

U.S.C.G. Merchant Marine Exam
First Assistant Engineer
Q512 General Subjects II
(Sample Examination)

Choose the best answer to the following Multiple-Choice Questions.

1. Referring to the illustrated dual duct multiple zone HVAC system, how is the space temperature directly controlled? Illustration RA-0043
- A. The space air temperature is controlled by automatically controlling the steam flow through the reheat coil.
 - B. The space air temperature is controlled by automatically controlling the chilled water flow through the cooling coil.
 - C. The space air temperature is controlled by automatically proportioning the cold and hot air streams at the mixing unit.
 - D. The space air temperature is controlled by automatically controlling the steam flow through the preheat coil.

Correct answer: C

2. It is absolutely essential that hydronic heating system hot water piping be kept free of air. Assuming that a system is initially properly filled with water, what is the primary source of air contamination?
- A. The introduction of air via the makeup water.
 - B. The introduction of air via the atmospheric drains tank vent.
 - C. The introduction of air with the convector steam supply.
 - D. The introduction of air via the expansion tank vent.

Correct answer: A

3. Referring to the illustrated psychrometric chart, suppose air at a dry bulb temperature of 60oF and a relative humidity of 52% passes over a heating coil, resulting in sensible heat gain, and the off-coil temperature is now 80oF. What is off-coil relative humidity? Illustration RA-0022
- A. 19%
 - B. 27%
 - C. 55%
 - D. 70%

Correct answer: B

4. In order to establish a good climate for communication it is important to minimize status barriers. Which of the following techniques would be the best way to minimize status barriers on a one-on-one, face-to-face conversation of a sensitive nature with an employee?
- A. Conversing with the employee in his/her workspace or a neutral area with privacy assured.
 - B. Conversing with the employee in his/her workspace or a neutral area without regard to being interrupted.
 - C. Conversing with the employee in your office with the employee sitting on the opposite side of the desk from you.
 - D. Conversing with the employee in the ship's office with the employee sitting on the opposite side of the desk from you.

Correct answer: A

5. An important communication tool for managers is known as active listening. It helps better ensure that managers understand employees and that feedback is encouraged. What is active listening?
- A. Active listening is when you maintain eye contact with the employee the whole time they are speaking.
 - B. Active listening is when you listen to an employee with undivided attention and not be distracted.
 - C. Active listening is when you make a response that states what you have heard from the employee.
 - D. Active listening is when you allow the employee to finish what they are saying before speaking.

Correct answer: C

6. Leadership style sometimes must change with the readiness level of the employees. Which of the following employee readiness level scenarios would be best suited for adopting a delegating leadership style?
- A. Where the employees are able and willing or confident.
 - B. Where the employees are able but unwilling or insecure.
 - C. Where the employees are unable and unwilling or insecure.
 - D. Where the employees are unable but willing or confident.

Correct answer: A

7. Which of the following shipboard groups would be an example of an informal group?
- A. Those officers and crew assigned to the engineering department of a ship.
 - B. Those officers and crew assigned to a particular ship.
 - C. Those officers and crew assigned to a maintenance task on a ship.
 - D. Those officers and crew assigned to the safety committee of a ship.

Correct answer: C

8. As a manager, one of the practices of positive confrontation reduction skills essential to conflict resolution involves a type of listening. What type of listening would be most effective in resolving a conflict?
- A. Active listening
 - B. Defensive listening
 - C. Passive listening
 - D. Reactive listening

Correct answer: A

9. An important component of pre-planning for fire emergencies is the fire control plan. Which statement is true concerning the fire control plan for a vessel?
- A. The fire control plan is a set of written instructions and contains information for how to extinguish a fire in a particular space.
 - B. The fire control plan is a set of drawings for each deck of the vessel and contains information for how to extinguish a fire in a particular space.
 - C. The fire control plan is a set of drawings for each deck of the vessel and contains information on vessel arrangements and fire suppression systems and locations of firefighting equipment.
 - D. The fire control plan is a set of written descriptions for each deck of the vessel and contains information on vessel arrangement and fire suppression systems and locations of firefighting equipment.

Correct answer: C

- 10.** Of all the individual components of a pre-fire planning package, which component contains information about emergency duty station locations and responsibilities for each crew member by position AND name?
- A. Station bill
 - B. Muster list
 - C. Fire control plan
 - D. Pre-fire plan

Correct answer: B

- 11.** In planning for a fire and emergency drill, to insure drill success within the context of a comprehensive fire and emergency training program, what should be planned for?
- A. The fire drill should be a simulated outbreak in a low fire risk area and for each fire drill the location should be changed.
 - B. The fire drill should be a simulated outbreak in a high fire risk area and for each fire drill the location should remain the same.
 - C. The fire drill should be a simulated outbreak in a high fire risk area and for each fire drill the location should be changed.
 - D. The fire drill should be a simulated outbreak in a low fire risk area and for each fire drill the location should remain the same.

Correct answer: C

- 12.** If the initial report or automatic fire detection equipment are insufficient to provide adequate information to properly size-up a fire, an exploratory survey team consisting of at least two people may be required for reconnaissance purposes. How should the survey team members be equipped?
- A. Each survey team member should be wearing full protective gear and a self-contained breathing apparatus.
 - B. At least one team member should be wearing full protective gear and at least one other team member should be wearing a self-contained breathing apparatus.
 - C. At least one team member should be wearing full protective gear and at least one other team member should be wearing a smoke filtering gas mask.
 - D. Each survey team member should be wearing full protective gear and a smoke filtering gas mask.

Correct answer: A

- 13.** When preparing/writing shipyard items for your vessel's upcoming dry-docking period, what would you consider as an item regarding CuNi salt water cooling systems/piping?
- A. Identify in your item all steel waster piece pipe spools in the CuNi systems and require them to be removed and replaced.
 - B. This item should be of no concern since you have not experienced system piping degradation/leaks.
 - C. Remove certain designated CuNi piping sections for inspection.
 - D. Replace all bonding pieces/wires between all CuNi system flanges.

Correct answer: A

- 14.** One is slated to be a senior officer of a new vessel and is to participate in the 'Builder's Sea Trials'. What would you consider your responsibilities when asked to witness scheduled tests?
- A. Observe, report any possible deficiencies to shipyard representatives and regulatory body representatives.
 - B. Observe and convey your comments of any possible deficiencies to the shipyard representative conducting the test.
 - C. Observe, report any possible deficiencies to the representatives of the regulatory bodies present.
 - D. Observe, note any deficiencies you may feel exist and convey them to your vessel owner's representatives.

Correct answer: D

- 15.** Upon joining a vessel on 28 April 2013 you find the last dry-docking was May 2011. When is the next date for vessel dry-docking if the vessel is not enrolled in an underwater survey program in lieu of dry-docking?
- A. No later than May 2013.
 - B. No later than November 2013.
 - C. No later than May 2014.
 - D. No later than May 2016.

Correct answer: C

- 16.** On a PERT network (or arrow or line), what do the circles which are the beginning points or ending points for arrows or lines represent?
- A. The circles are numbered and represent the task activity identification number.
 - B. The circles are numbered and represent the estimated duration of task.
 - C. The circles are not numbered and represent milestones for task accomplishment.
 - D. The circles are not initially numbered, but when numbered represent the actual task completion time.

Correct answer: C

- 17.** For newly constructed vessels, extensive shipyard repair or a vessel's modification period, what does a shipyard's 'Gantt' chart represent?
- A. Daily shipyard's production figures and progress.
 - B. Project's shipyard fiscal and man-hours expenditures per item/goal.
 - C. Daily actual shipyard progress, per item, vs. estimated.
 - D. Master schedule of time/man-hours vs. project's significant goals/items for the duration of the project.

Correct answer: D

18. According to 46 CFR regulations pertaining to periodic tests and inspections as related to machinery and equipment, what statement is true concerning the opening up of sea chests, sea valves, sea strainers, and emergency bilge suction valves?

- A. Sea chests, sea valves, sea strainers, and emergency bilge suction valves are required to be opened annually while the vessel is in dry-dock.
- B. Sea chests, sea valves, sea strainers, and emergency bilge suction valves are required to be opened every periodic inspection while the vessel is in dry-dock.
- C. Sea chests, sea valves, sea strainers, and emergency bilge suction valves are required to be opened every 5 years while the vessel is in dry-dock.
- D. Sea chests, sea valves, sea strainers, and emergency bilge suction valves are required to be opened every 10 years while the vessel is in dry-dock.

Correct answer: C

19. According to 46 CFR regulations pertaining to periodic tests and inspections as related to machinery and equipment, what would be the basis for conducting tests and inspections of a feedwater regulator for a boiler as conducted by a marine inspector during a periodic ship inspection?

- A. The marine inspector conducts any tests and inspections as necessary to check for safe operation of the feedwater regulator.
- B. The marine inspector conducts a pneumatic pressure test of the feedwater line including the feedwater regulator.
- C. The marine inspector conducts both an internal and an external inspection of the feedwater regulator.
- D. The marine inspector conducts a hydrostatic test of the feedwater line including the feedwater regulator.

Correct answer: A

20. Vessel special surveys are conducted how often in the life of a vessel?

- A. Every 5 years after the anniversary date of construction or last special survey.
- B. Every 5 years after the anniversary date of construction always.
- C. Every 2 1/2 years after the anniversary date of construction or last special survey.
- D. Annually on the anniversary date of the last survey.

Correct answer: A

21. As Chief Engineer you join a vessel enrolled in Continuous Machinery Survey. Approximately what percent of the machinery should be surveyed per year throughout the Special Survey cycle?

- A. 10%
- B. 20%
- C. 25%
- D. 50%

Correct answer: B

- 22.** If a vessel is to be laid up for an extended period of time with minimal utilities provided from ashore, boilers may be laid up dry. What statement concerning dry boiler lay-up is true as it relates to protecting boiler watersides?
- A. The steam and water drums should be opened up to permit air circulation. Under no circumstances should desiccant be placed inside the closed-up steam and water drums.
 - B. Desiccant should be placed inside the closed-up steam and water drums. Under no circumstances should the steam and water drums be opened up to permit air circulation.
 - C. Desiccant should be placed inside the steam and water drums and the drums should be opened to permit air circulation.
 - D. The steam and water drums can be opened up to permit air circulation, or as an alternative desiccant can be placed inside the closed-up steam and water drums.

Correct answer: D

- 23.** If a vessel is to be laid up for an extended period of time with minimal utilities provided from ashore, what statement is true as it relates to keeping gearboxes, turbine casings, and engine crankcases dry and free of moisture?
- A. A combination of mechanical circulation of air and humidification should be used.
 - B. A combination of mechanical circulation of air and dehumidification should be used.
 - C. A combination of an absence of air circulation and humidification should be used.
 - D. A combination of an absence of air circulation and dehumidification should be used.

Correct answer: B

- 24.** You are conducting a training session on how to parallel alternators manually. What delivery technique would be most effective to ensure transfer of learning with the desired outcome that the officers under training actually are able to successfully parallel manually in the future?
- A. After preliminary discussion, demonstrate the procedure at the actual switchboard to the officer trainees.
 - B. After preliminary discussion and practice recitals, ask the officer trainees to recite the procedure in a classroom setting.
 - C. After preliminary discussion, show a video demonstrating the procedure to the officer trainees in a classroom setting.
 - D. After preliminary discussion, demonstrations, and active practice, ask the officer trainees to parallel alternators at the actual switchboard.

Correct answer: D

- 25.** Before training is to be planned for, it is necessary to conduct a training needs analysis. What would be the best source of information to analyze before providing fire emergency skills training?
- A. Direct observation and reviewing critiques of the execution of shipboard fire and emergency drills performed by the existing crew.
 - B. Reviewing marine casualty and damage reports attributed to fires that have occurred on the vessel in the past.
 - C. Analyzing insurance premium costs relevant to fires that have occurred on the vessel in the past.
 - D. Analyzing statistical data collected relevant to fires that have occurred on the vessel in the past.

Correct answer: A

- 26.** A very large crude carrier is scheduled to depart of the Port of Long Beach, CA at 0800 on June 28th on a voyage to exceed 48 hours. What is the EARLIEST time that the communication means between the wheelhouse and the engine control room could be tested prior to getting underway and be in compliance 46 CFR Subchapter D (Tank Vessels)?
- A. 0800 June 27th
 - B. 1400 June 27th
 - C. 2000 June 27th
 - D. 0200 June 28th

Correct answer: C

- 27.** As a management level engineering officer on a motor vessel equipped with engines capable of burning both high sulfur content residual fuels and low sulfur content distillate fuels, on departure from a US port, when would you plan for the fuel changeover be commenced?
- A. When leaving US navigable waters 3 miles from the coastline.
 - B. When leaving US territorial boundaries 12 miles from the coastline.
 - C. When leaving the SOx emission control area.
 - D. When leaving the US economic exclusion zone 200 miles from the coastline.

Correct answer: C

- 28.** When transitioning from full sea speed to maneuvering speed on a slow-speed diesel-powered motor vessel featuring a direct-drive fixed-pitch propeller propulsion arrangement, how should this be accomplished?
- A. The engine should be decelerated from full sea speed to maneuvering speed very quickly and should transition through any critical speeds without any lingering.
 - B. The engine should be decelerated from full sea speed to maneuvering speed very gradually, even if it means lingering for extended periods of time at critical speeds.
 - C. The engine should be decelerated from full sea speed to maneuvering speed very gradually, but should transition through any critical speeds without any lingering.
 - D. The engine should be decelerated from full sea speed to maneuvering speed very gradually, without any concern for critical speeds as they will not be encountered.

Correct answer: C

- 29.** There are many tasks to carry out prior to and during bunkering. What is the best way to insure no task is missed?
- A. Use of the certificate of inspection.
 - B. Use of the declaration of inspection.
 - C. Use of a bunkering safety checklist.
 - D. Use of the vessel oil pollution response plan.

Correct answer: C

- 30.** Which of the following statements represents the acceptable practice to follow to prevent mixing of potentially incompatible fuels in a heavy fuel oil settling tank?
- A. Before shifting storage tank transfer pump suctions to another set of tanks, ideally the recipient heavy fuel oil settling tank should be brought to 50% volumetric capacity first.
 - B. Before shifting storage tank transfer pump suctions to another set of tanks, ideally the recipient heavy fuel oil settling tank should be stripped empty first.
 - C. Before shifting storage tank transfer pump suctions to another set of tanks, ideally the recipient heavy fuel oil settling tank should be drained of moisture and solids first.
 - D. Before shifting storage tank transfer pump suctions to another set of tanks, ideally the recipient heavy fuel oil settling tank should be brought to the proper settling temperature first.

Correct answer: B

- 31.** When performing mariner competency assessment onboard a vessel, as an assessor you must be mindful of the potential influence of other crew members. Which of the following statements regarding this potential influence is true?
- A. While you should never allow an assessment candidate to observe others being assessed for the same competency, other crew members can be allowed to interfere with the assessment.
 - B. You should never allow an assessment candidate to observe others being assessed for the same competency, and you should never allow other crew members to interfere with an assessment.
 - C. While you can allow an assessment candidate to observe others being assessed for the same competency, you should never allow other crew members to interfere with an assessment.
 - D. You can allow an assessment candidate to observe others being assessed for the same competency, and you can allow other crew members to interfere with an assessment.

Correct answer: B

- 32.** What is the critical first step that must be carried out before executing a plan?
- A. Assessing present and future conditions affecting achievement of the plan.
 - B. Identifying present and future conditions affecting achievement of the plan.
 - C. Developing a systematic approach to achievement of the plan.
 - D. Setting an objective or goal to be achieved by the plan.

Correct answer: D

- 33.** It has been demonstrated that delegation can enhance employee development. To avoid a fear of failure, what must a manager avoid when delegating decision-making power to an employee?
- A. Over-estimating the job maturity level of their employees and assigning tasks that are too easy.
 - B. Over-estimating the job maturity level of their employees and assigning tasks that are too difficult.
 - C. Under-estimating the job maturity level of their employees and assigning tasks that are too easy.
 - D. Under-estimating the job maturity level of their employees and assigning tasks that are too difficult.

Correct answer: B

- 34.** What is usually the first step in trying to resolve a beef or a dispute brought up by a crew member?
- A. Filing a formal grievance with a company and union agreed-upon arbitrator for binding arbitration.
 - B. Filing a formal grievance with the port committee made up of both company and union representatives in port before terminating articles.
 - C. Attempting to resolve the conflict by the crew member and the affected supervisor as immediately as practical.
 - D. Filing a formal grievance with the union's designated representative on board before terminating articles.

Correct answer: C

- 35.** In the event of a marine casualty, as a chief engineer what document would be considered a voyage record and must be made available to investigating officials?
- A. Machinery technical manuals
 - B. International Safety Management Code
 - C. Certificate of Inspection
 - D. Vessel engine room logbook

Correct answer: D

- 36.** While a vessel is underway in periodically unmanned engine room status, the oily-water separator is undergoing extensive maintenance and repairs and will not be available for service for another 24 hours. With bilge holding tanks nearing capacity, as chief engineer you wish to be informed of when the oily-water separator is available for service. How would you best ensure that you will be so informed?
- A. The request would be made of the duty engineer orally assuming that the word shall be passed on to his or her relief.
 - B. The request would be written as a note posted in the vicinity of the engineering department coffee mess.
 - C. The request would be written as a special instruction in the chief engineer's night order book.
 - D. The request would be written as a note inserted into the chief engineer's standing order book.

Correct answer: C

- 37.** You are installing a new refrigeration system aboard your vessel. The system comes with a 240 psi rupture disk, a safety valve set at 240 psi and a pressure gauge connection and gauge. In accordance with 46 CFR, what is the preferred setup for installing the equipment on the condenser?
- A. The rupture disk, safety valve, and pressure gauge are all piped in parallel.
 - B. Pressure gauge closest to the condenser, then safety valve then rupture disk in series after the pressure gauge.
 - C. Safety valve closest to the condenser, then pressure gauge then rupture disk in series after the safety valve.
 - D. Rupture disk closest to the condenser, then pressure gauge then safety valve in series after the rupture disk.

Correct answer: C

- 38.** Overcurrent protection for steering gear systems circuits that power alternating current motors must have an instantaneous trip set at what rating?
- A. At least 100% and not more than 175% of the rated full-load current of one steering-gear motor.
 - B. At least 175% and not more than 200% of the rated full-load current of one steering-gear motor.
 - C. At least 200% and not more than 275% of the rated full-load current of one steering-gear motor.
 - D. At least 300% and not more than 375% of the rated full-load current of one steering-gear motor.

Correct answer: B

- 39.** In accordance with the international MARPOL Annex VI regulations, what is the minimum allowable flue gas outlet temperature for a continuous-fed shipboard incinerator while in operation?
- A. 450oC
 - B. 650oF
 - C. 850oF
 - D. 1050oF

Correct answer: C

- 40.** Resonant vibrations, which can cause machinery failure, occur when which of the following conditions happen?
- A. The machinery is operated at the natural frequency with no external forces in play.
 - B. The natural frequency of the machinery is the same as the free vibration frequency.
 - C. A forced frequency is placed on a piece of operating machinery.
 - D. The frequency of an external vibration is the same as one of the natural frequencies of the machinery.

Correct answer: D

- 41.** If it is desired to perform a thermographic analysis of new equipment to gain a thermal signature for purposes of comparison to the thermal signature for the same equipment at a later date, what is the name of the thermography performed on the equipment when new?
- A. Comparative thermography.
 - B. Baseline thermography.
 - C. Thermal trending.
 - D. Spectral thermography.

Correct answer: B

- 42.** What type of maintenance system would be associated with accomplishing maintenance after a machinery breakdown?
- A. Predictive maintenance system
 - B. Planned maintenance system
 - C. Corrective maintenance system
 - D. Condition-based maintenance system

Correct answer: C

43. Which of the following would be a positive outcome associated with performing a trend analysis of data acquired from lube oil testing, vibration sensors, performance data sensors, and thermographic sensors?

- I) Avoidance of catastrophic failures.
 - II) Determining the need of when to perform corrective maintenance.
 - III) Improving the overall effectiveness of the engineering plant.
- A. I only.
 - B. II only.
 - C. I and II only.
 - D. I, II, and III.

Correct answer: D

44. As a management level engineering officer, you are apt to be the primary investigator investigating the root cause of the failure of a piece of machinery. Besides collecting and preserving the physical evidence of the failure and interviewing key personnel, which of the following supplemental information should be considered?

- I) Onboard operating and maintenance procedures
 - II) Historical operating and maintenance records
 - III) Technical manuals and specifications
 - IV) Personnel training records
- A. I, II, and III only.
 - B. I, III, and IV only.
 - C. II, III, and IV only.
 - D. I, II, III, and IV.

Correct answer: D

45. Alkylbenzene ISO 32 cSt synthetic refrigerant oil is miscible and suitable to use with which of the following refrigerants?

- A. R-22
- B. R-32
- C. R-134a
- D. R-143a

Correct answer: A

46. When one belt of a multiple V-belt drive requires replacing, what will be required?

- A. replace the entire belt set
- B. ensure the seasoned belts are reinstalled in their proper sequence
- C. ensure the proper belt dressing is applied
- D. season the new belt prior to installation

Correct answer: A

- 47.** Which of the conditions listed could cause excessively low refrigerant pressure at the compressor suction of a TXV controlled refrigeration system?
- A. The box solenoid valve "stuck" in the open position.
 - B. The high-pressure cutout switch is inoperative.
 - C. The system is low on refrigerant.
 - D. Insufficient flow of condenser cooling water.

Correct answer: C

- 48.** To prevent motor overload during start-up of a hermetically sealed centrifugal refrigeration system, what is true concerning the compressor suction gas variable inlet guide vanes?
- A. opened until the motor is connected across the line at full voltage and current drawn is up to full load current
 - B. closed until the motor is connected across the line at full voltage and current drawn is up to full load current
 - C. closed until the motor is connected across the line at full voltage and current drawn is below full load current
 - D. opened until the motor is connected across the line at full voltage and current drawn is below full load current

Correct answer: C

- 49.** If it is necessary to increase the operating head pressure of the refrigeration system using the device shown in the illustration, what should be done? Illustration RA-0014
- A. "2" should be turned to further compress the spring
 - B. "2" should be turned to relax the compression of the spring
 - C. "4" should be rotated to compress the enclosed bellows
 - D. "4" should be rotated to relax the enclosed bellows

Correct answer: A

- 50.** The rupture disc on a low-pressure centrifugal refrigeration unit is used as an overpressure protection device and is set to relieve at 15 psig and is most likely to lift when the compressor is idle. Where is the rupture disc located?
- A. at the top of the upper chamber of the economizer
 - B. on top of the condenser shell
 - C. on top of chiller evaporator shell
 - D. at the discharge of the compressor

Correct answer: C

- 51.** The coil temperature measured at the expansion valve sensing bulb of an operating system is 10°F. The low side pressure with the compressor running as shown on the gauge illustrated indicates 15 psig. What adjustments or changes, if any, should be made to the system? Illustration RA-0016
- A. The expansion valve should not be adjusted, as the degree of superheat is within the accepted range.
 - B. The liquid line strainer is obviously fouled and needs to be cleaned.
 - C. The filter drier needs to be changed to increase the suction pressure.
 - D. The evaporator coils need to be steam cleaned or high-pressure washed.

Correct answer: A

52. When replacing a thermostatic expansion valve power element, what is true concerning the thermal bulb?

- A. apply a heavy coating of grease to function as a heat sink
- B. apply a light film of oil to increase heat transfer
- C. carefully coat the device with silicone sealant to reduce the effects of convective cooling
- D. with steel wool or an abrasive cloth remove oxidation on the bulb and suction line

Correct answer: D

53. Which of the following conditions will occur if the power element of the thermostatic expansion valve shown in the illustration loses its charge? Illustration RA-0007

- A. The valve will fail open as designed to provide continuous cooling.
- B. The valve will fail open and the cooling capacity will be increased.
- C. The valve will fail closed, providing no cooling capacity.
- D. The valve will begin to close, but the external equalizing line will assist in keeping the valve unseated.

Correct answer: C

54. If the superheat value of the thermostatic expansion valve is adjusted too high, what would be the result?

- A. the evaporator will be overfed with liquid refrigerant
- B. the suction line of the compressor will be abnormally cold
- C. the suction line of the compressor will be abnormally warm
- D. the heat removal capacity of the evaporator will increase

Correct answer: C

55. If increasing the cooling water flow to a refrigeration condenser fails to lower the condenser pressure, the probable cause may be due to what condition?

- A. excessive amount of non-condensable gases trapped in the condenser
- B. partially blocked thermal expansion valve
- C. an evaporator coil in need of defrosting
- D. a low level of Freon in the receiver

Correct answer: A

56. Technicians servicing small refrigeration appliances can employ what type of recovery equipment?

- A. passive only
- B. active only
- C. either active or passive
- D. do not need to recover the refrigerant

Correct answer: C

57. Minor repairs may be performed on low-pressure refrigerant systems without recovering the refrigerant charge if the pressure in the system is raised to atmospheric. How may this be accomplished?

- A. heat the refrigerant
- B. charge the system until it is completely filled with liquid refrigerant
- C. pressurize the system with nitrogen
- D. open the system vent to the atmosphere and allow the pressure to equalize

Correct answer: A

- 58.** When a refrigeration system is being topped off with a small amount of refrigerant through the low side with the compressor running, what should be done?
- A. the suction service valve must be back seated
 - B. the refrigerant charging cylinder should be turned upside down
 - C. the refrigerant should be charged into the system as a vapor
 - D. the discharge service valve must be front seated

Correct answer: C

- 59.** Charging liquid HCFC-123 into a system under a deep vacuum could cause what to happen unless necessary precautions are taken?
- A. the purge unit to operate
 - B. air and moisture to enter the receiver
 - C. rupture disk to rupture
 - D. system secondary refrigerant to freeze

Correct answer: D

- 60.** Overfilling a refrigerant container is extremely dangerous because of the high pressures generated. The generation of pressure is the result of what?
- A. discharge pressure from the recovery cylinder
 - B. discharge pressure of the recovery compressor
 - C. hydrostatic pressure of the expanding liquid
 - D. vapor pressure of the refrigerant at saturation temperature

Correct answer: C

- 61.** Why can CFC or HCFC refrigerants leaking into a confined space or in limited surroundings cause suffocation?
- A. Refrigerants lighter than air will rise.
 - B. Refrigerants are heavier than air and displace oxygen.
 - C. Refrigerants contain an acidic substance.
 - D. Refrigerants obnoxious odor prevents breathing.

Correct answer: B

- 62.** What is the purpose of running a refrigeration compressor in short intermittent spurts or throttling the suction isolation valve when starting the system after a prolonged shutdown?
- A. let the refrigerated compartment cool gradually
 - B. allow refrigerant vapor cycling time
 - C. determine actual compressor oil level
 - D. prevent liquid slugging or overloading the compressor

Correct answer: D

63. When starting a reciprocating refrigeration compressor that has been shut down for a period of time, you should manually throttle which valve?

- A. expansion valve
- B. sea water valve
- C. king valve
- D. suction valve

Correct answer: D

64. In general, the thermal bulb for a thermal expansion valve used in a reciprocating air conditioning system is usually charged with what substance?

- A. bees wax
- B. distilled water
- C. the same refrigerant as the system
- D. mercuric sulfate

Correct answer: C

65. A room humidistat initiates the lowering of the humidity of the conditioned supply air to a space, while the actual process is accomplished by what means?

- A. lowering both the cooling coil temperature and the reheater temperature
- B. raising the cooling coil temperature and lowering the reheater temperature
- C. lowering the cooling coil temperature and raising the reheater temperature
- D. raising both the cooling coil temperature and the reheater temperature

Correct answer: C

66. Which of the following is true concerning the class "D" air conditioning system shown in the following illustration? Illustration RA-0042

- A. The duct thermostat determines the amount of water flow circulating through the cooling coil.
- B. The room thermostat controls the wet bulb temperature of the air conditioned space.
- C. The heat load will increase by increasing the amount of recirculated air.
- D. System cooling is the direct result of the vapor compression refrigerant circuit of a direct type air conditioning unit.

Correct answer: A

67. When pumping down an air conditioning system to test the low-pressure cutout switch, assuming that the compressor is running, what should be done to initiate the test?

- A. secure the condenser
- B. close the "king" valve
- C. stop the compressor
- D. stop the circulating pump

Correct answer: B

- 68.** While securing the air conditioning compressor you close the suction valve and the compressor stops after a short period of time. Subsequent attempts to start it produce no result. What control component would you suspect is preventing the compressor from starting?
- A. The low-pressure cutout switch.
 - B. The high-pressure cutout switch.
 - C. The lube oil differential pressure switch.
 - D. The water regulating valve.

Correct answer: A

- 69.** What could cause a lower efficiency and a higher bypass factor for an air conditioning cooling coil?
- A. Corrosion wasting away large sections of the fins attached to the cooling coil.
 - B. Chemically cleaning the coil.
 - C. An increase in ambient pressure and temperature.
 - D. Using material with a higher thermal expansion ratio.

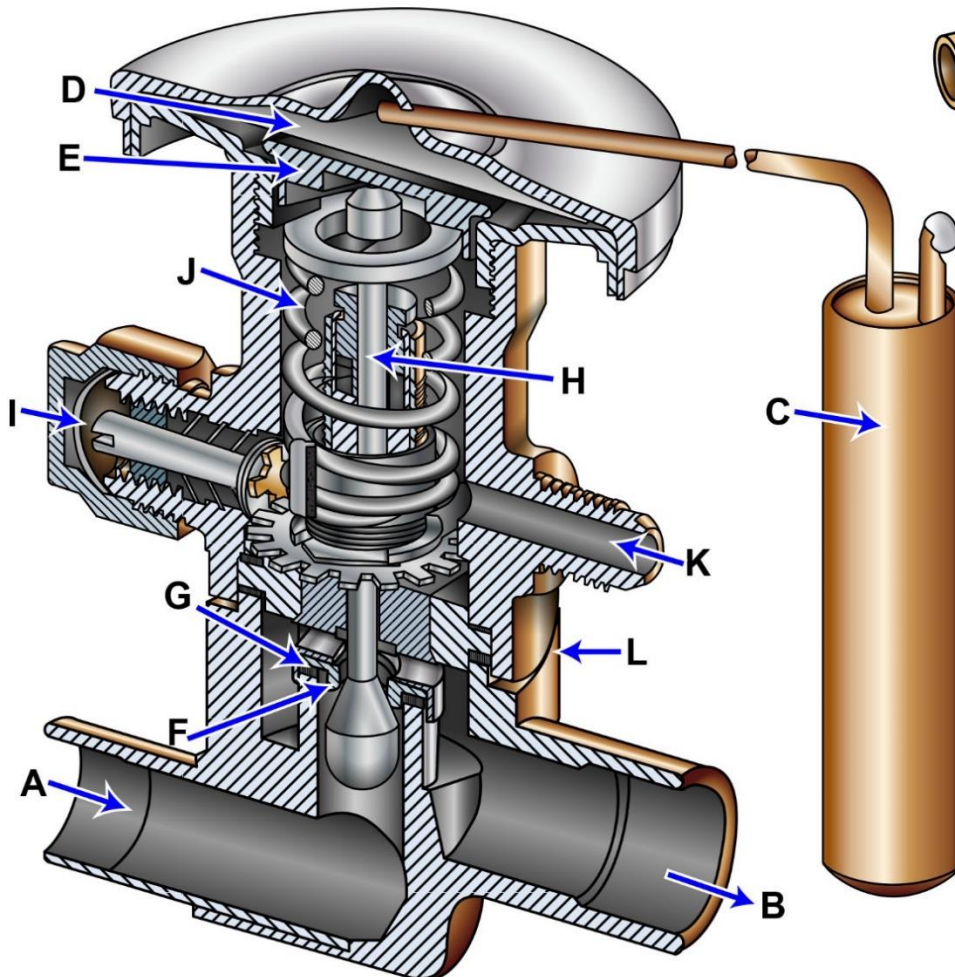
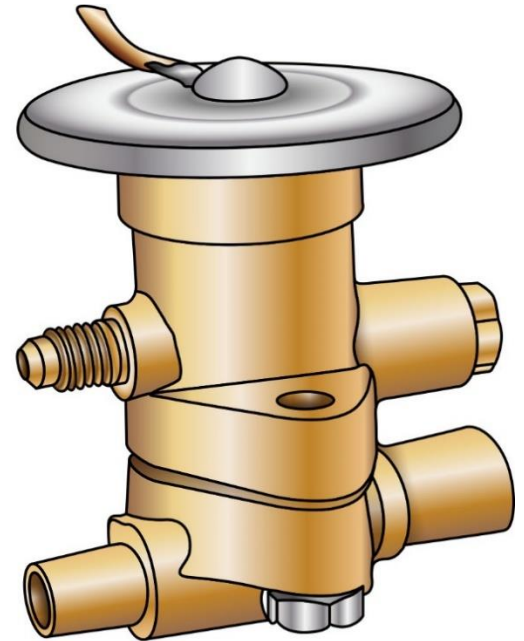
Correct answer: A

- 70.** If you find the pressure of a refrigeration system containing a Class I or Class II refrigerant to be opened for the accomplishment of repairs is 0 psig, what must be done?
- A. only recover the liquid refrigerant in the system
 - B. do not attempt to recover the refrigerant and repair the leak before pulling a vacuum on the system
 - C. recover liquid and vapor refrigerant and have it reclaimed
 - D. only recover the vapor refrigerant

Correct answer: B



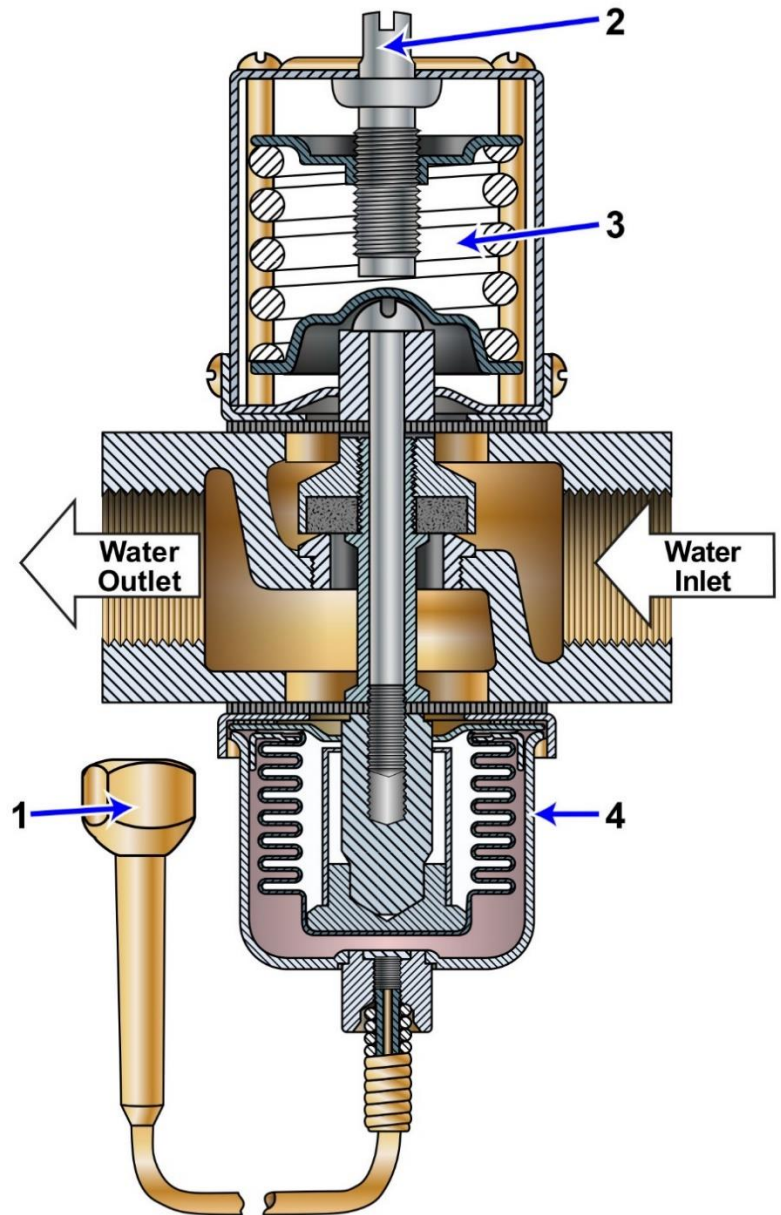
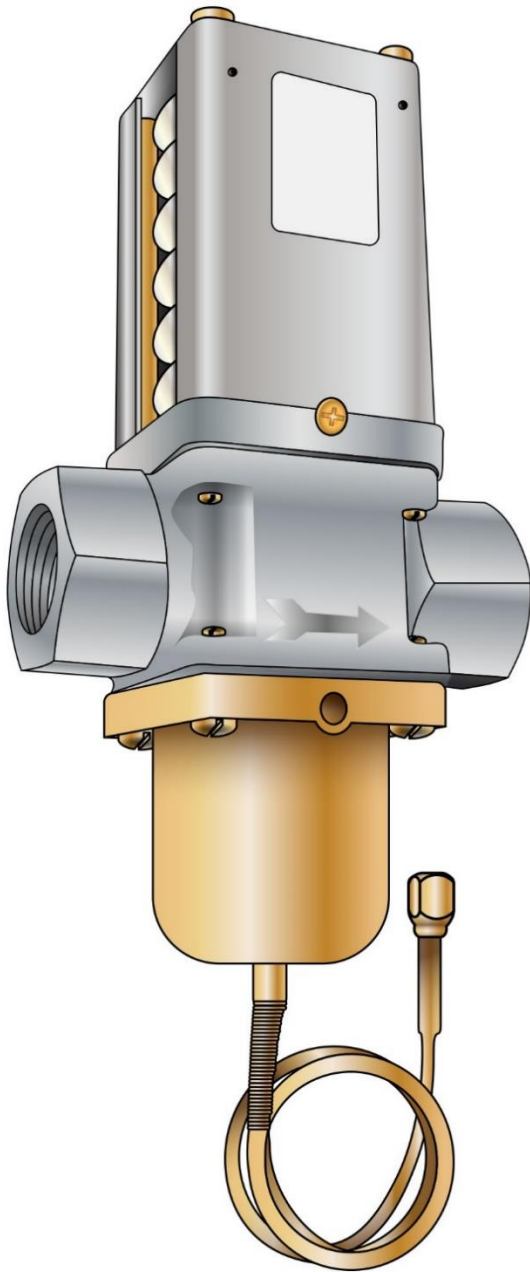
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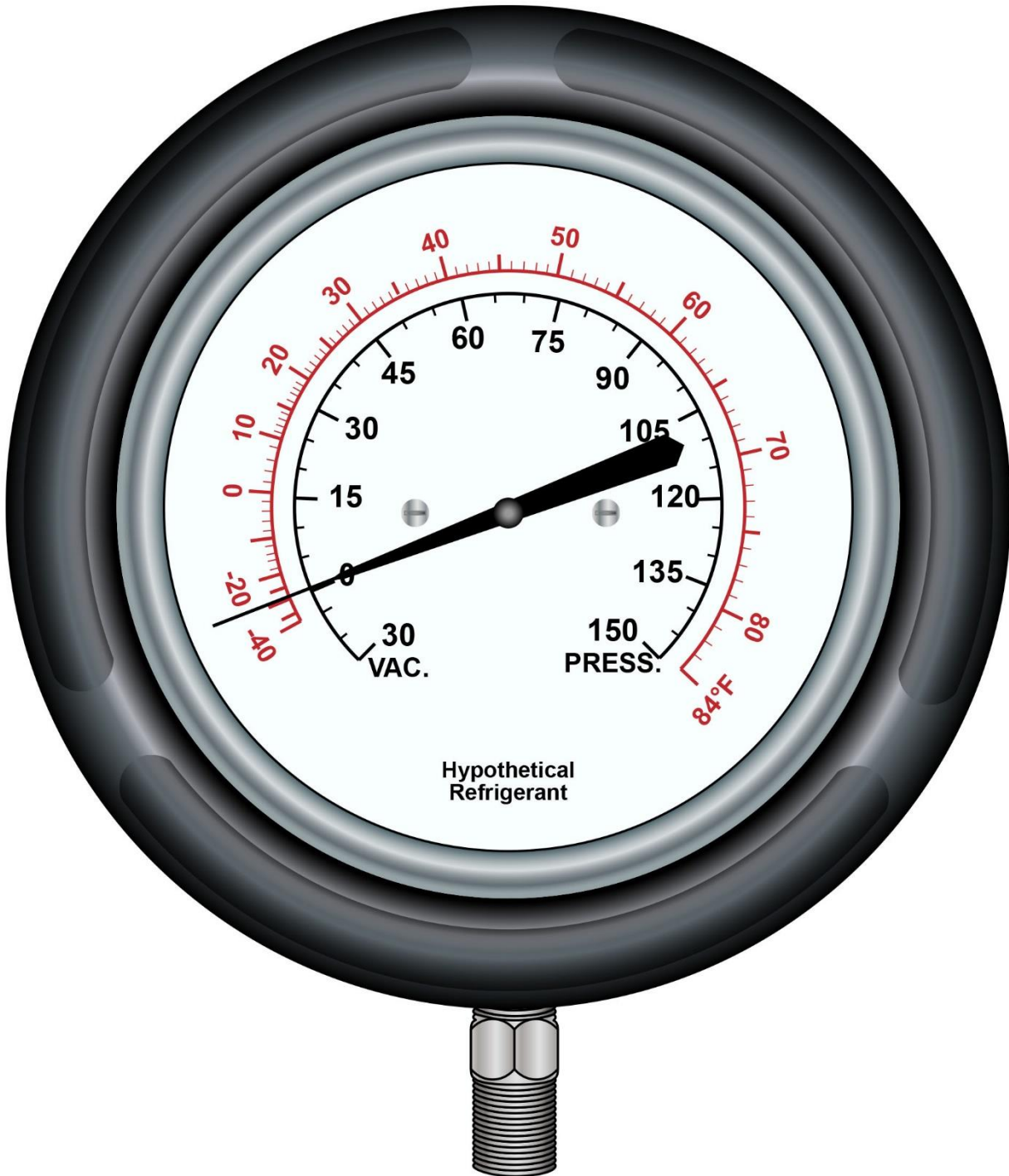
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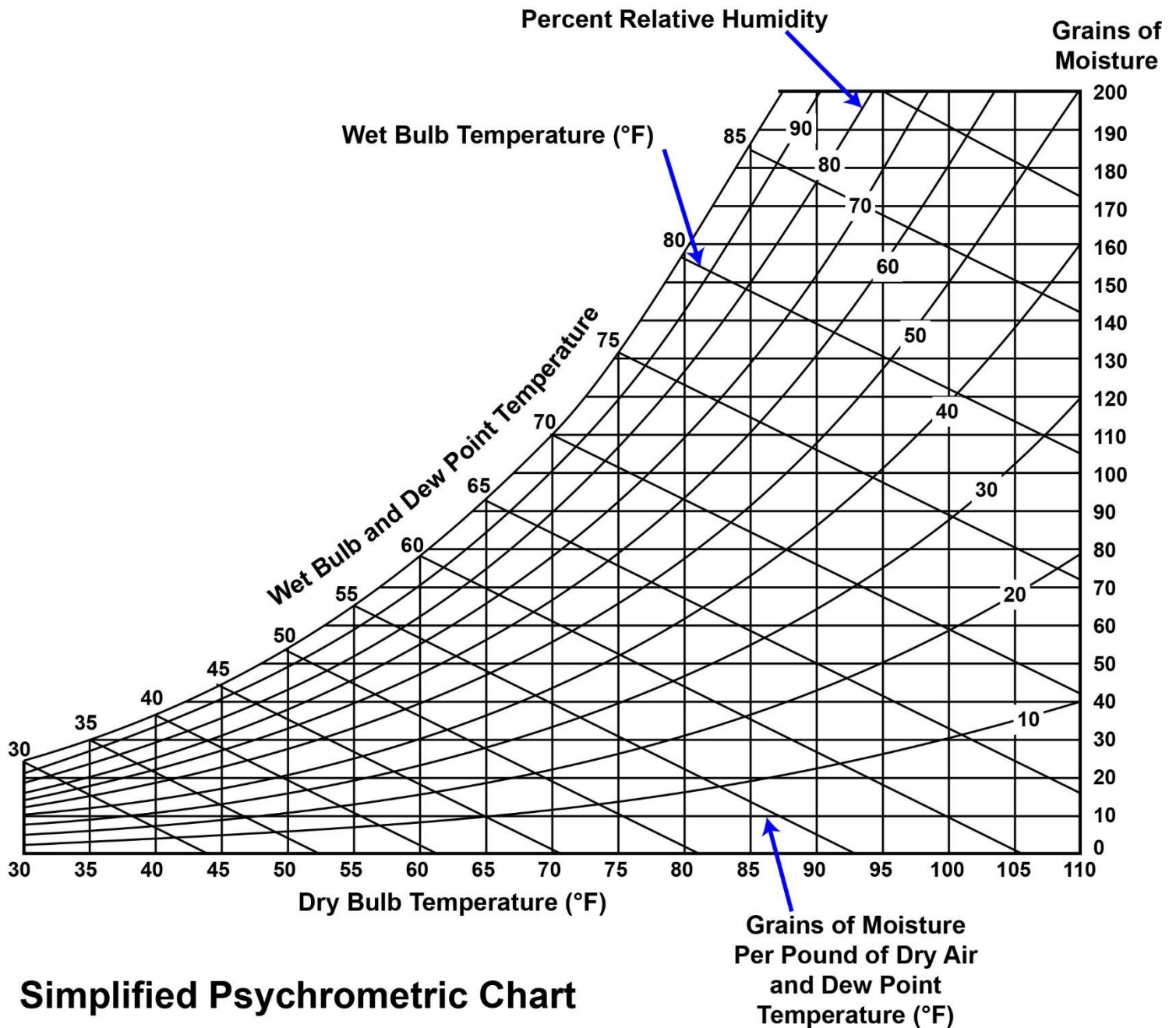
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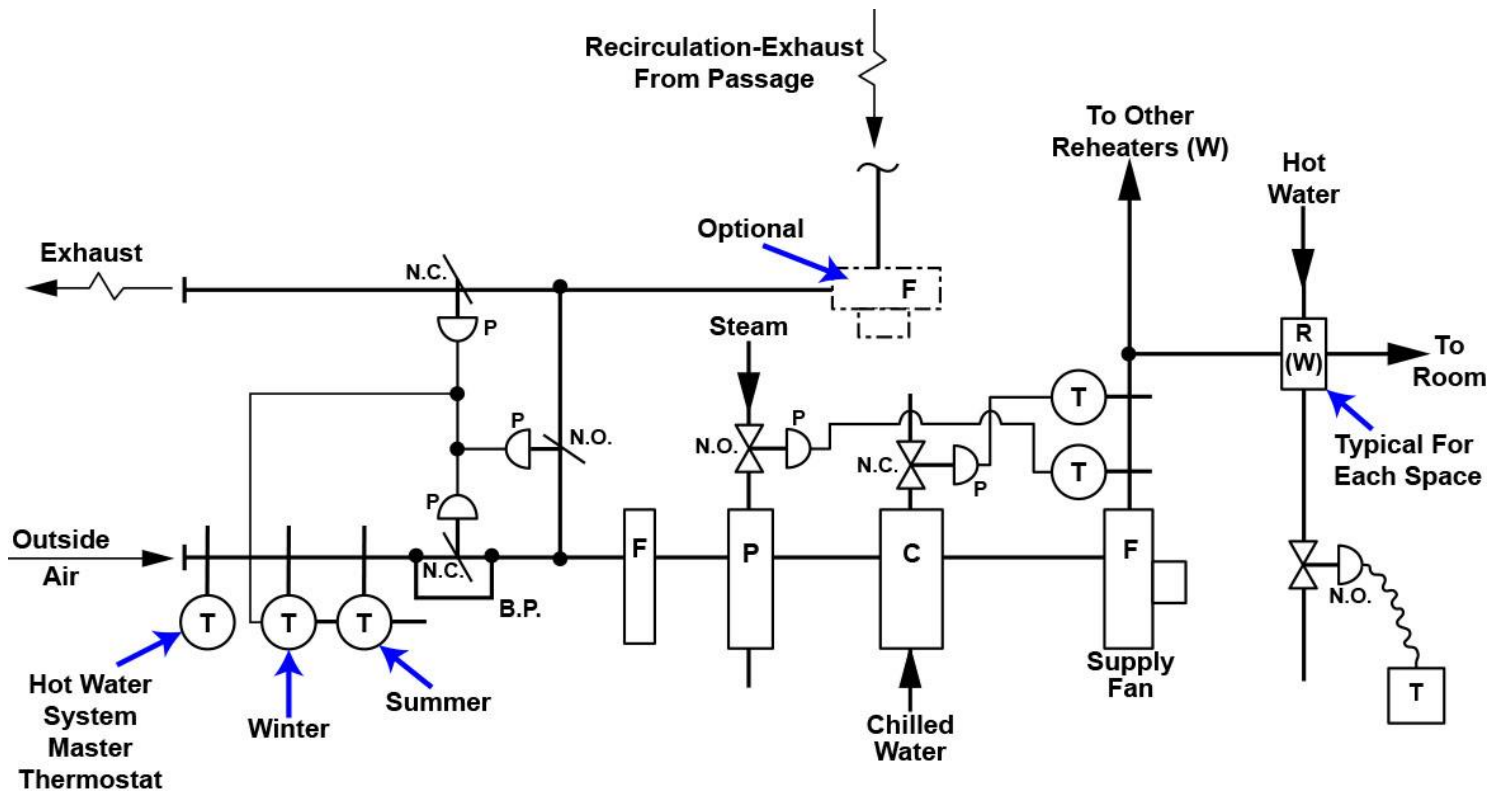


Simplified Psychrometric Chart





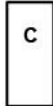




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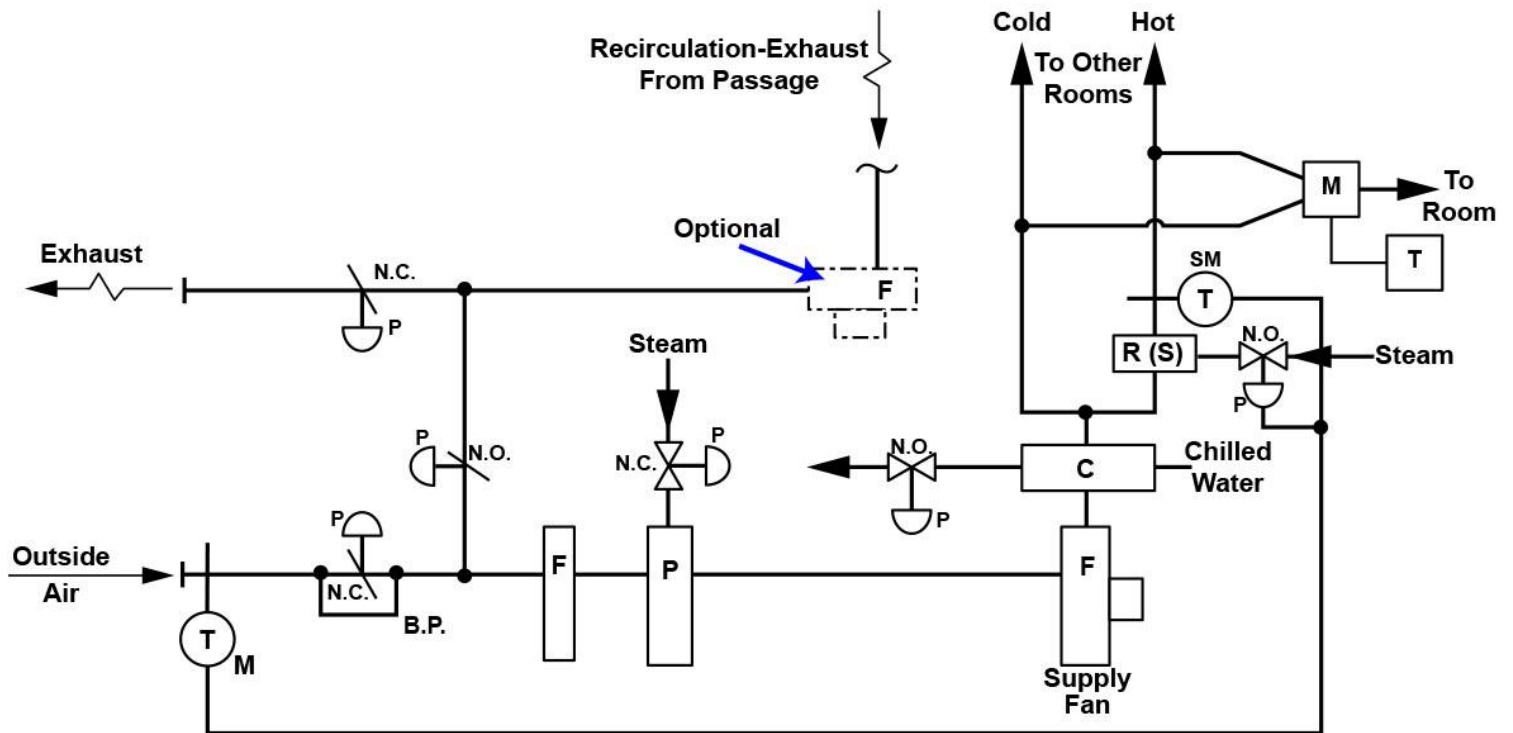
LEGEND

	Fan		Room Thermostat
	Filter		Duct Thermostat
	Cooling Coil		Pneumatic Damper and Motor
	Preheater (Steam)		Pneumatic Relay
	Reheater (Water)	N.C.	Normally Closed (Valve or Damper)
		N.O.	Normally Open (Valve or Damper)
		B.P.	Minimum Outside Air Bypass
		P	Positive Positioning Relay

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RA-0043



LEGEND

	Fan		Room Thermostat
	Filter		Duct Thermostat
	Cooling Coil		Pneumatic Damper and Motor
	Preheater (Steam)		Pneumatic Relay
	Reheater (Steam)	N.C.	Normally Closed (Valve or Damper)
	Dual Duct Air Mixing Unit	N.O.	Normally Open (Valve or Damper)
		B.P.	Minimum Outside Air Bypass
		P	Positive Positioning Relay
		M	Sub-Master
		SM	Master

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