a gas or vapor is called latent heat of
   A. Absorption
   B. Vaporization
   C. Fusion
   D. Liquid

   Answer: B

234. What is the compression ratio of a refrigerator compressor?
   A. The ratio of the absolute suction pressure to the absolute discharge pressure
   B. The ratio of the absolute discharge pressure to the absolute suction pressure
   C. The ratio of the excessive liquid refrigerant in the receiver to that in the system
   D. None of the above

   Answer: B

235. The thermostatic expansion valve is designed to maintain a constant _____.
   A. Superheat
   B. Flow
   C. Pressure
   D. Temperature

   Answer: A

236. A refrigerant gives up heat when it
   A. Vaporizes
   B. Evaporates
   C. Condenses
   D. Boils

   Answer: C

237. The cooling component of a refrigeration cycle is called _____.
   A. A receiver
   B. An evaporator
   C. A condenser
   D. A desiccant

Answer: B

238. When ordering an expansion valve which of the following information is necessary?
   A. Size and pressure
   B. Size, tonnage, temperature and pressure
   C. Pressure and temperature
   D. Size and tonnage

Answer: B

239. A hot crankcase and cylinder head accompanied by a low suction pressure would be caused by
   A. Excess refrigerant
   B. Insufficient refrigerant
   C. Air in the system
   D. Stuck discharge valve

Answer: B

240. Which of the following characteristics that is not desirable in a refrigerant?
   A. Low latent heat fusion
   B. High latent heat of vaporization
   C. Low latent heat of vaporization
   D. A and C

Answer: C

241. The principle of the centrifugal system is based on which of the following?
   A. Kinetic energy
   B. Potential energy
   C. Lenz's law
   D. Boyle's law

Answer: A

242. The temperature in the vegetable box should be approximately
   A. -5 ℉
   B. 20 ℉
   C. 38 ℉
   D. 10 ℉

Answer: C

243. The compressor will run continuously if there is
   A. Insufficient refrigerant
   B. Air in the system
   C. Too heavy a load
   D. Any of the above

Answer: D

244. A "direct" refrigeration system is one in which:
   A. Ice is used for cooling
   B. A secondary coolant is pumped through the evaporator coils
   C. The refrigerant passes through coils in the evaporator
   D. Any of the above

Answer: C

245. A "CARRENE" is a type of
   A. Refrigerant oil
   B. Refrigerant
   C. Scale cleaner
   D. None of the above

Answer: B

246. What is the first step that must be done when securing a system?
   A. Open bypass valve
   B. Close receiver (King) valve
   C. Open solenoid valve
   D. Cut out compressor on high pressure

Answer: B

247. When securing a Freon-12 system for repairs
   A. Open the line at 1 to 2 pounds pressure
   B. Open the line at 5 to 10 pounds pressure
   C. Pump down to a slight vacuum
   D. Pump down to 10 ˚vacuum

Answer: A

248. The most common reason for the small usage of CO_2 system is:
   A. It is too dangerous
   B. Its upkeep is too high
   C. The machinery is too heavy
   D. It is too costly

Answer: C

249. To increase heat transfer in the evaporator
   A. Increase suction pressure
   B. Increase air circulation
   C. Defrost coils
   D. B and C

Answer: D

250. When the compressor is operated in short spurts after a lay-up or overhaul the purpose is to:
   A. Allow refrigerant time to circulate
   B. Determine actual compressor oil level
   C. Effect gradual cooling
   D. None of the above

Answer: D

251. Which of the following types of valve are not used for suction or discharge?
   A. Gate
   B. Diaphragm
   C. Metallic
   D. Ring

Answer: A

252. What usually happened if brine has a high specific gravity?
   A. It will freeze
   B. It will crystalize
   C. Nothing will happen
   D. It will solidify

Answer: B

253. When does the refrigerant gives-up heat?
   A. When it evaporates
   B. When it condenses
   C. When it vaporizes
   D. When it boils

Answer: B

254. The thermostatic expansion valve is designed to maintain constant_____
   A. Pressure
   B. Flow
   C. Temperature
   D. Superheat

Answer: D

255. A reactor plate is essential to the operation of a _____.

A. Thermostatic valve
B. Halide torch
C. Solenoid bulb
D. None of the above

Answer: B

256. The greatest decrease in the temperature of the refrigerant is at the _____
A. Condenser
B. Expansion valve
C. Evaporator
D. Receiver

Answer: C

257. The temperature of the refrigerant is highest just before it enters the:
A. Receiver
B. Evaporator
C. Condenser
D. King valve

Answer: C

258. A hot suction line could be caused by:
A. Insufficient refrigerant
B. Excess refrigerant
C. Excess cooling water
D. Insufficient cooling water

Answer: A

259. Which of the following devices will prevent the relief valve from opening in the event of excessive pressure?
A. Water failure switch
B. High-pressure cutout switch
C. Low-pressure cutout switch
D. Any of the above

Answer: B

260. Which of the following would cause the suction switch to remain open?
A. Insufficient spring tension
B. Too much spring tension
C. Bellows broken or jammed
D. A or B

Answer: C

261. Which of the following would not cause high head pressure?
A. Air in system
B. Overcharge of refrigerant
C. Circulating water too warm
D. Liquid freezing back

Answer: D

262. A “cold diffuser” is a:
A. Type of condenser
B. Special valve used as a bypass
C. Type of evaporator
D. None of the above

Answer: C

263. Which do you think is the effect of “subcooling”?
A. It causes flooding back to the compressor
B. It reduces the horsepower per ton of refrigeration
C. It increases the compression ratio
D. It increases the horsepower per ton of refrigeration

Answer: B

264. Subcooling is to:
A. Cool the evaporator below its normal temperature
B. Cool the liquid before it enters the evaporator
C. Cool a liquid at constant pressure to a temperature lower than its considering temperature
D. Cool the refrigerant gas before it enters the receiver

Answer: C

265. When figuring compression ratio, the ratio will increase with a _____
A. Lower suction pressure
B. Higher suction pressure
C. Higher discharge pressure
D. A and C

Answer: D

266. Copper tubing is used in Freon system because:
A. It has less internal resistance
B. It is cheaper
C. It is easier to check leaks
D. Iron corrodes

Answer: A

267. The cooling water regulator is actuated by:
A. An electric relay
B. Pressure of the refrigerant
C. Temperature of the refrigerant
D. None of the above

Answer: B

268. If there is a 20 ℉ temperature drop between the temperature corresponding to the pressure at the compressor discharge and the condenser outlet, one should:
A. Decrease the amount of circulating water
B. Increase the amount of circulating water
C. Purge the system
D. None of the above

Answer: C

269. If refrigeration controls were constructed with little or no differential, the:
A. Compressor would short cycle
B. Icebox would get too cold
C. Icebox would get too warm
D. Refrigerant would be subcooled

Answer: A

270. What is the use of back pressure regulating valve?
A. Controls the evaporator temperature by throttling the flow of liquid refrigerant
B. Maintains a fixed pressure in the evaporator coils
C. Controls the flow of circulating water in the condenser tubes
D. Controls the temperature in the evaporator coils

Answer: B

271. If the thermal bulb becomes loose on the evaporator coils, it will cause_____
A. An electrical short
B. Flooding back of the refrigerant
C. Improper operation of expansion valve
D. Any of the above

Answer: C

272. External frost on inlet of expansion valve indicates:
    A. Expansion valve plugged or dirty
    B. Head pressure too high
    C. Refrigerating compartment too cold
    D. Air in system

Answer: A

273. Subcooling of the refrigerant results in:
    A. Less circulating water needed
    B. Effect of refrigerant increased
    C. Liquid less likely to vaporize
    D. B and C

Answer: D

274. Which of the following is the reason when the crankcase is cooler than the suction line?
    A. Too much refrigerant
    B. Insufficient refrigerant
    C. Expansion valve open too wide
    D. Suction valve leaking

Answer: A

275. If the outlet of the thermostatic valve is warmer than the inlet, it indicates:
    A. Flooding back
    B. Thermostatic valve working properly
    C. Thermostatic valve not working properly
    D. Solenoid valve not working properly

Answer: C

276. High temperature of cylinder heads and crankcase is caused by:
    A. Insufficient refrigerant
    B. Too much refrigerant
    C. High head pressure
    D. Noncondensable gases

Answer: A

277. Frost on the high- pressure side of a thermostatic expansion valve would probably be caused by
    A. High head pressure
    B. Dirty expansion valve
    C. Refrigerator box too cold
    D. Loss of circulating water to condenser

Answer: B

278. A Freon-12 gage shows pressure and _____
    A. Superheat temperature
    B. Saturation temperature
    C. Back pressure
    D. Vacuum

Answer: B

279. Moisture in a system will cause a:
    A. Faulty expansion valve
    B. High suction pressure
    C. High suction temperature
    D. Low discharge temperature

Answer: A

280. Which of the following is not essential to a centrifugal type of compressor system?
    A. Evaporator
    B. Distiller
    C. Condenser
    D. Expansion valve

Answer: B

281. A scale trap in a Freon system will be found on the :
    A. Receiver
    B. Discharge side
    C. Suction side
    D. Condenser

Answer: C

282. Which of the following would cause expansion valve failure?
    A. Dirt in the valve
    B. Moisture in the system
    C. Bulb in icebox ruptured
    D. Any of the above

Answer: D

283. Two compressor should not be run in parallel because:
    A. There is a possibility of losing oil
    B. It will give over-capacity
    C. It is not efficient
    D. A or B

Answer: A

284. The process that takes place in the evaporator is called:
    A. Transfer of the latent heat of vaporization
    B. Absorption of the latent heat of vaporization
    C. Absorption of the latent heat of fusion
    D. Transfer of the latent heat of fusion

Answer: B

285. What is the use of the low-water cutout switch?
    A. Recirculates the cooling water when there is too much refrigerant in the condenser
    B. Stops the compressor when there is no refrigerant running to the evaporator
    C. Stops the flow of refrigerant when the condenser temperature is too low
    D. Stops the compressor when there is insufficient cooling water

Answer: D

286. The high-pressure cutout switch:
    A. Stops the flow of refrigerant when the condenser temperature is too high
    B. Recirculates the refrigerant through the compressor under emergency conditions
    C. Stops flow of water to condenser when there is no refrigerant passing through
    D. Stops compressor when head pressure is too high

Answer: D

287. Zinc rods are found in this:
    A. Gas side of the condenser
    B. Salt water side of the condenser
    C. Evaporator area
    D. Compressor crankcase

Answer: B

288. Which of the following is not essential to a compression refrigeration system?
    A. A receiver
    B. A condenser
    C. An evaporator
    D. A dehydrator

Answer: A

289. What is the effect if the refrigerant is removed from the system too fast?
   A. It may flood the evaporator
   B. It may “freeze-up” the condenser
   C. It will lower the icebox temperature
   D. None of the above

Answer: B

290. Closing the solenoid valve stops the compressor through the:
A. high-pressure cutout switch
B. low water-pressure cutout switch
C. low-pressure cutout switch
D. high water-pressure cutout switch

Answer: C

291. A precooler, if used, is located between the:
A. expansion valve and evaporator
B. compressor and condenser
C. evaporator and compressor
D. condenser and expansion valve

Answer: D

292. When the outlet temperature at the evaporator exceeds the inlet temperature, the condition is known as:
A. superheating
B. desuperheating
C. dehydrating
D. saturating

Answer: A

293. The purpose of providing hot-gas defrosting facilities:
A. defrosting without raising compartment temperature above 32 °F
B. thawing frozen coils
C. defrosting automatically
D. B or C

Answer: A
294. The suction control switch on the compressor is a
A. thermal element
B. thermostat
C. pressure element
D. bellows

Answer: C

295. With one machine serving several compartments, with one compartment reaches the desired temperature in that compartment is maintained by:
A. the expansion valve
B. the solenoid valve
C. the back-pressure valve
D. any of the above

Answer: B

296. The back-pressure regulating valve:
A. controls the water flow through the condenser
B. stops the flow of liquid refrigerant when temperature drops in evaporator
C. maintains a fixed pressure in the evaporator coils
D. none of the above

Answer: C

297. Faulty F-12 compressor valves will be indicated by:
A. low head pressure-high suction pressure
B. compressor running continuously
C. gradual or sudden decrease in capacity
D. all of the above

Answer: D

298. How were tubing joints done?
A. brazed
B. welded
C. screwed
D. silver soldered

Answer: D

299. When starting a refrigerating unit, be sure the water side of the condenser is _____.
A. secured
B. bypassed
C. vented
D. B and C

Answer: C

300. The water regulating valve is operated by the
A. compressor discharged pressure
B. compressor discharged temperature
C. compressor suction pressure
D. none of the above

Answer: D

301. High superheat of the vapor in the steam would cause
A. an increase in capacity
B. a more efficient unit
C. a decrease in capacity
D. A and B

Answer: C

302. The solenoid valve is actuated by which of the following?
A. a bellows
B. a magnet
C. a spring
D. any of the above

Answer: B

303. Which of the following stops the compressor before the relief valve opens?
A. low water-pressure cutout
B. high-pressure cutout
C. low oil-pressure cutout
D. low-pressure cutout
Answer: B
304. What is the effect if the thermal bulb is loose on the evaporator coils?
A. improper operation of expansion valve
B. flooding back of refrigerant
C. vibration causing leaks
D. improper operation of solenoid valve

Answer: A

305. If the superheat on the suction side of the compressor is increased, what will happen to the tonnage capacity of the unit?
A. increases
B. decreases
C. no change
D. none of the above

Answer: B

306. What do you usually do to correct slugging and flooding back?
A. change the discharged pressure
B. clean the traps
C. removes some refrigerant
D. check the expansion valve

Answer: D

307. In a Freon-11 system there is no
A. receiver
B. distiller
C. condenser
D. evaporator

Answer: B

308. The suction pressure control valve is actuated by which of the following?
A. thermostat
B. bellows
C. thermal element
D. pressure diaphragm

Answer: D
309. Which of the following would cause the crankcase and head to get hot with low suction pressure?
A. excess refrigeration
B. air in system
C. insufficient refrigeration
D. insufficient cooling water

Answer: C

310. Which of the following is the function of a suction pressure regulating valve?
A. cuts out the compressor
B. controls the expansion valve
C. cuts in the compressor
D. maintains the proper back pressure

Answer: D

311. Which of the following is the cause if the outlet of a thermostat valve is warmer than the inlet inside?
A. valve is working properly
B. valve is not working properly
C. solenoid valve is not working properly
D. none of the above

Answer: B

312. How is a thermostatic valve tested?
A. immersing its bulb in warm water
B. immersing its bulb in ice water
C. holding its bulb in one's hand
D. shorting out the cutout switch

Answer: B

313. Which of the following will cause an automatically controlled F-12 compressor to start?
A. closing the expansion valve
B. opening the expansion valve
C. closing the solenoid valve
D. opening the solenoid valve

Answer: D

314. Where is the solenoid coil installed?
A. horizontally over the valve
B. vertically over the valve
C. vertically below the valve
D. horizontally below the valve

Answer: B

315. The "refrigeration effect" of a refrigerant is:
A. quantity of heat that 1 pound of refrigerant absorbs while flowing through the evaporator under given condition
B. amount of heat it can remove in a given time
C. quantity of heat that 1 pound of refrigerant absorbs
D. A or B

Answer: A

316. The "refrigerant effect" of a refrigerant is always:
A. more than its latent heat
B. more than its sensible heat
C. less than its sensible heat
D. less than its latent heat

Answer: D

317. What will happen if the expansion valve is opened too wide?
A. liquid will flow back to the compressor
B. it will make no difference, as the automatic expansion valve is still operating
C. the condenser coils will overheat
D. A or C

Answer: A

318. Which of the following should not be used to clean scale tarps?
A. compressed air
B. cotton waste
C. kerosene
D. diesel oil

Answer: B
319. If one of the ship's service boxes suddenly stops cooling, the most likely cause would be the malfunction of the:
A. discharge valve
B. king valve
C. solenoid valve
D. expansion valve

Answer: C

320. Which of the following items is not important when using a halide torch?
A. move flame slowly around joints
B. hold flame close to the joints
C. adjust to a clear white flame
D. adjust to a clear blue flame

Answer: C.

321. A system should be purged when the liquid outlet temperature from the condenser is more than the temperature corresponding to the discharge pressure:
A. 10 °F above
B. 20 °F below
C. 20 °F above
D. 5 °F below

Answer: D

322. Which of the following would cause the compressor to run continuously?
A. low-pressure switch jammed
B. high-pressure switch jammed
C. clogged strainer
D. defective thermal bulb

Answer: A

323. In a vapor compression cycle the lowest temperature is found in ____.
A. receiver
B. condenser
C. compressor
D. evaporator

Answer: D
324. The moisture in a refrigeration system can be removed with the help of which of the following?

A. driers
B. evaporators
C. dehumidifies
D. coolers

Answer: A

325. Which of the following refrigerants has lowest freezing point temperature?
A. Freon 12
B. Ammonia
C. Freon 22
D. Freon 11

Answer: C

326. During compression in a vapor compression cycle when the refrigerant is super-heated, what happens to the performance?
A. C.O.P. is reduced
B. C.O.P. remains unchanged
C. work done is increased
D. refrigerating effect is reduced

Answer: A

327. A Bell-Coleman Cycle is also known as _____.
A. reversed Otto cycle
B. reversed Joule cycle
C. reversed Rankine cycle
D. reversed Carnot cycle

Answer: B

328. Critical Temperature is that temperature above which:
A. a gas will never liquefy
B. a gas gets immediately liquefy
C. water gets evaporated
D. water will never evaporate
Answer: A

329. Rating of a domestic refrigerator is of the order of:
A. 0.1 tons
B. 50 tons
C. 100 tons
D. 40 tons

Answer: A

330. What is the usual COP of a domestic refrigerator?
A. less than 1
B. more than 1
C. equal to 1
D. depends upon the make of it

Answer: B

331. Horsepower per ton of refrigeration is expressed as:
A. 4.75/COP
B. 4.75 x COP
C. COP/4.75
D. 4.75/COP

Answer: C

332. The highest temperature in vapor compression cycle is produced during:
A. expansion valve
B. evaporator
C. condenser discharged
D. compressor discharged

Answer: D

333. Which type of compressor is used in refrigeration system?
A. reciprocating
B. centrifugal
C. rotary sliding vane
D. all of the above

Answer: D

334. What is the reason why a thermometer in vapor compression system is installed close to the compressor?
A. because it helps the operator in adjusting compressor for greatest efficiency
B. because temperature indicates whether liquid or vapor refrigerant is going to compressor
C. because temperature helps in calculating the coefficient of performance
D. because the performance of other units of the cycle can be controlled

Answer: A

335. Which refrigerant has the highest critical point temperature?
A. ammonia
B. Freon 11
C. Freon 12
D. Freon 22

Answer: B

336. White ice is
A. Fast cooled water
B. sub cooled water
C. due to dissolved air, gases and impurities
D. formed by blowing air during freezing

Answer: C

337. Clear ice
A. is pure ice
B. contains dissolved gases
C. contains dissolved air
D. is formed by blowing air during freezing

Answer: D

338. Dry ice is
A. free from water
B. free from dissolved air and gases
C. does not contain impurities
D. solidified form of carbon dioxide

Answer: D

339. The leaks in the refrigeration system using Freon can be detected by:
A: Halide torch which detention forms greenish flame lighting
B. Sulfur sticks which on detection forms white smoke
C. using certain reagents
D. smelling

Answer: A

340. The lower horizontal line of the refrigeration cycle plotted on pressure-enthalpy diagram represents:
A. compression of the refrigerant vapor
B. evaporation of the refrigerant liquid
C. condensation of the refrigerant vapor
D. metering of the refrigerant liquid

Answer: B

341. Which of the following uses a secondary refrigerant?
A. domesticated refrigerator
B. room air conditioner
C. deep freezer
D. ice plant

Answer: D

342. Which of the following secondary refrigerants generally used milk chilling plants?
A. Brine
B. Ammonia solution
C. Glycol
C. Sodium silicate

Answer: C

343. What is the cycle where a refrigeration system generally operates?
A. open cycle
B. close cycle
C. mixed cycle
D. Hybrid cycle

Answer: B

344. Which of the following is also known as Refrigerant No.R-717?
A. Ammonia
B. Freon 22
C. Freon 12
D. methyl chloride

Answer: A

345. In which part of the vapor compression cycle there is abrupt change in pressure and temperature
A. solenoid valve
B. evaporator
C. expansion valve
D. drier

Answer: C

346. What do you call a plate or vane used to direct or control movement of fluid or air within the confined area?
A. baffle
B. bellows
C. regulator
D. diffuser

Answer: A

347. Brazing is used for joining two _____.
A. two ferrous material
B. one ferrous and non-ferrous material
C. two non-ferrous material
D. two non-metals

Answer: C

348. Which refrigerant is used for the air-conditioning of the passenger aircraft cabin?
A. ammonia
B. Freon 12
C. Freon 11
D. air

Answer: D

349. Oil separator in a refrigeration cycle is installed between the _____.
A. compressor and condenser
B. condenser and evaporator
C. metering device and evaporator
D. none of the above

Answer: A

350. A flash chamber is installed in the refrigeration circuit so as to:
A. improve overall heat transfer coefficient
B. reduce pressure losses through the evaporator
C. reduce the size of the evaporator by avoiding vapors going to evaporator
D. all of the above

Answer: D

351. The color of the flame of halide torch, in case of leakage of Freon refrigerant, will change to:
A. yellow
B. red
C. green
D. orange

Answer: C

352. What is the boiling temperature of F-12?
A. -33.33 ℃
B. -78.5 ℃
C. - 29.8 ℃
D. -40 ℃

Answer: C

353. What is the boiling temperature of F-22?
A. -33.33 ℃
B. - 29.8 ℃
C. -78.5 ℃
D. -40 ℃

Answer: D

354. The following gas is preferred in refrigeration system:
A. F-11
B. F-22
C. CO_2
D. NH_3

Answer: B

355. The bhp/ton refrigeration requirement with increase in condenser temperature, in a vapor compression system that uses reciprocating compressor receiving refrigerant gas at constant suction temperature, will follow:
A. linearly decreasing characteristic
B. linearly increasing characteristic
C. first increase rapidly and then decrease slowly
D. first increase slowly and then rapidly

Answer: B

356. Antifreeze chemicals are:
A. same as refrigerants
B. those that are added to refrigerants for better performance
C. those that lower down the freezing points of liquids
D. those that do not freeze at all

Answer: C

357. The capacity of ice making is always
A. less than the refrigerating effect
B. greater than the refrigerating effect
C. equal to the refrigerating effect
D. directly proportional to the refrigerating effect

Answer: D

358. To check the lack of refrigerant or clogged refrigerant lines
A. installing service valves must be necessary
B. installing king valve must be an option
C. sight glasses can be possibly used
D. discharge pressure and temperature must be monitored

Answer: A

359. **Past ME Board Question**

Can any refrigerant be used with a booster system?

A. Yes
B. No
C. Used for some
D. Used for all

Answer: B

360. **Past ME Board Question**
What is the chemical formula of methylene chloride?

A. $CHCl_2F$
B. CH_2Cl_2
C. $CClF_3$
D. $CBRF_3$

Answer: B

361. **Past ME Board Question**
What is the chemical formula of butane?

A. C_2H_5Cl
B. C_3H_8
C. $C_2H_4O_2$
D. C_4H_{10}

Answer: D

362. **Past ME Board Question**
Type of refrigerant control which maintains pressure difference between high side and low side pressure in refrigerating mechanism.

A. Suction valve
B. Expansion valve
C. Service valve
D. Solenoid valve

Answer: B

363. **Past ME Board Question**
The dividing point between the high pressure and low pressure sides of the refrigeration cycle occurs at the:

A. expansion valve
B. compressor
C. condenser
D. cooling coil

Answer: A

364. **Past ME Board Question**
Boiling temperature of Freon 12 is:

A. -33.33 ℃
B. -78.5 ℃
C. -29.8 ℃
D. -40.7 ℃

Answer: C

365. **Past ME Board Question**
Boiling temperature of Freon 22 is:

A. -33.33 ℃
B. -29.8 ℃
C. -78.5 ℃
D. -41.04 ℃

Answer: D

366. **Past ME Board Question**
The faster way to remove frost from a direct-expansion finned-tube evaporator is to:

A. sent hot gas through the coil
B. scrape off frost
C. wash with warm water
D. shut down warm let frost melt

Answer: A

367. **Past ME Board Question**
You want to change refrigerants in a Freon 12 plant using a reciprocating single-acting compressor. Which refrigerants requires smallest amount of change to the system?

A. Carbon dioxide
B. Ammonia
C. Methyl chloride
D. Aqua ammonia

Answer: C

368. **Past ME Board Question**
Soft copper tubing that is used for refrigerant piping erected on premises containing other than the Group 1 refrigerant must be protected by _____.

A. Supporting it by approved clamps
B. Limiting its length between supports up to 10 feet
C. A rigid or flexible metal enclosure
D. Wrapping it with insulation tape throughout its length

Answer: C

369. **Past ME Board Question**
A Freon 12 refrigeration system is fitted with thermal expansion valves. The valves are rated in:

A. Pound per minute
B. Super heat setting
C. Tons of refrigeration
D. Cubic feet per minute

Answer: C

370. **Past ME Board Question**
The vapor cycle in thermal efficiency as the refrigeration cycle is to the _____.

A. Energy efficiency ratio
B. COP for a refrigerator
C. COP for a heat pump
D. Carnot efficiency

Answer: B

371. **Past ME Board Question**
The main purpose of a sub cooler in a refrigerating system especially a two-stage system is to:

A. Increase the heat rejection per ton and avoid system shutdown
B. Improve the flow of evaporator gas per ton and increase the temperature
C. Reduce the total power requirements and return oil to the compressor
D. Reduce the total power requirements and heat rejection to the second stage

Answer: D

372. **Past ME Board Question**
Ton of refrigeration is a unit equivalent to:

A. 50.4 kCal/sec
B. 12,660 kN-m/hr
C. 3413 kW/hr
D. 2545 Btu/hr

Answer: B

373. **Past ME Board Question**
In a refrigerating system, the heat absorbed in the evaporator per kg mass of refrigerant passing through:

A. Equals the increase in enthalpy
B. Does not depend on the refrigerant used
C. Is decreased if pre-cooler is used
D. Equals the increase in volume

Answer: A

374. **Past ME Board Question**
Lithium bromide is used in refrigeration system in:

A. Condensate return lines
B. Absorbers
C. Centrifugal compressors
D. Ion exchangers

Answer: B

375. **Past ME Board Question**

A refrigeration system in which only part of the refrigerant passes over the heat transfer surface is evaporated and the balance is separated from the vapor and recirculated.

A. Direct expansion system
B. Chilled water system
C. Flooded system
D. Multiple system

Answer: C

376. **Past ME Board Question**
A device whose primary function is to meter the flow of refrigerant to the evaporator.

A. Sniffer valve
B. Equalizer
C. Thermostatic expansion valve
D. Crossover valve

Answer: C

377. **Past ME Board Question**
Select the one in which secondary refrigerant is used.

A. Domestic refrigerator
B. Room air conditioner
C. Deep freezer
D. Ice plant

Answer: D

378. **Past ME Board Question**
AN odorless refrigerant whose boiling point varies over a wide range of temperature.

A. Freon 22
B. Freon 12
C. Ammonia
D. Freon 11

Answer: A

379. **Past ME Board Question**
The part that directs the flow of refrigerant through the compressor.

A. Wrist pin
B. Valve
C. Piston
D. Connecting rod

Answer: B

380. **Past ME Board Question**
The highest temperature in vapor compression cycle is produced during:

A. Receiver
B. Evaporator
C. Condenser discharge
D. Compressor discharge

Answer: D

381. **Past ME Board Question**
The boiling point of Freon 12 is:

A. -41.04 °F
B. -40.60 °F
C. -38.40 °F
D. -31.40 °F

Answer: A

382. **Past ME Board Question**
The secondary refrigerant used in milk chilling plants is generally:

A. Brine
B. Ammonia
C. Glycol
D. Sodium silicate

Answer: C

383. **Past ME Board Question**
The sensible heat ratio is 0.8. That is

A. 20% latent heat and 60% sensible heat
B. 80% sensible heat and 20 % latent heat
C. 80% sensible heat and 20% sensible heat and latent heat
D. 20% latent heat and 80% sensible heat and latent heat

Answer: B

384. **Past ME Board Question**
The effect of superheating the refrigerant is to:

A. Increase the COP
B. Increase and decrease the COP
C. Decrease COP
D. Maintains COP

Answer: A

385. **Past ME Board Question**
The ice making capacity is always

A. Directly proportional to the refrigerating effect
B. Less than the refrigerating effect
C. Greater than the refrigerating effect
D. Equal to the refrigerating effect

Answer: A

386. **Past ME Board Question**
The amount of sensible heat for a sensible heat ratio of 0.80 and a total cooling load of 100 is:

A. 80
B. 20
C. 100
D. 60

Answer: A

387. **Past ME Board Question**
The high pressure of refrigerant system consist of the line to the expansion valve, the receiver, the uppermost half of the compressor and the:

A. Line after the expansion valve
B. Lower most half of compressor
C. Condenser
D. Evaporator

Answer: C

388. **Past ME Board Question**
Which of the following material is suitable for tubing in refrigeration application where refrigerant ammonia is employed?

A. Plastic
B. Brass
C. Steel copper
D. Copper

Answer: C

389. **Past ME Board Question**
If PV is the power required for a vapor-compression refrigeration system, then what is the power required for an air-refrigeration system, assuming that they have the same capacity?

A. 5PV
B. 2PV
C. PV/10
D. 1/PV

Answer: A

390. **Past ME Board Question**
Tons of refrigeration in Btu/24 hours is

A. 288,000
B. 28,800
C. 290,000
D. 29,000

Answer: A

391. **Past ME Board Question**
R-22 is:

A. Dichlorodiflouromethane
B. Monochlorodiflouromethane
C. Methyl chloride
D. Trichlorodiflouromethane

Answer: B

392. **Past ME Board Question**

A salimeter reads the:
A. Density of brine
B. Rate of brine
C. Dew point temperature
D. Relative humidity
Answer: A

393. **Past ME Board Question**
Which of the following measure the density of salt in water?
A. Salimeter
B. Hydrometer
C. Pitot tube
D. Calorimeter
Answer: A

394. **Past ME Board Question**
What is the device used to protect the compressor from overloading due to high head pressure?
A. Overload relay
B. Hold back suction valve
C. Thermostatic expansion valve
D. Expansion valve
Answer: A

395. **Past ME Board Question**
The purpose of the expansion valve is to control the flow of the refrigerant to the evaporator. The other function is to:
A. Reduce the pressure of the liquid refrigerant
B. Increase the pressure of the vapor refrigerant
C. Reduce the pressure of the vapor refrigerant
D. Increase the pressure of the liquid refrigerant
Answer: A

396. **Past ME Board Question**
It prevents the refrigerant from the condenser to go back to the compressor.
A. Check valve
B. Float switch
C. Expansion valve
D. Low side float
Answer: A

397. If the freezing point of water is 0℃, which of the following is its melting point?
A. slightly less than 0℃
B. slightly more than 0℃
C. 0℃
D. 32℃
Answer: C

CHAPTER 15 – AIR CONDITIONING

1. How do you call the water vapor content of air?
A. Moisture
B. Humidity
C. Dew
D. Vapor

Answer: B

2. When air contains all of the water vapor it can hold, it is said to be
A. Simulated
B. Loaded
C. Saturated
D. Moistured

Answer: C

3. What is the instrument used to register relative humidity?
A. Hygrometer
B. Hydrometer
C. Perometer
D. Manometer

Answer: A

4. Humidity is a measure of which of the following?
A. water vapor content
B. temperature
C. latent heat
D. any of the above

Answer: A

5. Air conditioning is the process of:
A. keeping a place cool
B. removing heat from a specific area
C. maintaining the air at a required temperature and humidity
D. A or C

Answer: C

6. In an air-conditioning system, before the air is circulated to the required area, it is:
A. cooled
B. filtered
C. dehumidified
D. all of the above

Answer: D

7. The temperature at which water vapor in the atmosphere begins to condense is known as the:
A. vapor point
B. dew point
C. moisture point
D. none of the above

Answer: B

8. Saturation temperature is the same as;
A. dew point
B. vapor temperature
C. steam temperature
D. humidity

Answer: A

9. When the bypass factor is B, the coil efficiency for sensible cooling of air is equal to:
A. 1 + B
B. 1 – B
C. 1 – B / B
D. 1 + B / B

Answer: B

10. The psychrometric chart in air conditioning determines the
A. wet bulb and dry bulb temperatures
B. psychrometric temperature requirements
C. saturation temperature and relative humidity
D. moist air conditions

Answer: D

11. Which of the following is considered as comfort condition in air conditioning?
A. 40℃ DBT, 80% RH
B. 30℃ DBT, 60% RH
C. 30℃ DBT, 80% RH
D. 20℃ DBT, 60% RH

Answer: D

12. The drift loss in cooling towers is about:
A. 1% only
B. 12 to 15%
C. 10 to 20%
D. 30 to 40%

Answer: C

13. Cooling towers are used for cooling water:
A. to be injected in circulating air
B. to be used for humidification
C. to be used for filtration of air
D. to be used for cooling the compressor

Answer: D

14. By which of the following processes heat mainly dissipates in cooling towers?
A. conduction
B. convection
C. radiation
D. evaporation

Answer: D

15. Which one is commonly used liquid absorbent?
A. silica gel
B. activated alumina
C. ethylene glycol
D. any of the above

Answer: C

16. In sensible heating cooling following parameter remains unchanged
A. dry bulb temperature
B. wet bulb temperature
C. relative humidity
D. humidity ratio

Answer: D

17. Heating and dehumidification can be obtained simultaneously if air is passed through:
A. sprays of water kept at a temperature higher than the dew point temperature of the entering air
B. a solid absorbent surface
C. a liquid absorbent spray
D. any one of B and C

Answer: D

18. Dirt and foreign materials normally build-up on the side of the condenser tubes. To ensure adequate condenser capacity, a certain factor is used in calculating the overall heat transfer through the walls of the tubes including the heat transfer rate of the layers dirt and foreign materials. What is this factor?
A. Booster Factor
B. Factor of Safety
C. Fouling Factor
D. Compression Factor

Answer: C

19. The engineer was tested to design the air conditioning system for a ball room dance hall. Considering that this involve a lot of activity from its users, the engineer would design that will require:
A. Maximum attainable effective temperature
B. Constant Effective temperature
C. Higher Effective Temperature
D. Lower Effective Temperature

Answer: A

20. What is the value of the Mach No. throat of the converging-diverging nozzle?
A. Zero
B. Two
C. One
D. Ten

Answer: C

21. What do bodies at a temperature above absolute zero?
A. It emits Energy
B. It emits Thermal Radiation
C. It emits Heat for Conduction
D. It emits Heat for convection

Answer: B

22. When air is saturated, the wet bulb depression is:
A. zero
B. indefinite
C. unity
D. 100%

Answer: A

23. In a window air conditioning unit which of the following is usually done by the owner?
A. Semiannual cleaning or replacement of filters
B. Annual cleaning of the evaporator, condenser fan blades, fan motor, compressor and casing
C. Inspection of fan motors and lubricate them
D. All of these

Answer: A

24. Fan motors in air conditioning units usually have:
A. 2 or 3 speeds
B. 3 or 4 speeds
C. 1 or 2 speeds
D. 4 or 5 speeds

Answer: A

25. Which of the following capacitors that can usually be found in an air conditioning unit?
A. Starting capacitors
B. Running capacitors
C. Fan motor capacitors
D. all of these

Answer: D

26. Which of the following troubles commonly occurs inside an air conditioning unit?
A. Stuck Compressor
B. Clogged Refrigerant circuit
C. Short Circuit, open circuit, grounded motor winding
D. All of these

Answer: D

27. The motor condition of an air conditioning unit can be checked with:
A. the continuity of light or with an ohmmeter
B. the flow of refrigerant in the receiver
C. the discharge pressure in the compressor
D. All of these

Answer: A

28. An air conditioning system wherein the entire systems are mounted in the cabinet:
A. Console Air Conditioners
B. Centralized Air Conditioners
C. Package Type Air Conditioners
D. Multizone Split Ductless System

Answer: A

29. The use of water to carry heat occupied spaces
A. Hydronic Heating System
B. Water Boiling System

C. Hydrokinetic Heating System
D. Hydraulic Heating System

Answer: A

30. The method of cooling which primarily used where ambient air temperatures are high and relative humidity is used:
A. Swamp Cooling
B. Evaporative Cooling
C. Condensate Cooling
D. Hydroionic Cooling

Answer: A

31. The other name for Swamp Cooling is:
A. Evaporative Cooling
B. Condensate Cooling
C. Wet Roof Cooling
D. Excelsior Cooling

Answer: C

32. Evaporative Condenser is used to cool
A. condenser vapor
B. condenser surface
C. condensate liquid
D. All of these

Answer: A

33. A method of cooling which uses water as refrigerant. Pressure on the water surface is reduced to lower its boiling temperature.
A. Steam Jet Cooling
B. Evaporative Cooling
C. Vortex Tube Cooling
D. Pressurized Cooling

Answer: A

34. Palladium Chloride may be used to measure the presence of:
A. vapor
B. CO
C. ammonia
D. refrigerant

Answer: B

35. The amount of CO can be determined by the color of Palladium Chloride. An amount of 30 ppm to 70 ppm will cause:
A. Slight Darkening
B. Grey Color
C. Red Color
D. Black Color

Answer: A

36. The term used to express the amount moisture in a given sample of air. It is compared with the amount of moisture in a given sample of air.
A. Humidity
B. Relative Humidity
C. Absolute Humidity
D. Humidity Ratio

Answer: B

37. How should the window type air conditioning unit be placed?
A. Slant toward the inside of the home
B. Slant toward the outside of the home
C. Level
D. Slant at approximately 15^o from the horizontal

Answer: B

38. A dehumidifier is usually a small hermitic refrigerating system. It has both a condenser and an evaporator. Many older systems use R-12 or R-500. The newer units use:
A. R-134a
B. R-145a
C. R-217a
D. R-121a

Answer: A

39. The normal cut-out setting of a window unit thermostat is between:
A. 13℃ to 16℃
B. 16℃ to 21℃
C. 17℃ to 22℃
D. 10℃ to 15℃

Answer: A

40. Thermostat are used with most window units. They have differentials which vary between:
A. 2℃ to 4℃
B. 3℃ to 5℃
C. 4℃ to 5℃
D. 1℃ to 2℃

Answer: A

41. In an air conditioning unit, the thermostat fails. The unit did not start. How do you test the operation of the thermostat?
A. Cover the air outlet and air inlet with a cloth. The air will recirculate into the unit and the temperature will quickly drop to the cut out temperature
B. Cover the outlet and the air will not circulate and the thermostat functions because no air movement
C. Cover both the inlet and outlet so that the recirculating air has the same temperature
D. Never cover any air passage so that the air can freely move and thermostat functions well

Answer: A

42. Which of the following dehumidifier is often used to reheat the air after moisture is removed?
A. Evaporator
B. Chiller
C. Condenser
D. Compressor

Answer: C

43. Which of the following refrigerant is added sometimes to other refrigerant to improve oil circulation?
A. R-117
B. R-777
C. R-170 (Ethane)
D. R-270

Answer: C

44. A refrigeration that deals with producing temperature of -157 ℃ or lower,
A. Low temperature refrigeration
B. Extremely low temperature refrigeration
C. Absolute zero refrigeration
D. Cryogenics

Answer: D

45. Measurement of a device's ability to remove atmospheric air from test air.
A. Atmospheric Dust Spot Efficiency

B. Atmospheric Dry Air Efficiency
C. Test Air Efficiency
D. Baudelot Air Efficiency

Answer: A

46. A liquid mixture having constant maximum and minimum boiling points. Refrigerants comprising this mixture do not combine chemically, yet the mixture provides constant characteristics
A. Azeotropic Mixture
B. Homogeneous Mixture
C. Conzeotropic Mixture
D. Cryogenic Mixture

Answer: A

47. Refrigerant in Group A1 (R-11). Chemical combination of carbon, chlorine and fluorine
A. Carrene
B. Cerrene
C. CCL group
D. HCL group

Answer: A

48. Which of the following refrigerants is popular in the industrial refrigerating system; also popularly absorption system of refrigerant.
A. R-717 (Ammonia)
B. R-600 (Butane)
C. R-611 (Methyl Formate)
D. R-504

Answer: A

49. Which of the following is a function of air conditioning?
A. Temperature and Humidity Control
B. Air, Filtering, Cleaning, and Purification
C. Air Movement and Circulation
D. All of these

Answer: D

50. Oxygen is approximately what percent by weight in the atmosphere?
A. 23%
B. 27%
C. 77%
D. 73%

Answer: A

51. Substances that have the ability to absorb moisture from the air are called:
A. Desiccants
B. Moisturizer
C. Dehygroscopic substance
D. Moisture absorber

Answer: A

52. When the dry bub and the wet bulb temperatures are identical, the air is said to be:
A. saturated
B. compressed
C. humidified
D. dehumidified

Answer: A

53. In what form that water exists in air?
A. Solid
B. Liquid
C. Vapor
D. Saturated

Answer: C

54. When air is heated, what happened to its relative humidity?
A. Increase
B. Decrease
C. Remain Constant
D. May increase or Decrease Depending on temperature

Answer: B

55. The Horizontal Scale (Abscissa) in the Psychrometric Chart represents:
A. Dry bulb temperature
B. Wet bulb temperature
C. Relative Humidity
D. Humidity

Answer: A

56. Most people are comfortable with the relative humidity of:
A. 30% to 70%
B. 10% to 40%
C. 20% to 30%
D. 40% to 80%

Answer: A

57. The temperature below which water vapor in the air will start to condense.
A. Condensing Temperature
B. Dry Bulb Temperature
C. Dew Point Temperature
D. Wet Bulb Temperature

Answer: C

58. Which of the following is not used as method to measure air velocities?
A. Hot wire Anemometer
B. Rotating Anemometer
C. Swinging Vane Velocimeter
D. Open type Barometer

Answer: D

59. It is a form of oxygen photochemically produced in nature.
A. Ozone
B. Oxidation
C. Oxidizing Agent
D. DO_2

Answer: A

60. What is the chemical formula of Ozone?
A. O_3
B. O_2
C. D_2O
D. O_1

Answer: A

61. In the upper atmosphere, ozone is made by ultraviolet light reacting with:
A. Oxygen
B. Hydrogen
C. Nitrogen
D. Water Vapor

Answer: A

62. The ozone concentration of 0.10 parts per million (ppm) is generally considered the maximum permissible for how many hours exposure?
A. 8 hrs

B. 4 hrs
C. 7 hrs
D. 3 hrs

Answer: A

63. How may moisture be removed from air?
A. Condensation
B. Absorption
C. A and B
D. none of these

Answer: C

64. In cooling cycle, the dry bulb temperature (db) of the air is lowered. When this happens, the relative humidity
A. increases
B. decreases
C. remains constant
D. increases or decreases depending on the temperature at which it is cooled

Answer: A

65. What is the effect of superheating the refrigerant?
A. It increases the Coefficient of Performance
B. It decreases the Coefficient of Performance
C. It lowers the boiling point of the refrigerant
D. It increases the suction pressure of the refrigeration

Answer: A

66. In sensible heating the absolute humidity remains constant but the relative humidity:
A. increases
B. decreases
C. Remains constant
D. zero

Answer: B

67. The relative humidity becomes 100% and where the water vapor starts to condense
A. Dew Point
B. Cloud Point
C. Saturated Point
D. Critical Point

Answer: A

68. Why should you avoid bending or twisting of fan blades in an air conditioning unit?
A. It will cause ice build-up
B. It will wear out the motor bearings and cause noise
C. It may slice suction line
D. It decreases the volume flow refrigerant

Answer: B

69. A type of refrigerant that will not damage the ozone layer
A. Hydroflourocarbons (HCF's)
B. Hydrochloroflourocarbons (HCHF's)
C. R- 22
D. R-12

Answer: A

70. Which of the following is the type of refrigerant that damages Ozone layer?
A. Hydrochloroflourocarbons (HCHF's)
B. R-12
C. R-22
D. All of these

Answer: D

71. Large-bulb alcohol thermometer used to measure air speed or atmospheric condition by means of cooling.
A. Kata Thermometer
B. Kelvin Thermometer
C. JJ Thompson Thermometer
D. Wet Bulb Thermometer

Answer: A

72. Which of the following components of the window air conditioning system must be cleaned annually?
A. Evaporator and Condenser
B. Motor and compressor
C. Fan Blades and Fan motor
D. All of these

Answer: D

73. The phenomenon that warm air rise and cold air settle is called:
A. Stratification
B. Sedimentation
C. Setting due
D. Ventilation

Answer: A

74. Air delivered to the room from the supply duct, moving at a velocity of 150 ft/min or more is called:
A. Primary Air
B. Secondary Air
C. Saturated Air
D. Air Turbulence

Answer: A

75. Carries needed to deliver air to the conditioned space. It is made of sheet of metals like aluminum, galvanized sheet steel and some structural materials that will not burn.
A. Duct
B. Air Inlet
C. Air Outlet
D. Diffuser

Answer: A

76. From what principle that air ducts operate?
A. Principle of Pressure Difference
B. Principle of Temperature Difference
C. Forced Draft Fan Principle
D. Principle of Natural Convection

Answer: A

77. Which of the following is the common classification of ducts?
A. Condition-Air Ducts
B. Recirculating
C .Fresh-air Ducts
D. All of these

Answer: D

78. It is used deliver concentrated airstreams into a room. Many have one-way or two-way adjustable air stream deflectors.
A. Register
B. Grille
C. Diffuser
D. Damper

Answer: A

79. It is used to control the air-throw distance, height and spread, as well as the amount of air.
A. Grille

B. Register
C. Diffuser
D. Damper

Answer: A

80. It is used to deliver widespread, fan-shaped flows of air into the room.
A. Grille
B. Register
C. Diffuser
D. Damper

Answer: C

81. Which of the following fans in air conditioning systems which can be classified as centrifugal flow?
A. Axial fan
B. Propeller fan
C. Bi-axial fan
D. None of these

Answer: B

82. The most common controller in the heating and cooling systems.
A. Thermostat
B. Pressure gage
C. Barometer
D. Sling Psychrometer

Answer: A

83. A thermostat that functions as increase or decrease instead of starting and stopping system is called:
A. modulate
B. heating-cooling the thermostat
C. interlocked
D. compound thermostat

Answer: A

84. A number used to compare energy usage for different areas. It is calculated by dividing the energy consumption by the fottage of the conditioned are.
A. Energy Utilization Unit
B. Energy Utilization Efficiency
C. Energy Utilization Index
D. Energy Utilization Ratio

Answer: C

85. The ratio of the rated cooling capacity divided by the amount of electrical power used:
A. Energy Efficiency Ratio (EER)
B. Energy Efficiency Index (EE)
C. Cooling Efficiency (CE)
D. Energy Cooling Ratio (ECR)

Answer: A

86. Heat exchanger in which water flows by gravity over the outside of the tubes or plates.
A. Baudelot Cooler
B. Free Cooler
C. Newtonian Cooler
D. Bourdon Cooler

Answer: A

87. A popular air conditioning system that includes a single outdoor condenser, three independent evaporators, and individual evaporator temperature control. The condensing unit is located outside on a slab. They are frequently used in legal and medical offices, motels and homes without ducts.
A. Multizone Ductless Split System
B. Package Terminal Air Conditioner
C. Console Air Conditioner
D. Window type Air Conditioner

Answer: A

88. An air conditioning system which is a combination of heating and cooling system. It is designed to serve an individual room or zone.
A. Multizone Ductless Split System
B. Package Terminal Air Conditioner
C. Console Air Conditioner
D. Window type Air Conditioner

Answer: B

89. Which of the following is to be checked as regular monthly maintenance schedule of a console air conditioning units?
A. Water Leaks
Fan Speeds
C. Cooling Tower
D. Duct Dampers, Registers and Diffusers

Answer: D

90. Which of the following is to be checked as part of the weekly maintenance schedule of a console air conditioners?
A. Filters
B. Humidifiers
C. Safety valves
D. Cooling Tower

Answer: D

91. A mechanism that removes moisture.
A. Humidifiers
B. Dehumidifiers
C. Moisturizers
D. Cooling Towers

Answer: B

92. When coil surface temperature is below the dew point of the air.
A. moisture will condense out of the air
B. vapor will evaporate through the air
C. air is dehumidified
D. air is humidified and saturated

Answer: A

93. Nitrogen occupied almost how much of the Earth's Atmosphere
A. One-fourth
B. Three-fourths
C. One-half
D. One-third

Answer: B

94. Water in vapor form remains a vapor as long as its temperature is what relations to the dew point temperature.
A. above
B. equals
C. below
D. almost

Answer: C

95. An instrument used in measuring air velocity by velocity-pressure method
A. Pitot Tube
B. Anemometer
C. Aneroid Barometer
D. Flowmeter

Answer: A

96. What is the specific humidity of dry air?
A. 100
B. 20
C. 0
D. 50
Answer: C

97. When hot soup was served in a cup during dinner, an engineer was so eager to drink it. Since it was hot, he added ice cubes of ice to cool the soup stirred it. He noticed that dew starts to form on the outermost surface of the cup. He wanted to check the temperature of the outermost surface of the cup. What is the temperature equal to?
A. superheated temperature
B. equal to zero
C. standard temperature
D. equal to air's dew point temperature

Answer: D

98. The temperature at which the water vapor in the gas begins to condense in a constant pressure process.
A. Dew point
B. Vapor point
C. Flue point
D. Gas point

Answer: A

99. All the following processes can be found on a psychrometric chart except:
A. humidification
B. sensible heating
C. natural convection
D. sensible cooling

Answer: C

100. All of the following process can be found on a psychrometric chart except:
A. heating and humidifying
B. cooling and dehumidification
C. black body radiation
D. evaporative cooling

Answer: C

101. Which is not commonly used to cool and dehumidify equipment?
A. Calcium chloride
B. Activated alumina
C. Sodium zeolite
D. Silica gel

Answer: A

102. All the following temperatures have meaning in psychrometrics excepts:
A. dry-bulb temperature
B. wet-bulb temperature
C. adiabatic wall temperature
D. dew point

Answer: C

103. The relative humidity is given by the:
A. ratio of the actual humidity to the saturated humidity at the same temperature and pressure
B. ratio of the partial pressure of water vapor to the saturation pressure
C. ratio of wet-bulb to dry-bulb temperature
D. ratio of dry-bulb temperature to dew point

Answer: B

104. The determination of properties and behavior of atmospheric air usually the purview of:
A. thermodynamics
B. psychrometrics
C. forced convection
D. Kirchoff's law

Answer: B

105. **Past ME Board Question**
Which of the following statements is correct?
The relative humidity of an air water vapor mixture
A. Is the ratio of the partial pressure of the water vapor to the partial pressure of the air
B. Indicates the mass of water vapor in the mixture
C. Is equal to the mole fraction of water vapor in the mixture at the mixture temperature
D. Is the ratio of the partial pressure of water vapor to the saturation pressure at the mixture temperature

Answer: D

106. **Past ME Board Question**
In sensible cooling process, moisture content
A. Does not change
B. Decreases
C. Indeterminate
D. Increases

Answer: A

107. **Past ME Board Question**
What amount of air is required in a low bypass factor?
A. Greater
B. Lesser
C. Indeterminate
D. Constant

Answer: B

108. **Past ME Board Question**
The design of an air supply duct of an air conditioning system _____.
A. Adds moisture to the air
B. Lowers the temperature of the air
C. Does not affect the moisture of air
D. Affects the distribution

Answer: D

109. **Past ME Board Question**
What is the lowest temperature to which water could possibly be cooled in a cooling tower?
A. The effective temperature
B. The temperature of adiabatic compression
C. The wet bulb depression
D. The dew point temperature of the air

Answer: B

110. **Past ME Board Question**
Combined process of cooling and humidifying is also known as:
A. Heating and humidifying
B. Cooling tower
C. Evaporative cooling process
D. Moisture removal process

Answer: C

111. **Past ME Board Question**
In a cooling tower, the water is cooled mainly by:
A. Condensation
B. Evaporation
C. Convection
D. Conduction

Answer: C

112. **Past ME Board Question**
Which of the following types of air dryers works by absorbing moisture on a solid dessicant or drying material such as activated alumina, silicon gel, or molecular sieve?
A. Regenerative dryer
B. Deliquescent dryer
C. Spray dryer
D. Refrigerated dryer

Answer: B

113. **Past ME Board Question**
The relationship of water vapor in the air at the dew point temperature to the amount that would be in the air if the air were saturated at the dry bulb temperature is:
A. Partial pressure actual at dew point
B. Percentage humidity
C. Relative humidity
D. Partial pressure of water

Answer: C

114. **Past ME Board Question**
When the air is saturated, the wet bulb depression is:
A. Zero
B. Indefinite
C. Unity
D. 100%

Answer: A

115. **Past ME Board Question**
A temperature measurement in an ordinary thermometer which has constant specific humidity
A. Critical temperature
B. Dew point temperature
C. Dry bulb temperature
D. Wet bulb temperature

Answer: B

116. **Past ME Board Question**
During sensible heating, the humidity remains constant but the relative humidity.
A. Increases
B. Decreases
C. Remains constant
D. Zero

Answer: B

117. **Past ME Board Question**
The relative humidity becomes 100% and where the water vapor starts to condense.
A. Critical point
B. Saturated point
C. Dew point
D. Cloud point

Answer: C

118. **Past ME Board Question**
What is the specific humidity of dry air?
A. 150
B. 100
C. 50
D. 0

Answer: D

119. **Past ME Board Question**
An engineer inspected an air-conditioning unit. He found out that the unit does not produce any cooling effect, however, the air-conditioning unit is running. He checked the temperatures of the condenser and evaporator and had the unit run. He found out that there was no change in temperature. What should he do?
A. Replace fuse
B. Charge with new refrigerant
C. Replace relay
D. Adjust door seal

Answer: B

120. **Past ME Board Question**
What is the temperature range of air in air conditioning application where the dry air can be considered ideal gas?
A. 100 to 125 ℃
B. 50 to 75 ℃
C. 75 to 100 ℃
D. -10 to 50 ℃

Answer: D

121. **Past ME Board Question**
What is the value of air stratification in air conditioning design fit for human comfort?
A. Minimum
B. Maximum
C. Less than air temperature
D. Equal to air temperature

Answer: C

CHAPTER 16-MACHINE FOUNDATION AND CHIMNEY
1. **Past ME Board Question**
Foundations are preferably built of concrete in the proportion of what measure of Portland cement; sand; crushed stones?
A. 1 : 2 : 5
B. 2 : 4 : 6
C. 2 : 3 : 5
D. 1 : 2 : 4

Answer: D

2. **Past ME Board Question**
For design stability, the center of gravity of the total combined engine, driven equipment and foundation should be kept _____.
A. Anywhere
B. Above the foundation top
C. In line with surface of the foundation
D. Below the foundation top

Answer: D

3. The machine foundation must have a factor of safety of
A. 4
B. 5
C. 6
D. 7

Answer: B

4. The diesel engine foundation safe soil bearing pressure is:
A. 4,890 kg/cm^2
B. 4,500 kg/cm^2
C. 4,490 kg/cm^2
D. 4,125 kg/cm^2

Answer: A

5. Anchor bolts in a machine foundation should be embedded in concrete of at least how many times the bolt diameter?
A. 12
B. 20
C. 30
D. 25

Answer: C

6. As a good practical rule, the foundation depth may be taken as how many times of the engine stroke?
A. 2.2 to 3.2
B. 3.2 to 4.2
C. 2.5 to 3.5
D. 3.5 to 4.5

Answer: B

7. To secure the belts embedded within the foundation, the distance of the edges of the foundation from the bedplate must be _____.
A. 120 mm to 300 mm
B. 150 mm to 330 mm
C. 100 mm to 280 mm
D. 200 mm to 380 mm

Answer: A

8. The weight of the machine foundation is how many times of the weight of the engine?
A. 4 to 5 times
B. 3 to 5 times
C. 2 to 3 times
D. 4 to 6 times

Answer: B

9. To eliminate transmission of vibration, the foundation should be isolated from floor slabs or building footings at least how many mm around its perimeter?
A. 15
B. 20
C. 25
D. 30

Answer: C

10. The minimum vertical distance from the floor or soil level to the top edge of the foundation must be around _____.
A. 150 mm
B. 100 mm
C. 200 mm
D. 120 mm

Answer: D

11. For stability, the total combined engine, driven equipment and foundation center of gravity must be kept _____.
A. below the foundation top
B. above the foundation top
C. 120 mm above the foundation top
D. none of the above

Answer: A

12. There shall be no foundation bolts less than ____.
A. 12 mm in diameter
B. 16 mm in diameter
C. 18 mm in diameter
D. 20 mm in diameter

Answer: A

13. The weight of steel bar reinforcements should be how many times the weight of the foundation?
A. ½% to 1%
B. 1% to 1.5%
C. 3% to 5%
D. 3.2% to 4.2%

Answer: A

14. Concrete foundation should have steel bar reinforcements placed vertically and horizontally to avoid ____.
A. breaking
B. thermal cracking
C. melting
D. vibration

Answer: B

15. Foundations bolt length should be at least how many times the anchor bolt diameter?
A. 16 times
B. 18 times
C. 20 times
D. 30 times

Answer: B

16. Foundation bolts of specified size should be used and surrounded by a pipe sleeve with an inside diameter of at least how many times the diameter of the anchor bolt?
A. 3
B. 4
C. 5
D. 6

Answer: A

17. For a diesel engine's foundation, in pouring a concrete mixture, it should be poured:
A. one time
B. two times
C. three times
D. four times

Answer: A

18. For foundations of steam turbine, the concrete mixture should be _____.
A. 1: 2: 4
B. 1: 3: 5
C. 1: 2: 3
D. 1: 3: 4

Answer: A

19. The steam turbine foundation should be designed to support the machine load plus how many percent of the impact, condenser load, floor loads and dead loads?
A. 15
B. 20
C. 25
D. 30

Answer: C

20. Which of the following draft rely on the stack effect to draw off combustion gases?
A. Natural draft
B. Forced draft
C. Induced draft
D. Balanced draft

Answer: A

21. Fans located before the furnace that are used to supply air for burning.
A. Natural draft
B. Forced draft
C. Induced draft
D. Balanced draft

Answer: B

22. Forced draft fans are run at relative high speed in the range of:
A. 1200 to 1800 rpm
B. 1000 to 1600 rpm
C. 1500 to 2000 rpm
D. 900 to 1500 rpm

Answer: A

23. Chimneys that rely on natural draft are sometimes referred to as
A. natural chimney
B. gravity chimney
C. normal chimney
D. stack

Answer: B

24. Force draft fans create a positive pressure of:
A. 0.5 to 2.5 kPa
B. 1.0 to 3.0 kPa
C. 2.0 to 4.0 kPa
D. 0.2 to 2.2 kPa

Answer: A

25. Fans that are used to draw combustion products through the furnace bed, stack, and pollution control system by injecting air into the stack after combustion.
A. Natural draft
B. Forced draft
C. Induced draft
D. Balanced draft

Answer: C

26. The term used when the static pressure is equal to the atmospheric pressure.
A. Natural draft
B. Forced draft
C. Induced draft
D. Balanced draft

Answer: D

27. In order to keep combustion products inside the combustion chamber and stack system, balanced draft system may actually operate with a slight
A. negative pressure
B. positive pressure
C. positive and negative pressures
D. absolute pressure

Answer: A

28. The static pressure drop due to friction through the boiler and stack.
A. draft loss
B. available draft
C. stack effect
D. fan boost

Answer: A

29. The difference between the theoretical draft and the draft loss.
A. draft loss
B. available draft
C. stack effect
D. fan boost

Answer: B

30. In a balanced system, the available draft is:
A. unity
B. zero
C. 100
D. infinite

Answer: B

31. The total pressure supplied by the fan at maximum operating conditions.
A. net rating or fan boost
B. draft loss
C. available draft
D. stack effect

Answer: A

32. Generally the higher the chimney
A. the smaller the stack effect
B. the greater the stack effect
C. stack effect is zero
D. the stack effect approaches unity

Answer: B

33. Modern stacks are seldom built higher than
A. 60 m
B. 50 m
C. 40 m
D. 30 m

Answer: A

34. Most stacks are built of height less than:
A. 60 m
B. 50 m
C. 40 m
D. 30 m

Answer: D

35. The average flue gas temperature is
A. the temperature entering the stack
B. the temperature leaving the stack
C. the temperature halfway up the stack
D. the sum of the temperatures

Answer: C

36. The coefficient of velocity is approximately
A. 0.30 to 0.50
B. 0.40 to 0.60
C. 0.20 to 0.40
D. 0.50 to 0.70

Answer: A

37. For realistic problems, the achievable stack effect probably should be considered to be:
A. 75% of the ideal
B. 80% of the ideal
C. equal to the ideal
D. half the ideal

Answer: B

38. Guyed stacks seldom exceed:
A. 1.83 m in diameter
B. 2.83 m in diameter
C. 1.45 m in diameter
D. 2.45 m in diameter

Answer: A

39. The angle between the stack and the guy wire is usually:
A. 30 degrees
B. 45 degrees
C. 60 degrees
D. 75 degrees

Answer: C

40. Guyed stacks height seldom exceeds:
A. 30.48 m
B. 34.80 m
C. 43.80 m
D. 48.30 m

Answer: A

41. The maximum unit pressure of turbine and generator on the reinforced concrete should not exceed
A. 17.62 kg/cm^2
B. 18.62 kg/cm^2
C. 16.62 kg/cm^2
D. 19.62 kg/cm^2

Answer: A

42. Foundations should be isolated from floor slabs or building footings by at least how many mm to eliminate transmission of vibration.
A. 25 mm
B. 15 mm
C. 35 mm
D. 45 mm

Answer: A

43. Concrete foundations should have steel bar reinforcements placed both vertically and horizontally to avoid
A. vibrations
B. thermal cracking
C. breakdown
D. rupture

Answer: B

44. Foundation bolts of specified size should be used and surrounded by a pipe sleeve with an inside diameter of at least how many times the diameter of the anchor bolt?
A. 3
B. 4
C. 5
D. 6

Answer: A

45. Foundation bolts of specified size should be used and surrounded by a pipe sleeve with a length of at least how many times the diameter of the bolt?
A. 18
B. 14
C. 15
D. 16

Answer: A

46. Foundation should be designed to support the machine load plus how many percent of the impact, condenser load, floor loads and dead loads?
A. 25
B. 34
C. 15
D. 36

Answer: A

47. In guyed steel stacks, the angel between wires in a set of three is:
A. 120 deg.
B. 110 deg.
C. 135 deg.
D. 145 deg.

Answer: A

48. Guys are usually applied in how many sets?
A. 1 to 3
B. 2 to 4
C. 3 to 5
D. 4 to 6

Answer: A

49. The empirical coefficient e in machine foundation if not given is assumed
A. 0.11
B. 0.25
C. 0.32
D. 0.15

Answer: A

50. The term suction units is used with
A. Natural draft
B. Forced draft
C. Induced draft
D. Balanced draft

Answer: C

CHAPTER 17 – INSTRUMENTATION

1. An instrument used for measuring evaporation, generally that of water, into the atmosphere.
A. Aerometer
B. Atmometer
C. Anemometer
D. Fadometer

Answer: B

2. An instrument for testing the resistance of materials to fading when they are exposed to artificial sunlight or ultraviolet light under controlled conditions.
A. Fadometer
B. Fulgurator
C. Odometer
D. Atmometer

Answer: A

3. The type of calorimeter in which the specific heat of a specimen is measured by the quantity of ice it melts is the:
A. ice calorimeter
B. heat calorimeter
C. vapor calorimeter
D. hysometer

Answer: A

4. An instrument used for determination of the boiling point of water for estimating the altitude above sea level from its known variation with atmospheric pressure.
A. Vapor calorimeter
B. Hysometer
C. Boiler
D. Vapor bomb

Answer: B

5. A unit of work or energy equal to 10^7 ergs. It is equivalent to the work done by a force of one Newton acting through a distance of one meter.
A. Btu
B. Calorie
C. Joule
D. Watt

Answer: C

6. An electromagnetic device for separating isotopes by electrical sorting of their ions.
A. Ion sorter
B. Isotopes sorter
C. Isotron
D. Jolly balance

Answer: C

7. A device used for the determination of the specific gravity of a substance by weighing it in air and in water.
A. Kelvin balance
B. Spring balance
C. Hysometer
D. Jolly balance

Answer: D

8. Which of the following instruments is NOT used to measure flow rates?
A. Anemometer
B. Rotameter
C. Flowmeter
D. Velometer

Answer: D

9. An instrument used to measure the quality of steam is the:
A. psychometer
B. gas calorimeter
C. pyrometer
D. steam calorimeter

Answer: D

10. An instrument used to measure the density of gases is known as:
A. aerovane
B. aerometer
C. hygrometer
D. atmometer

Answer: A

11. Which of the following is the apparatus used for mixing air with other fluids?
A. Carburetor
B. Dehydrator
C. Gas mixer
D. Aerator

Answer: D

12. A device that supplies air to an air-injection system is called
A. air pump
B. air nozzle
C. gas scrubber
D. air injector

Answer: B

13. An instrument used for measuring pressure, flow velocity and discharge rate of a fluid flowing in a conduit.
A. Kampometer
B. Flowmeter
C. Pitot tube
D. Katharometer

Answer: B

14. An instrument used for measuring radiant energy especially in the thermal region.
A. Kampometer
B. Luxmeter
C. Kapnometer
D. Katharometer

Answer: A

15. An instrument for determination of the composition of the gas mixture by measuring variations in the thermal conductivity.
A. Kampometer
B. Atmometer
C. Kapnometer
D. Katharometer

Answer: D

16. An apparatus used for measuring the surface tension of a liquid by recording the force necessary to detach a metal ring from the surface.
A. Tachometer
B. Tensiometer
C. Odometer
D. Telemeter

Answer: B

17. An instrument used for measuring various quantities at a distance.
A. Tachometer
B. Odometer
C. DME
D. Telemeter

Answer: D

18. An apparatus used for determination of the transition point by measuring the temperature at which the vapor pressure of the two modifications become equal.
A. Tensiometer
B. Tensimeter
C. Tachometer
D. Bourdon gage

Answer: B

19. An instrument for measuring the revolutions per minute of a rotating shaft.
A. Tachometer
B. Odometer
C. All of the choices
D. Speedometer

Answer: A

20. A device used for demonstrating the extreme force exerted by water when if freezes is called:
A. Ice calorimeter
B. Hysometer
C. Ice bomb
D. Freezer

Answer: C

21. A device to measure vertical distances or displacements?
A. Kampometer
B. Kapnometer
C. Altimeter
D. Cathetometer

Answer: D

22. A precision instrument for measuring very short time intervals.
A. Clinometer
B. Chronoscope

C. Stop watch
D. Decremeter

Answer: B

23. Which of the following is a laboratory method for the determination of the boiling range of petroleum?
A. Jolly balance
B. Kelvin balance
C. Engler distillation
D. Fractional distillation

Answer: C

24. An instrument used to measure the humidity in the air.
A. Hygrometer
B. Hydrometer
C. Pressure gauge
D. Wind vane

Answer: A

25. An instrument used to measure the specific gravity or relative density of liquids.
A. Hygrometer
B. Hydrometer
C. U – tube
D. Manometer

Answer: B

26. An apparatus used for the determination of the concentration of solid or liquid particles dispersed in a gas, such as the density of smoke in fog.
A. Kampometer
B. Atmometer
C. Kapnometer
D. Katharometer

Answer: C

27. **Past ME Board Question**
Hydrometer is used to find out:
A. Specific gravity of liquids
B. Specific gravity of solids
C. Specific gravity of gases
D. Relative humidity

Answer: A

28. **Past ME Board Question**
What is the clockwork operated device which records continuously the humidity of the atmosphere?
A. Hetrograph
B. Hygrometer
C. Hygrodeik
D. Hygrograph

Answer: D

29. **Past ME Board Question**
A device whose function is to pass an information in an unchanged form or in some modified form.
A. Relay
B. Sensor
C. Transmitter
D. Transducer

Answer: A

30. **Past ME Board Question**
A general term for a device that receives information in the form of one or more physical quantities, modifies the information and or its form if required and produces a resultant output signal.
A. Converter
B. Transducer
C. Sensor
D. Scanner

Answer: B

31. **Past ME Board Question**
An engine indicator is generally used to measure what?
A. Steam temperature
B. Heat loss
C. Steam cylinder pressure
D. Gauge reading errors

Answer: C

32. **Past ME Board Question**
In the processing section, there is an instrument frequently used to measure the flow rate of fluids. What is the instrument consisting of a vertical passage with variable cross-sectional area, a float and a calibrated scale?
A. Rotameter
B. Pitot tube
C. Rota Aire
D. Manometer

Answer: A

33. **Past ME Board Question**
What is the function of a steam separator?
A. Trapping the steam and letting water through
B. Throttling
C. Changing the direction of the steam flow
D. Steam metering

Answer: A

34. **Past ME Board Question**
A salimeter reads the:
A. Density of brine
B. Dew point temperature
C. Rate of brine
D. Relative humidity

Answer: A

35. **Past ME Board Question**
Which of following measures the density of salt in the water?
A. Salimeter
B. Pitot tube
C. Hydrometer
D. Odometer

Answer: A

CHAPTER 18 – BASIC ELECTRICAL ENGINEERING
1. Ebb current refers to:
A. the eddy current
B. the movement of the tidal current away from shore or down a tidal stream
C. the removal by screen of undesirable fine materials from broken ore
D. none of the above

Answer: D

2. In power station practice “spinning reverse” is
A. reverse generating capacity that is in operation but not in service
B. reserve generating capacity that is connected to bus and ready to take load
C. reserve generating capacity that is available for service but not in operation
D. capacity of the part of plant remains under maintenance

Answer: B

3. Turnaround efficiency of battery energy storage system is about
A. 75 percent
B. 40 percent
C. 25 percent
D. 80 percent

Answer: A

4. Most of the generators in thermal power plants run at:
A. 15000 rpm
B. 1500 rpm
C. 750 rpm
D. 3000 rpm

Answer: B

5. The power supplied to domestic consumers is at 220 volts. This represents:
A. mean value of voltage
B. seak value of voltage
C. RMS value of voltage
D. none of the above

Answer: C

6. The conductors that are used for transmitting bulk of power at high voltage are of which of the following type?
A. Cadmium copper
B. Galvanized steel
C. Any of the above
D. Copper

Answer: D

7. When a conductor is suspended between two supports at the same level its shape becomes:
A. catenary
B. cycloid
C. semicircle
D. parabola

Answer: A

8. Sag is provided in overhead transmission lines so that:
A. repairs can be carried out easily
B. corona can be reduced
C. skin effect can be reduced
D. safe tension is not exceeded

Answer: D

9. The string efficiency in an AC system is:
A. 50.75%
B. 100%
C. 25.50%
D. 70.7%

Answer: D

10. Satellites are powered by
A. solar cells
B. thermo-electric generators
C. thermionic converters
D. photo-electric cells

Answer: A

11. A ship is powered by:
A. steam turbine
B. diesel engines
C. steam turbines or diesel engine
D. steam turbines, diesel engines, hydraulic turbines or nuclear reactors

Answer: C

12. Which of the following plant is suitable for peak load?
A. Diesel engine plant
B. Steam power plant
C. Nuclear power plat
D. All of the above

Answer: A

13. The term ‘critical’ is associated with power plant of the type:
A. steam power plant
B. diesel engine power plant
C. gas turbine power plant
D. nuclear power plant

Answer: D

14. A turbocharger is a part of:
A. thermal power plant
B. diesel engine power plant
C. hydro-electric power plant
D. nuclear power plant

Answer: B

15. Which of the following plant has least pollution problem?
A. Steam power plant
B. Gas turbine power plant
C. Nuclear power plant
D. Hydro-electric power plant

Answer: D

16. Which of the following power plant can be installed within the shortest time?
A. Nuclear power plant
B. Hydro-electric power plant
C. Gas turbine power plant
D. Diesel engine plant

Answer: D

17. Which of the following item consumes least power?
A. Toaster
B. Desert cooler
C. Electric shaver
D. Electric iron

Answer: C

18. Which of the following needs highest level of illumination?
A. Proof reading
B. Hospital wards
C. Railway platforms
D. Foyer for cinema halls

Answer: A

19. The lamp that is used for cinema projectors is a:
A. frosted GLS lamp
B. nitrogen filled GLS lamp
C. mercury vapor lamp
D. carbon arc lamp

Answer: D

20. In a fluorescent tube circuit, choke acts as
A. a starter
B. a device for improving the power factor
C. a current limiting device
D. a source of heat

Answer: B

21. Transient disturbances are due to:

A. switching operations
B. load variations
C. faults
D. any of the above

Answer: D

22. Bottoming cycle is quite common in:
A. cement plants
B. sugar mills
C. paper mills
D. all of the above

Answer: A

23. Which of the following is the most highly developed device for confining plasma with magnetic field?
A. Tokamak
B. Tomahawk
C. Breeder reactor
D. Cyclotron

Answer: A

24. Fuses and circuit breakers do not protect electric motors from:
A. short circuiting
B. motor burnout
C. overload
D. overheating

Answer: D

25. Corona generally results in:
A. violet glow
B. hissing noise
C. production of ozone gas
D. all of the above

Answer: D

26. Which of the following affects corona?
A. Conductor size
B. Spacing between conductors
C. Line voltage
D. All of the above

Answer: D

27. The statement that the product of the error in the measured determination of a particle's position and its momentum is of the order Planck's constant "h" is known as
A. Bohr's theory
B. D'Alembert's paradox
C. the Heisenberg uncertainty principle
D. Planck's law

Answer: C

28. The phenomenon of physical adhesion of molecules of the surfaces of solids without chemical reaction is
A. dredging
B. adsorption
C. coking
D. liquation

Answer: B

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A. short circuiting
B. motor burnout
C. overload
D. overheating

Answer: D

30. In which of the following systems where Betz law is widely used?
A. MHD system
B. solar cells
C. geothermal power plants
D. wind mills

Answer: D

31. At what rpm where most of the generators in thermal power plants run?
A. 15000 rpm
B. 1500 rpm
C. 750 rpm
D. 3000 rpm

Answer: B

32. Turnaround efficiency of battery energy storage system is about
A. 75 percent
B. 40 percent
C. 25 percent
D. 80 percent

Answer: A

33. The conductors that are used for transmitting bulk of power at high voltage are of which of the following type?
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D. All of the above

Answer: D

36. When a conductor is suspended between two supports at the same level its shape becomes
A. catenary
B. cycloid
C. semicircle
D. parabola

Answer: A

37. **Past ME Board Question**
What is the unit of electromagnetic wave frequency?
A. Volts
B. Horsepower
C. Hertz
D. Knot

Answer: C

CHAPTER 19 – LATEST BOARD QUESTION
1. **Past ME Board Question**

A pump with capacity Q_1 and head H_1 is connected in series with another pump with capacity Q_2 and head H_2. What is the head developed if Q_2 is less than Q_1?

A. $2H_2\ H_1$
B. $H_2 + H_1$
C. H_2 / H_1
D. $H_2 H_1$

Answer: B

2. **Past ME Board Question**
At ordinary temperature what substance will behave as inert gas and will not react in the combustion process?

A. Nitrogen
B. Sulfur
C. Hydrogen
D. Carbon

Answer: A

3. **Past ME Board Question**
Which of the following cycles is ideal for spark-ignition reciprocating engine?

A. Diesel cycle
B. Dual cycle
C. Rankine cycle
D. Otto cycle

Answer: D

4. **Past ME Board Question**
What is the relative humidity when the dew point and dry bulb temperature are equal?

A. 110%
B. 0%
C. 100%
D. 50%

Answer: C

5. **Past ME Board Question**
Reheating process is normally employed in steam plane when:

A. There is excess steam
B. Subcooling is required
C. Turbine undergoes excessive moisture
D. Dehumidifying is required

Answer: C

6. **Past ME Board Question**
Where does the final removal of water vapor in an absorption refrigeration system occur?

A. Analyzer
B. Generator
C. Condenser
D. Rectifier

Answer: D

7. **Past ME Board Question**
If the average temperature of liquid of power cycle during heat addition process is as high as possible, then the thermal efficiency of the cycle will:

A. Increase
B. Remain constant
C. Decrease
D. Zero

Answer: A

8. **Past ME Board Question**
What is the temperature of lubricant at which it will ignite thus limits its application?

A. Cold point
B. Burning point
C. Flash point
D. Use point

Answer: C

9. **Past ME Board Question**
What is the heat that is removed from the space to be cooled, which is the same as the heat absorbed by the cooling coils?

A. Heating capacity
B. Enthalpy
C. Work compression
D. Refrigerating effect

Answer: D

10. **Past ME Board Question**
An air conditioning system in which water is chilled or cooled and which passes the evaporator coils.

A. Chilled water system
B. Direct expansion
C. Absorption
D. Water circulation system

Answer: A

11. **Past ME Board Question**
A multi-stage refrigeration system which is realizable in using different refrigerants

A. Direct
B. Cascade
C. Flooded
D. Vapor

Answer: B

12. **Past ME Board Question**
Very large pipe diameter means a thicker wall and high cost. It also means

A. Zero pressure drop
B. High pressure drop
C. Constant temperature
D. Low pressure drop

Answer: B

13. **Past ME Board Question**
Aside from maintaining appropriate temperature for food cold storage, how is desiccation minimized or decreased?

A. Low oxygen
B. Maintain humidity ratio
C. Low air circulation
D. Increase humidity ratio

Answer: B

14. **Past ME Board Question**
During combustion process, only limited air is supplied and not enough to supply two molecule of oxygen per one molecule of carbon, then the product is:

A. Hydration
B. Carbon monoxide
C. Carbonic acid
D. Carbon dioxide

Answer: B

15. **Past ME Board Question**
As far as combustion chamber design is considered, the maximum power output of a given engine can be increased by:

A. Increasing combustion time
B. Increasing combustion chamber volume
C. Decreasing combustion chamber volume
D. Providing small values

Answer: C

16. **Past ME Board Question**
A water conservation device which employs both air and water is condensed a condenser and cooling tower combined into one is called:

A. Shell and tube condenser
B. Air-cooled condenser
C. Water-cooled condenser
D. Evaporative condenser

Answer: D

17. **Past ME Board Question**
In order to perform efficiently, a power cycle must be communicated with the outside temperature of its surroundings and into one is called:

A. Kirchoff's Law
B. Second Law of Thermodynamics
C. Kelvin-Planck Law
D. Frist Law of Thermodynamics

Answer: B

18. **Past ME Board Question**
Water is heated in a container. It expands and becomes less dense and lighter. It rises up the container because of its reduced density and replaced by cooler air. As this process continues, the heat is transferred and disturbed all throughout. What is this mode of heat transfer called?

A. Condenser
B. Radiation
C. Conduction
D. Convection

Answer: D

19. **Past ME Board Question**
When required, a regulator water valve in refrigerating system should be

A. On the suction line on compressor line
B. In the water inlet
C. Anywhere in the system
D. In the water outlet

Answer: D

20. **Past ME Board Question**
When there is no work between the thermodynamic system and its surrounding, the quantity of net heat transfer is equal to:

A. Total energy of an open system
B. Temperature of an open system
C. Total energy of a closed system
D. Temperature of a closed system

Answer: D

21. **Past ME Board Question**
In order to attain equilibrium in the condenser, the cooling tower range must be _____ with respect to temperature rise in the condenser.

A. Greater
B. Equal
C. Less
D. Zero

Answer: B

22. **Past ME Board Question**
If ice will form in a solution of water and salt, then it is at a temperature called:

A. Dew point
B. Freezing point depression
C. Boiling point depression
D. Critical point

Answer: B

23. **Past ME Board Question**
The flow of the convergent section of a nozzle is always subsonic. If the flow is subsonic then the mach number is:

A. Greater than unity
B. Less than unity
C. Near than unity
D. Unity

Answer: B

24. **Past ME Board Question**
One hundred twenty percent theoretical air was supplied for combustion. What is the equivalent excess equal to:

A. 20%
B. 100%
C. 240%
D. 120%

Answer: A

25. **Past ME Board Question**
If Pi is the indicated horsepower and Pb is the indicated horsepower of a compressor, then what is mechanical efficiency, Em, equal to:

A. Em = Pb / Pi
B. Em = Pi / Pb
C. Em = Pb – Pi
D. Em = Pi – Pb

Answer: B

26. **Past ME Board Question**
What is the least number of compressors a multistage system that will use?

A. Three
B. Two
C. Four
D. One

Answer: B

27. **Past ME Board Question**
The relation between the Fahrenheit absolute scale and the Celsius absolute scale is:

A. R = 1.8 K
B. R = 32 K
C. R = 3.2 K
D. R = 18 K

Answer: A

28. **Past ME Board Question**
The sum of the internal energy and the product of pressure and specific volume is known as the:

A. Enthalpy
B. Entropy
C. Total work
D. Total internal energy

Answer: A

29. **Past ME Board Question**
A refrigeration control that guards the compressor from overloads brought about by abruptly increases loads resulting from defrosting, warm products and others, is called:

A. Safety valve
B. Suction hold-back valve
C. Solenoid valve
D. Expansion valve

Answer: B

30. **Past ME Board Question**
What does fossil-fuel fired power plants release, which in turn produces the key ingredient in acid rain?

A. Nitrogen
B. Sulfur emission
C. Carbon monoxide
D. Carbon dioxide

Answer: B

31. **Past ME Board Question**
The fraction of the radiation energy incident on a surface which is absorbed by the surface is called:

A. Convection
B. Absorptivity
C. Emission
D. Radiation

Answer: B

32. **Past ME Board Question**
Which of the following power plants uses energy from uranium to produce electric power?

A. Diesel Plant
B. Geothermal Plant
C. Nuclear Plant
D. Hydroelectric Plant

Answer: C

33. **Past ME Board Question**
Ice cubes added to a glass of water and stirred. Moisture starts to form on the outer surface of the glass. At this point, what is the temperature at the outer surface called?

A. Critical temperature
B. Surface temperature
C. Dew point temperature
D. Saturation temperature

Answer: C

34. **Past ME Board Question**
The force when applied to a mass of one kilogram will give mass an acceleration of one meter per second for every second called:

A. Watt
B. Joule
C. Newton
D. Pascal

Answer: C

35. **Past ME Board Question**
The kinetic energy of a moving fluid is used to isentropically compressed the fluid to state of zero velocity. The temperature of a moving fluid at the state zero velocity is called:

A. Stagnation temperature
B. Partial temperature
C. Critical temperature
D. Absolute temperature

Answer: A

36. **Past ME Board Question**
The dew point temperature of the products of combustion in the saturation temperature that corresponds to the partial pressure of the _____ in the products.

A. SO_2
B. H_2O
C. N_2
D. CO_2

Answer: B

37. **Past ME Board Question**
What do we call a device that is used to boiler operation that will stop the burner or at least send a signal to the operator if the water drops to a low level that is no longer safe?

A. Safety valve
B. Dead-weight valve
C. High water cut off
D. Low water cut off

Answer: D

38. **Past ME Board Question**
Dry analysis is a fractional analysis of the products of combustion which does not include:

A. Water vapor
B. Carbon dioxide
C. Sulfur dioxide
D. Carbon monoxide

Answer: A

39. **Past ME Board Question**
The size of a reciprocating pump is stamped on the builder's plate 3" x 4" x 6". The diameter of the liquid cylinder is:

A. 5"
B. 6"
C. 3"
D. 4"

Answer: D

40. **Past ME Board Question**
One foot water is equal to:

A. 0.4138 lb/in^2
B. 68.3 lb/ft^2
C. 0.8673 lb/in^2
D. 62.43 lb/ft^2

Answer: D

41. **Past ME Board Question**
The freezing point of R – 22 is:

A. -109 °F
B. -252 °F
C. -256 °F
D. -211 °F

Answer: C

42. **Past ME Board Question**
Which of the following is a type of evaporator?

A. Shell-and-tube condenser
B. Shell-and-tube water cooler
C. Oil lantern rings
D. Polyphase motors

Answer: A

43. **Past ME Board Question**
For Brayton cycle, the result of regeneration is:

A. Increase in thermal efficiency
B. Decrease thermal efficiency
C. Moderate thermal efficiency
D. Low thermal efficiency

Answer: A

44. **Past ME Board Question**
If the pressure exerted on a liquid is higher than the saturation corresponding to its temperature. The liquid is a:

A. Saturated liquid
B. Subcooled liquid
C. Superheated liquid
D. Highly superheated liquid

Answer: B

45. **Past ME Board Question**
In a power driven pump, each piston stroke is displaced by 360^o divided the _____.
A. Revolution per minute
B. Bore
C. Length of the stroke
D. Number of cylinders

Answer: D

46. **Past ME Board Question**
If the air is compressed without discarding heat, then what do you call this kind of compression?
A. Isobaric
B. Isochoric
C. Adiabatic
D. Isothermal

Answer: C

47. **Past ME Board Question**
If a gas possesses internal energy, then it is due to its:
A. Velocity
B. Pressure and volume values
C. Height from a certain datum level
D. Molecular motion

Answer: D

48. **Past ME Board Question**
The pressure of ammonia was detected in brine solution. How can ammonia be removed?
A. Freeze the brine solution
B. Heat the brine to a high temperature enough to free the ammonia
C. Throw the brine solution
D. Low the temperature of the brine

Answer: B

49. **Past ME Board Question**
What will happen when the pressure at any point inside a centrifugal pump goes below the vapor pressure corresponding to the temperature of the liquid?
A. Turbulent flow
B. Laminar flow
C. Cavitation
D. Priming

Answer: C

50. **Past ME Board Question**
What does a negative Joule-Thompson coefficient means during a throttling process?
A. Fluid pressure is constant
B. Fluid temperature drops
C. Fluid temperature rises
D. Fluid pressure zero

Answer: C

51. **Past ME Board Question**
For steam power plants, increasing the operating pressure of the boiler will:
A. Increase thermal efficiency
B. Decrease thermal efficiency
C. Bring thermal efficiency to zero
D. Make thermal efficiency constant

Answer: A

52. **Past ME Board Question**
The ratio of the average load to that of the rated capacity of a plant is called:
A. Output factor
B. Load factor
C. Demand factor
D. Capacity factor

Answer: D

53. **Past ME Board Question**
What is the method used to evaluate all welds performed on pressure parts of boiler tube materials?
A. Hydrostatic test
B. Orsat analysis
C. Vacuum test
D. Radiographic test

Answer: D

54. **Past ME Board Question**
If the pressure is disregarded in the various other components of a steam of gas power plants, the pressure rise in the pump or compressor is ____ to the pressure drop in the turbine.
A. Inversely proportional
B. Constant
C. Equal
D. Varying

Answer: C

55. **Past ME Board Question**
What is the effect on saturated temperature if the pressure of the fluid is decreased?
A. There is no effect
B. Saturation temperature decreases
C. Saturation temperature remains constant
D. Saturation temperature increases

Answer: B

56. **Past ME Board Question**
If V3 is the cylinder volume after the combustion process of a Diesel cycle and V2 is its cylinder volume before combustion, then calculate the cut-off ratio, r.
A. r = V3 – V2
B. r = V2 – V3
C. r = V2 / V3
D. r = V3 / V2

Answer: D

57. **Past ME Board Question**
Compare the temperature of discharge vapor refrigerant leaving the compressor for a superheated cycle and saturated cycle, for the same condensing temperature and pressure.
A. There is no difference
B. Higher for the superheated cycle
C. Higher for the saturated cycle
D. Lower for the superheated cycle

Answer: B

58. **Past ME Board Question**
A valve that releases steam from the boiler by opening at a pre-determined pressure in order to keep the steam pressure from rising more than the pressure from which the valve is set is called a
A. Ammonia valve
B. Stop valve
C. Check valve
D. Safety valve

Answer: D

59. **Past ME Board Question**
What is the relationship of the capacity of a centrifugal pump, Q, to impeller diameter, D, when there are two impeller diameters in the same pump?

A. Q is directly proportional to the square of the ratio of D
B. Q is inversely proportional to the ratio of D
C. Q. is directly proportional to the ratio of D
D. Q is inversely proportional to the square of the ratio of D

Answer: C

60. **Past ME Board Question**
If Wt is the turbine shaft work of a gas turbine unit, Wc is its compressor shaft work and Q is the heat supplied in fuel, then determine its thermal efficiency.
A. Q / (Wt – Wc)
B. Q / (Wt + Wc)
C. (Wt + Wc) / Q
D. (Wt – Wc) / Q

Answer: D

61. **Past ME Board Question**
The schedule number of a pipe, N, indicates the thickness of the pipe wall. If the allowable stress of the pipe is S, then what is the internal pressure equal to?
A. N – S
B. N / S
C. N x S
D. S / N

Answer: C

62. **Past ME Board Question**
What is the pressure present inside the casing of an impulse turbine?
A. Vacuum
B. Atmospheric pressure
C. Above atmospheric
D. Zero

Answer: B

63. **Past ME Board Question**
In order to remove the fly ashes from the flue gas, which of the following must a power plant equipped with?
A. Condenser
B. Demineralizer
C. Electrostatic precipitator
D. Desulphurization plant

Answer: C

64. **Past ME Board Question**
If Hs is the total suction head of a pump, Hp is its suction surface pressure, and Hf is its suction friction head, then calculate the total suction head, Ht.
A. Ht = Hs – Hp – Hf
B. Ht = Hs + Hp – Hf
C. Ht = Hs + Hp + Hf
D. Ht = Hs – Hp + Hf

Answer: C

65. **Past ME Board Question**
The constant spending of certain percentage of circulated water in a cooling tower in order to prevent accumulation of dissolved mineral solids and other impurities in the condenser water is called
A. Approach
B. Drift
C. Range
D. Bleed-off

Answer: D

66. **Past ME Board Question**
What process is employed when the turbine steam power plants experience excessive moisture?
A. Reheating
B. Supercooling
C. Subcooling
D. Freezing

Answer: A

67. **Past ME Board Question**
A company is interested to produce a water turbine wherein only little energy is required or necessary because the guide vanes are to be controlled. The turbine must be a:
A. Gas turbine
B. Propeller turbine
C. Kaplan turbine
D. Francis turbine

Answer: C

68. **Past ME Board Question**
If Et is the total net energy generated by a plant in a certain period of time and Er is the rated net energy capacity of the plant during the same period of time, then what is the plant operating factor?
A. Er – Et
B. Et / Er
C. Et – Er
D. Er / Et

Answer: B

69. **Past ME Board Question**
If W is the work output of a heat engine and H is the total heat input of an engine, then determine its thermal efficiency, e.
A. e = H/ W
B. e = W / H
C. e = W x H
D. e = I – (W – H)

Answer: B

70. **Past ME Board Question**
Which of the following is converted to mechanical energy by a water.
A. Internal energy
B. Kinetic energy
C. Potential energy
D. Hydraulic energy

Answer: C

71. **Past ME Board Question**
What must be the value of the available Net Positive Suction Head (NPSH) of a centrifugal pump compared to its require NPSH to avoid losing priming?
A. Available NPSH lesser than required NPSH
B. Available NPSH equal than required NPSH
C. Available NPSH greater than required NPSH
D. Available NPSH constant at all times

Answer: C

72. **Past ME Board Question**
What type of fuel is used with stationary power plants where gas is available by pipeline?
A. Gaseous fuels
B. Solid fuels
C. Coal
D. Liquid fuels

Answer: A

73. **Past ME Board Question**
Wb is shaft work of an engine and Wi is the indicated work of an engine. If mechanical friction is present in the engine mechanism, then:

A. Wb is equal to Wi
B. Wb is less than Wi
C. Wb is proportional to Wi
D. Wb is greater than Wi

Answer: B

74. **Past ME Board Question**
What is the saturation pressure at the critical temperature, or the lowest pressure in which a substance can be in the liquid state at its critical pressure?
A. External pressure
B. Critical pressure
C. Condensing pressure
D. Evaporation pressure

Answer: B

75. **Past ME Board Question**
What is the significance of a high dielectric strength of lubricating oil?
A. Oil is thick
B. Oil is contaminant – free
C. Oil is thin
D. Oil is not clean

Answer: B

76. **Past ME Board Question**
Theoretically, what is the effect of the compressor clearance on horsepower?
A. Varies in direct proportion
B. Increase power
C. Decrease power
D. There is no effect

Answer: D

77. **Past ME Board Question**
Compare the refrigerating effect per unit mass of refrigerant circulated for a superheated cycle that produces useful cooling and a saturated cycle, for the same vaporizing and condensing temperature.
A. Lower for a superheated cycle
B. Greater for a saturated cycle
C. The same
D. Greater for a superheated cycle

Answer: D

78. **Past ME Board Question**
It is important to take some moisture from the air to dehumidify it if the relative humidity reaches high levels. To do this, it requires cooling the air:
A. At wet-bulb temperature
B. Above its dew point temperature
C. At critical temperature
D. Below its dew point temperature

Answer: D

79. **Past ME Board Question**
What does enthalpy measure in a substance?
A. Its coldness
B. Its heat content
C. Its humidity
D. Its dew point

Answer: B

80. **Past ME Board Question**
Pneumatic tools are powered by:
A. Natural gas
B. Air
C. Electricity
D. Steam

Answer: B

81. **Past ME Board Question**
The pump will not cavitate if the available Net Positive Suction Head (NPSH) is:
A. Less than the required NPSH
B. Equal or lesser than the required NPSH
C. Equal or greater than the required NPSH
D. Zero compared to the required NPSH of 1

Answer: C

82. **Past ME Board Question**
A water-tube condenser has a total of 60 tubes. If these are two passes, then compute the number of tubes per pass.
A. 6 C
B. 15
C. 3 C
D. 2

Answer: B

83. **Past ME Board Question**
If Ev is the volumetric efficiency of a reciprocating pump, then determine SLIP which represents all losses of capacity given in percentage of the displacement.
A. 1 / Ev
B. 1 – 1 / Ev
C. 1 – Ev
D. Ev + 1

Answer: C

84. **Past ME Board Question**
What is the relationship of the horsepower of a centrifugal pump, Hp, to the impeller speed, S, if the pump is at two different rotative speeds?
A. Hp is inversely proportional to the cube of the ratio of S
B. Hp is directly proportional to the ratio of S
C. Hp is inversely proportional to the ratio of S
D. Hp is directly proportional to the cube of the ratio of S

Answer: D

85. **Past ME Board Question**
What is likely to occur when sections of the impeller of a centrifugal pump are handling vapor and other sections are handling liquid?
A. Erosion of the pump
B. High head and low capacity
C. Excessive vibration
D. Complete failure to operate

Answer: D

86. **Past ME Board Question**
When vapor compression takes place on one side of the piston and one during one revolution of the crankshaft, then the compressor is:
A. Double-acting
B. Four-cycle
C. Two-revolution
D. Single-acting

Answer: D

87. **Past ME Board Question**
In Stirling and Erickson Cycles, the efficiency can be increased by:
A. Compressibility

B. Superheating
C. Regeneration
D. Subcooling

Answer: C

88. **Past ME Board Question**
Which of the following is used to control refrigeration compressor capacity?
A. Dehumidifier
B. Check valve
C. Solenoid valve
D. Unloader

Answer: D

89. **Past ME Board Question**
During a cooling and dehumidifying process, sensible and latent heats are removed in the cooling coil. If Hs is the sensible heat and Ht is the total heat transferred, then determine the coil sensible heat factor.
A. Ht – Hs
B. Hs – Ht
C. Ht / Hs
D. Hs / Ht

Answer: D

90. **Past ME Board Question**
Based on the PSME Code, what should be provided in each stream outlets if two or more boilers will be connected in parallel?
A. Relief and check valves
B. Non-return and shut-off valves
C. Expansion and shut-off valves
D. Expansion and check valves

Answer: B

91. **Past ME Board Question**
The diesel cycle is the ideal cycle for a :
A. Absorption
B. Steam-jet
C. Compression-ignition engine
D. Gas turbine

Answer: C

92. **Past ME Board Question**
If a Carnot cycle is at the same maximum and minimum temperatures as a Rankine cycle, then how would you compare the efficiency of a Rankine cycle to that of the Carnot cycle?
A. Efficiency is the same
B. Higher efficiency
C. Efficiency is higher by 30%
D. Lower efficiency

Answer: D

93. **Past ME Board Question**
Compute the wall gain load of a load storage room when A is the outside surface area of the wall, D is the temperature differential across the wall, and U is the overall coefficient of heat transmission.
A. AU / D
B. D / AU
C. A / UD
D. AUD

Answer: D

94. **Past ME Board Question**
If m is the mass of dry air and H is the specific enthalpy of the water vapor in air and r is the humidity ratio, then determine the latent heat of any dry air.
A. m / (r – H)
B. r / (H – m)
C. (m – r) / H
D. m (r x H)

Answer: D

95. **Past ME Board Question**
When an electric motor nameplate indicates a “100-kw electric motor” then what does a 100-kw rating refers to?
A. Thermal energy input
B. Thermal energy output
C. Electrical power output
D. Mechanical power output

Answer: D

96. **Past ME Board Question**
For a hydraulic power to be transmitted at its maximum what should be the value of loss of head due to friction if H is the total available head?
A. 11H
B. 1/3 H
C. 1/4 H
D. 5H

Answer: C

97. **Past ME Board Question**
The ratio of the average load during a certain time to peak the load occurring during the same period of time is called:
A. Demand factor
B. Capacity factor
C. Load factor
D. Output factor

Answer: C

98. **Past ME Board Question**
Based on the PSME Code, what should be the effective temperature of the air to be maintained for comfort cooling at an air movement from 0.0761 to 0.127 meter per second?
A. 25 – 29 degrees C
B. 35 – 39 degrees C
C. 20 – 24 degrees C
D. 30 – 34 degrees C

Answer: C

99. **Past ME Board Question**
If R is the delivery rate of a pump, H is the total pumping head and e is the efficiency of the pump, then compute the power required to drive the pump.
A. R / H x e
B. 1 – (R + H) / e
C. (R x H) / e
D. (H – R) / e

Answer: C

100. **Past ME Board Question**
There are three basic boiler types, namely:
A. Water-tube, horizontal tube and cast-iron boilers
B. Cast-iron, fire-tube and water tube boilers
C. Fire-tube, cast-iron and water tube boilers
D. HRT, fire-tubes and Scotch Marine boilers

Answer: B

101. **Past ME Board Question**
The amount of heat necessary to bring up the temperature of a unit mass of a substance through a unit degree is called:
A. Specific volume
B. Thermal heat
C. Total heat
D. Specific heat

Answer: D

102. **Past ME Board Question**
What is the specific gravity of an oil which has a Baume reading g of 28 degrees F?

A. 0.215
B. 0.562
C. 0.886
D. 0.774

Answer: C

103. **Past ME Board Question**
If C is the capacity of the compressor in a refrigeration system and F is the heat rejection factor, then calculate the condenser load, L.

A. L = F – C
B. L = F / C
C. L = C x F
D. L = C / F

Answer: C

104. **Past ME Board Question**
Based on the PSME Code, what should be the humidity ratio of air to be used for comfort cooling?

A. 75% - 80% relative humidity
B. 50% - 60% relative humidity
C. 60% - 70% relative humidity
D. 70% - 75% relative humidity

Answer: B

105. **Past ME Board Question**
What is the cause of pressure drop in the boiler, condenser and the pipings between different components? Because of this drop, steam leaving the boiler is at lower pressure.

A. Positive slip
B. Fluid friction
C. Negative slip
D. Low thermal efficiency

Answer: B