

# PRACTICE EXAM 20: RACM RED SEAL SIMULATION (125 QUESTIONS)

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1. Under the Canadian Environmental Protection Act, what is the primary environmental concern associated with releasing CFC and HCFC refrigerants to the atmosphere?
  - A. They deplete stratospheric ozone
  - B. They lower the boiling point of nearby water sources
  - C. They increase ground-level oxygen concentration
  - D. They react with nitrogen to form inert salts
  
2. A technician measures a suction pressure of 35 psig on an R-134a system. Using a P-T relationship, the saturated suction temperature is closest to:
  - A. -10°F
  - B. 20°F
  - C. 40°F
  - D. 75°F
  
3. What is the main function of the metering device in a vapour-compression refrigeration cycle?
  - A. To create a pressure drop and control refrigerant flow into the evaporator
  - B. To raise the refrigerant to condensing pressure
  - C. To reject heat absorbed in the evaporator to the ambient
  - D. To separate oil from the returning suction vapour
  
4. A scroll compressor is rotating backward after a phase reversal during installation. What is the most likely immediate symptom?
  - A. Loud noise with little or no pressure differential developing

- B. Excessive subcooling at the condenser outlet
- C. A rapid rise in both suction and discharge pressures
- D. Smooth operation with improved efficiency

5. On a TXV-controlled system, the bulb senses which condition to modulate refrigerant flow?

- A. Liquid line subcooling
- B. Condensing pressure
- C. Suction line superheat at the evaporator outlet
- D. Ambient dry-bulb temperature

6. Which refrigerant property describes the heat absorbed when liquid changes to vapour at constant temperature?

- A. Specific heat
- B. Latent heat of vaporization
- C. Sensible heat
- D. Critical temperature

7. A megohmmeter reads 0.2 megohms across a hermetic compressor's motor windings to ground. This reading indicates:

- A. Excellent winding insulation
- B. Deteriorated insulation and a likely grounded winding
- C. An open run capacitor
- D. Correct refrigerant charge

8. What is the purpose of subcooling the liquid refrigerant before it reaches the metering device?

- A. To increase superheat at the compressor

- B. To raise discharge temperature
- C. To prevent flash gas in the liquid line and ensure solid liquid flow
- D. To reduce condenser fan amperage

9. When brazing copper tubing on a refrigerant line, dry nitrogen should be flowed through the line to:

- A. Increase the joint temperature for faster brazing
- B. Add moisture to the system for leak detection
- C. Prevent the formation of copper oxide scale inside the tubing
- D. Pressurize the system to operating conditions

10. A capillary tube metering device is best described as a:

- A. Modulating device that adjusts to load changes instantly
- B. Pressure-actuated valve with an external equalizer
- C. Thermostatically controlled expansion valve
- D. Fixed-orifice device with no moving parts

11. The most accurate way to verify a refrigerant charge on a system equipped with a TXV and a receiver is to:

- A. Weigh in the nameplate charge only
- B. Measure suction superheat
- C. Measure liquid line subcooling against manufacturer specifications
- D. Observe frost on the suction line

12. Under WHMIS 2015, an SDS must be readily available for which of the following on a job site?

- A. Only refrigerants over 50 lb cylinders

- B. Only flammable refrigerants
- C. Compressed nitrogen but not refrigerants
- D. All hazardous products including refrigerants and chemicals used

13. A high condensing pressure on an air-cooled system in normal ambient conditions is most likely caused by:

- A. Low refrigerant charge
- B. A dirty or restricted condenser coil
- C. An oversized metering device
- D. A faulty suction service valve

14. Superheat is defined as:

- A. The temperature of the liquid below its saturation point
- B. The temperature rise of vapour above its saturation temperature at a given pressure
- C. The pressure difference across the compressor
- D. The latent heat content of the refrigerant

15. Which control device protects a compressor by opening on a loss of oil pressure?

- A. Low-pressure cut-out
- B. Defrost termination thermostat
- C. Head pressure control
- D. Oil pressure safety switch

16. When evacuating a system, a deep vacuum is pulled primarily to:

- A. Add refrigerant charge

- B. Increase the system's superheat
- C. Test the compressor windings
- D. Remove non-condensables and boil off moisture

17. A refrigerant with a high glide (e.g., a zeotropic blend) must be charged into a system as a:

- A. Vapour from the top of the cylinder
- B. Liquid from the cylinder to maintain blend composition
- C. Vapour only after warming the cylinder
- D. Either liquid or vapour with no difference

18. The purpose of a crankcase heater on a compressor is to:

- A. Increase compression ratio at startup
- B. Prevent refrigerant from migrating and dissolving into the oil during off-cycles
- C. Warm the suction gas entering the cylinders
- D. Defrost the evaporator coil

19. A water-cooled condenser using a cooling tower rejects heat primarily through:

- A. Evaporation of a portion of the circulating water
- B. Conduction to the tower structure
- C. Radiation to the night sky
- D. Compression of the air stream

20. What does a "TXV hunting" condition typically indicate?

- A. A correctly sized valve operating normally

- B. A fully closed liquid line solenoid
- C. Excessive subcooling in the receiver
- D. The valve over- and under-feeding causing fluctuating superheat

21. Under provincial regulations, a technician handling refrigerants in Canada must hold which credential?

- A. An Ozone Depletion Prevention / refrigerant handling certification
- B. A commercial driver's licence
- C. A first-aid level 3 certificate only
- D. A boiler operator's ticket

22. A hot gas defrost system removes evaporator frost by:

- A. Spraying warm water over the coil
- B. Routing discharge gas through the evaporator coil
- C. Reversing the condenser fan direction
- D. Lowering the suction pressure setpoint

23. The compression ratio of a system is calculated as:

- A. Discharge temperature divided by suction temperature
- B. Absolute discharge pressure divided by absolute suction pressure
- C. Suction pressure minus discharge pressure
- D. Condenser capacity divided by evaporator capacity

24. Flash gas appearing in the liquid line is most commonly caused by:

- A. Excessive subcooling

- B. An oversized receiver
- C. A pressure drop or insufficient subcooling causing liquid to boil
- D. Too much superheat at the evaporator

25. A reciprocating compressor's volumetric efficiency decreases as:

- A. Suction pressure increases
- B. Discharge pressure decreases
- C. Compression ratio increases
- D. Clearance volume decreases

26. Which of the following best describes a "pump down" cycle?

- A. Increasing system charge before shutdown
- B. Pumping refrigerant into the receiver/condenser by closing the liquid solenoid while the compressor runs
- C. Removing all oil from the crankcase
- D. Reversing the cycle to heat the space

27. A psychrometric chart is used in HVAC/R to determine:

- A. Air properties such as relative humidity, dew point, and enthalpy
- B. Compressor oil viscosity
- C. Refrigerant pressure-temperature relationships
- D. Electrical motor slip

28. The function of an accumulator in a refrigeration system is to:

- A. Store excess liquid refrigerant on the high side

- B. Prevent liquid refrigerant from returning as a slug to the compressor
- C. Increase the condensing pressure
- D. Filter contaminants from the discharge line

29. When a fixed-orifice (piston) metering device is used, system charge is critical because the device:

- A. Modulates flow automatically with load
- B. Maintains constant superheat regardless of charge
- C. Eliminates the need for a filter drier
- D. Cannot compensate for over- or undercharge

30. A solenoid valve in the liquid line that fails to open will cause:

- A. High suction pressure and flooded evaporator
- B. Continuous compressor short cycling on high pressure
- C. Excessive condenser subcooling only
- D. The compressor to pump down and cut out on low pressure

31. Which instrument is used to measure the actual operating superheat at the evaporator outlet?

- A. A manometer only
- B. A thermometer at the suction line plus a pressure gauge converted to saturation temperature
- C. An ammeter
- D. A megohmmeter

32. The triple evacuation method improves system dehydration by:

- A. Adding three charges of refrigerant

- B. Tripling the compressor run time
- C. Breaking the vacuum with dry nitrogen between successive evacuations
- D. Using three separate vacuum pumps simultaneously

33. A "short cycling" compressor on the low-pressure control most often indicates:

- A. A refrigerant restriction or low charge causing rapid pressure drop
- B. An oversized condenser fan motor
- C. Excessive ambient humidity
- D. A correctly functioning anti-recycle timer

34. The primary reason for installing a filter drier in the liquid line is to:

- A. Remove moisture and filter particulate contaminants
- B. Increase liquid line subcooling
- C. Reduce discharge superheat
- D. Act as a metering device

35. In a parallel rack system serving multiple cases, the suction header pressure is controlled to:

- A. Maximize discharge temperature
- B. Eliminate the need for individual TXVs
- C. Increase oil retention in the cases
- D. Match the highest required evaporating temperature among the cases

36. A non-condensable gas (e.g., air) trapped in the condenser will cause:

- A. Higher than normal head pressure and reduced capacity

- B. Lower than normal head pressure
- C. Increased subcooling
- D. Reduced compressor amperage

37. Refrigerant recovery into a recovery cylinder must stop when the cylinder reaches:

- A. Exactly atmospheric pressure
- B. Its rated burst pressure
- C. 80% of its capacity to allow for liquid expansion
- D. 100% full to maximize recovery

38. The latent heat of vaporization of a refrigerant decreases as the:

- A. Saturation pressure (and temperature) increases toward the critical point
- B. Refrigerant subcooling increases
- C. Suction superheat increases
- D. Oil concentration decreases

39. A single-phase PSC (permanent split capacitor) motor that hums but won't start most likely has a:

- A. Shorted thermostat
- B. Correct run capacitor
- C. Failed run capacitor
- D. Reversed rotation only

40. When a TXV's external equalizer line is plugged, the valve will tend to:

- A. Open wider and flood the evaporator

- B. Have no effect on operation
- C. Underfeed the evaporator due to false pressure reference
- D. Maintain perfect superheat control

41. The function of an oil separator on the discharge line is to:

- A. Cool the discharge gas before the condenser
- B. Return oil to the compressor crankcase and reduce oil in circulation
- C. Meter refrigerant flow to the evaporator
- D. Remove moisture from the system

42. A heat reclaim system on a supermarket rack recovers:

- A. Cooling tower water for irrigation
- B. Suction line cooling for the building
- C. Rejected condenser heat for space or water heating
- D. Compressor noise energy

43. What does a sight glass with a continuous stream of bubbles in the liquid line usually indicate?

- A. Proper, fully charged operation
- B. Low refrigerant charge or flash gas
- C. Excessive oil in the system
- D. A plugged suction filter

44. The defrost termination and fan delay control on a low-temp evaporator functions to:

- A. End defrost when the coil reaches a set temperature and delay fans until the coil is cold

- B. Start defrost based on suction pressure only
- C. Keep the fans running throughout defrost
- D. Prevent the compressor from ever cycling off

45. A capacitor-start, capacitor-run (CSCR) motor uses the start capacitor to:

- A. Run continuously for power factor correction
- B. Limit running amperage
- C. Reduce starting torque
- D. Provide high starting torque, then drop out of the circuit

46. When charging a system with a zeotropic blend after a leak, the correct procedure is to:

- A. Top up with vapour to save refrigerant
- B. Add any compatible single-component refrigerant
- C. Add a proportional amount of the same blend as vapour
- D. Recover the remaining charge and recharge with virgin blend by weight

47. A thermostatic expansion valve set with too little superheat risks:

- A. Starving the evaporator
- B. Overheating the discharge line
- C. Liquid floodback to the compressor
- D. Raising condensing pressure excessively

48. The "approach" temperature of a condenser refers to:

- A. The suction superheat value

- B. The evaporator's saturation temperature
- C. The difference between condensing temperature and the cooling medium temperature
- D. The compressor's discharge temperature

49. In a multi-evaporator system, an EPR (evaporator pressure regulator) is installed to:

- A. Maintain a minimum pressure/temperature in a higher-temp evaporator
- B. Increase the compressor discharge pressure
- C. Replace the metering device
- D. Lower the suction pressure to the lowest case

50. A vacuum pump should be isolated from the system before shutting it off to prevent:

- A. Excessive refrigerant migration to the pump
- B. Pump oil being drawn back into the evacuated system
- C. Loss of the system charge
- D. Overheating of the pump motor

51. The COP (coefficient of performance) of a refrigeration system is the ratio of:

- A. Discharge pressure to suction pressure
- B. Condenser capacity to evaporator capacity
- C. Refrigerating effect to work input
- D. Latent heat to sensible heat

52. A liquid-line solenoid valve is typically wired to:

- A. Open when the system calls for cooling and close on satisfied/pump-down

- B. Stay open continuously regardless of demand
- C. Modulate proportionally to superheat
- D. Open only during defrost

53. Excessive superheat at the evaporator outlet generally indicates:

- A. An overcharged system
- B. A flooded evaporator
- C. Liquid floodback to the compressor
- D. An underfed evaporator or low charge

54. A reversing valve in a heat pump redirects:

- A. Only the liquid refrigerant flow
- B. The electrical supply to the compressor
- C. Cooling tower water flow
- D. Discharge and suction gas to switch heating and cooling modes

55. Under the building/mechanical code, refrigerant piping passing through a fire-rated wall must be:

- A. Left uninsulated for inspection
- B. Sealed with an approved fire-stop system
- C. Coated with flammable mastic
- D. Routed only through ductwork

56. A TXV with a cross-charged bulb is used to:

- A. Increase the system's compression ratio

- B. Eliminate the need for an external equalizer
- C. Prevent any superheat at all
- D. Prevent flooding during low-load/low-temperature conditions

57. When a compressor trips repeatedly on its internal overload, the technician should first check:

- A. Operating amperage, voltage, and for a refrigerant or airflow restriction
- B. The cooling tower fill
- C. The psychrometric chart values
- D. The defrost timer schedule

58. A "flooded" evaporator design differs from a "dry expansion" design in that:

- A. It uses a capillary tube only
- B. The evaporator is kept mostly full of liquid with a level control
- C. It requires no compressor
- D. It operates with very high superheat

59. The recommended method to check for a refrigerant leak using an electronic leak detector is to:

- A. Move the probe slowly along the underside of joints and fittings
- B. Pass the probe rapidly over the top of components
- C. Spray water on the suspected area first
- D. Disconnect the detector and use only soap bubbles

60. A high superheat with a low suction pressure on a TXV system most likely indicates:

- A. An overcharged system

- B. A flooded evaporator
- C. A starved evaporator from a restriction or stuck-closed valve
- D. Excessive condenser subcooling

61. The purpose of staging compressors in a parallel rack is to:

- A. Increase the discharge superheat
- B. Match capacity to load and improve part-load efficiency
- C. Eliminate the need for oil management
- D. Maintain a single fixed suction pressure regardless of load

62. Refrigerant oil must be miscible with the refrigerant in a DX system to:

- A. Return reliably to the compressor with the suction vapour
- B. Increase the latent heat of the refrigerant
- C. Lower the condensing pressure
- D. Act as a metering medium

63. A wattmeter reading on a running compressor that is far below nameplate FLA wattage suggests:

- A. A locked rotor condition
- B. Excessive head pressure
- C. Light loading, possibly low charge or unloaded compressor
- D. A grounded winding

64. When a condenser fan cycling control fails and the fans run continuously in cold weather, the result is:

- A. Higher than normal head pressure

- B. Increased compressor amperage
- C. Excessive evaporator superheat only
- D. Low head pressure and possible loss of liquid feed to the TXV

65. The dew point of an air sample is the temperature at which:

- A. Air becomes saturated and condensation begins
- B. The refrigerant flashes to vapour
- C. The compressor reaches discharge temperature
- D. Water boils at atmospheric pressure

66. A liquid receiver is sized to:

- A. Increase suction superheat
- B. Hold the system charge during pump-down and accommodate charge fluctuations
- C. Replace the accumulator on the suction line
- D. Meter refrigerant to multiple evaporators

67. Two-stage compression with an intercooler is used in low-temperature applications to:

- A. Eliminate the need for a condenser
- B. Reduce discharge temperature and improve efficiency at high compression ratios
- C. Increase the evaporator superheat
- D. Lower the system COP intentionally

68. A defrost timer that initiates defrost too frequently will cause:

- A. Heavy ice buildup on the coil

- B. Lower energy use overall
- C. Reduced refrigeration capacity and wasted energy
- D. Higher evaporator superheat permanently

69. When silver-brazing a joint, the filler metal flows into the joint primarily by:

- A. Gravity feeding from above
- B. Magnetic attraction to copper
- C. Compressed nitrogen pressure
- D. Capillary action drawing molten filler into the gap

70. A compressor running with high amperage and high head pressure most likely has:

- A. A low refrigerant charge
- B. An open run capacitor
- C. Excessive evaporator superheat
- D. A condenser problem such as a dirty coil or non-condensables

71. The primary safety hazard of working with high-pressure refrigerant cylinders in a hot environment is:

- A. Cylinder freezing solid
- B. Over-pressurization and potential cylinder rupture
- C. Loss of refrigerant odour
- D. Increased viscosity of the liquid

72. An air-cooled condenser's capacity is most directly affected by:

- A. Suction superheat

- B. Ambient air temperature and airflow across the coil
- C. The metering device type
- D. The accumulator size

73. A "TEV with MOP charge" (maximum operating pressure) limits suction pressure to:

- A. Increase the evaporator load at startup
- B. Eliminate superheat
- C. Raise condensing pressure
- D. Protect the compressor motor from overload during pull-down

74. When isolating a hermetic compressor for replacement, the refrigerant should be:

- A. Vented to atmosphere quickly
- B. Burned off in the condenser
- C. Recovered into an approved recovery cylinder
- D. Left in the system and capped

75. A balanced-port TXV provides better control than a standard TXV by:

- A. Reducing the effect of fluctuating liquid-line pressure on valve operation
- B. Eliminating the sensing bulb
- C. Removing the need for any superheat
- D. Increasing the orifice size automatically

76. The purpose of a suction-line heat exchanger (liquid-suction HX) is to:

- A. Increase condensing pressure

- B. Cool the discharge gas
- C. Subcool the liquid while superheating the suction gas
- D. Remove oil from the suction line

77. A compressor that will not start and draws locked-rotor amperage indicates:

- A. Normal operation under light load
- B. A correctly charged system
- C. An open low-pressure control only
- D. A seized or mechanically bound compressor, or a stuck contactor

78. The wet-bulb temperature of air is always:

- A. Higher than the dry-bulb temperature
- B. Equal to the dew point in all conditions
- C. Equal to the dry-bulb at 50% RH
- D. Equal to or lower than the dry-bulb temperature

79. A "kickout" / lockout on a high-pressure control that requires manual reset is designed to:

- A. Automatically restart after each trip
- B. Increase head pressure
- C. Force technician inspection after a serious high-pressure event
- D. Bypass the safety entirely

80. When recovering refrigerant, recovery is faster if the:

- A. Recovery machine is undersized for the system

- B. Ambient temperature is very low
- C. Liquid is recovered first using a push-pull method on larger systems
- D. Cylinder is filled completely with liquid

81. The main reason to keep refrigerant lines clean and dry during installation is to:

- A. Increase the system's refrigerating effect
- B. Prevent acid formation, restrictions, and metering device problems
- C. Lower the latent heat of the refrigerant
- D. Increase the compression ratio

82. A floating head pressure control strategy improves efficiency by:

- A. Maintaining the highest possible head pressure year-round
- B. Disabling the condenser fans entirely
- C. Allowing head pressure to drop in cooler weather while maintaining minimum liquid pressure
- D. Eliminating the metering device

83. A solid-state defrost control with adaptive logic adjusts defrost based on:

- A. Actual frost/coil conditions rather than a fixed clock schedule
- B. The cooling tower water level
- C. The compressor oil pressure
- D. The ambient barometric pressure only

84. A refrigerant blend showing significant temperature glide will, in a flooded evaporator, tend to:

- A. Have no effect on evaporator temperature

- B. Eliminate the need for superheat control
- C. Lower the condensing pressure dramatically
- D. Cause uneven evaporator temperatures, complicating control

85. When a contactor's coil is energized but the contacts do not close, the likely cause is:

- A. Correct contactor operation
- B. Burned, pitted, or mechanically stuck contacts
- C. An overcharged refrigerant system
- D. A plugged metering device

86. The function of a liquid-line check valve in a heat pump is to:

- A. Meter refrigerant continuously
- B. Increase suction superheat
- C. Separate oil from the discharge gas
- D. Direct refrigerant flow through the correct metering device per mode

87. A system showing low suction pressure, low head pressure, and high superheat is most consistent with:

- A. An overcharged system
- B. An undercharge or liquid-line restriction
- C. A dirty condenser coil
- D. Non-condensables in the condenser

88. Proper torch flame for silver brazing copper is generally:

- A. A strongly oxidizing flame

- B. A neutral to slightly reducing (carburizing) flame
- C. A pure oxygen flame
- D. A cold flame with no acetylene

89. The purpose of a discharge muffler on a compressor is to:

- A. Increase the discharge pressure
- B. Subcool the liquid refrigerant
- C. Filter moisture from the suction line
- D. Reduce gas pulsation noise from the compressor

90. A flooded chiller (shell-and-tube) maintains capacity control primarily through:

- A. Adjusting the brazing temperature
- B. Changing the refrigerant type seasonally
- C. Reversing the water flow
- D. Compressor capacity modulation and refrigerant level control

91. When two refrigerants are accidentally mixed in a system, the correct action is to:

- A. Recover the mixture and recharge with the correct virgin refrigerant
- B. Continue operating if pressures seem normal
- C. Add more of the original refrigerant to dilute
- D. Vent the mixture and recharge

92. A capillary-tube system is matched to a specific charge, so an overcharge typically results in:

- A. Excessive superheat and a starved evaporator

- B. Liquid floodback and high suction pressure
- C. Loss of condenser subcooling
- D. Lower head pressure than normal

93. The function of the king valve on a receiver is to:

- A. Meter refrigerant to the evaporator
- B. Relieve excess pressure to atmosphere
- C. Isolate the receiver liquid outlet for service and pump-down
- D. Separate oil from refrigerant

94. A subcooling circuit added to a condenser increases system capacity by:

- A. Raising the suction superheat only
- B. Increasing the discharge temperature
- C. Increasing the refrigerating effect per pound of refrigerant
- D. Lowering the compressor amperage to zero

95. When testing a run capacitor with a multimeter set to capacitance, a reading far below the rated microfarads indicates:

- A. A weak or failed capacitor that should be replaced
- B. A perfectly good capacitor
- C. A grounded compressor winding
- D. An overcharged system

96. A defrost heater that remains energized after defrost should terminate due to a stuck timer will cause:

- A. Lower case temperature than setpoint

- B. Improved energy efficiency
- C. Heavier frost accumulation
- D. Excessive case temperature and possible product loss

97. The recommended slope for horizontal suction lines to aid oil return is:

- A. Perfectly level with no slope
- B. Pitched downward toward the compressor
- C. Pitched steeply upward away from the compressor
- D. Vertical only

98. A pressure-temperature chart is essential because it allows a technician to:

- A. Determine saturation temperature from a measured pressure for a given refrigerant
- B. Measure the compressor's winding resistance
- C. Calculate the building's heat load
- D. Set the defrost timer schedule

99. Liquid slugging in a reciprocating compressor can cause:

- A. Improved volumetric efficiency
- B. Broken valves or connecting rods due to incompressible liquid
- C. Lower discharge temperature with no damage
- D. Increased oil pressure safely

100. A condenser flooding valve (head pressure control) holds liquid in the condenser during cold weather to:

- A. Lower the system charge requirement

- B. Increase suction superheat permanently
- C. Eliminate the receiver
- D. Maintain adequate head pressure for proper TXV operation

101. A technician should always recover refrigerant rather than vent it because venting:

- A. Improves compressor efficiency
- B. Is prohibited by environmental regulations and harms the ozone layer/climate
- C. Increases the refrigerant charge
- D. Lowers the system's superheat

102. A burnout in a hermetic compressor requires the technician to:

- A. Simply replace the compressor and recharge immediately
- B. Add extra oil to the new compressor only
- C. Clean the system with suction-line and liquid-line burnout driers and verify acid removal
- D. Operate the system at higher head pressure to clear contaminants

103. The "net refrigerating effect" of a refrigerant is:

- A. The heat absorbed in the evaporator per pound of refrigerant circulated
- B. The total heat rejected at the condenser
- C. The compressor work input
- D. The latent heat at the critical point

104. An expansion valve that is undersized for the load will cause:

- A. A flooded evaporator with low superheat

- B. Excessive condenser subcooling
- C. Insufficient feed and high superheat at full load
- D. No effect on capacity

105. When pressure-testing a new installation with nitrogen, a trace of refrigerant may be added to:

- A. Pre-charge the system for operation
- B. Increase the test pressure beyond nitrogen limits
- C. Enable electronic leak detection during the test
- D. Lubricate the compressor before startup

106. A scroll compressor offers advantages over a reciprocating compressor including:

- A. Fewer moving parts and tolerance of some liquid floodback
- B. Higher noise and more valves
- C. No need for any oil
- D. Inability to handle vapour refrigerant

107. The purpose of a hot-gas bypass valve is to:

- A. Increase the system's COP at full load
- B. Replace the metering device
- C. Eliminate the condenser
- D. Maintain a minimum evaporator load and prevent low-suction cutout at light load

108. When charging by superheat on a fixed-orifice system, the target superheat is determined by:

- A. The discharge pressure alone

- B. Indoor wet-bulb and outdoor dry-bulb conditions per a charging chart
- C. The receiver liquid level
- D. The compressor nameplate amperage

109. A water-cooled condenser with scaled tubes will exhibit:

- A. Higher condensing temperature and pressure due to poor heat transfer
- B. Lower head pressure than normal
- C. Increased subcooling
- D. Reduced compressor amperage

110. An evaporator operating with a TXV that is overfeeding will show:

- A. High superheat and a warm suction line
- B. Normal superheat and proper operation
- C. Low superheat and a cold, sweating or frosting suction line back to the compressor
- D. High head pressure with low amperage

111. The maximum allowable working pressure (MAWP) marked on a vessel indicates:

- A. The pressure the vessel is rated to safely contain
- B. The required operating suction pressure
- C. The compressor discharge superheat
- D. The recommended evacuation level

112. A "deep vacuum" for a refrigeration system is typically considered to be below:

- A. 500 microns ( $\mu\text{m Hg}$ )

- B. 28 inches of mercury gauge only
- C. Atmospheric pressure
- D. 5 psig

113. The purpose of a thermistor or RTD in modern refrigeration controls is to:

- A. Meter refrigerant flow mechanically
- B. Replace the compressor contactor
- C. Store the system charge
- D. Provide accurate temperature input to electronic controllers

114. When two compressors share a common suction in a parallel system, oil equalization is important to:

- A. Increase the discharge pressure
- B. Eliminate the need for an oil separator
- C. Prevent one compressor from losing oil while another floods
- D. Reduce the system's refrigerating effect

115. A high discharge temperature with normal pressures most likely indicates:

- A. A flooded evaporator
- B. An overcharged system
- C. High superheat returning to the compressor or high compression ratio
- D. A plugged liquid-line drier only

116. The function of an EEV (electronic expansion valve) compared to a mechanical TXV is to:

- A. Eliminate the sensing element entirely

- B. Operate without any electrical power
- C. Increase the system charge automatically
- D. Provide faster, more precise superheat control via electronic actuation

117. When a system is overcharged, a TXV system will typically show:

- A. Low head pressure and low subcooling
- B. High superheat and a starved evaporator
- C. Reduced condenser subcooling
- D. High head pressure and high subcooling

118. The correct first step before opening any refrigeration system for service is to:

- A. Recover the refrigerant and verify the system is at the proper pressure for the task
- B. Energize the compressor at full load
- C. Add nitrogen to operating pressure
- D. Remove the filter drier first

119. A "TXV bulb" that has lost its charge will cause the valve to:

- A. Close and starve the evaporator (no opening force)
- B. Open fully and flood the evaporator
- C. Modulate normally
- D. Have no effect on superheat

120. The advantage of a brazed-plate heat exchanger over a shell-and-tube in a chiller is:

- A. Larger refrigerant charge required

- B. Lower heat transfer efficiency
- C. Inability to handle water
- D. Compact size and high heat-transfer efficiency with low charge

121. A compressor cycling on its low-pressure control during normal cooling load with a clean coil suggests:

- A. Excessive condenser subcooling
- B. A flooded evaporator
- C. Low refrigerant charge or a liquid-line restriction
- D. An oversized metering device

122. When determining airflow across an evaporator coil, a technician most commonly measures:

- A. The temperature split (return-air vs. supply-air dry-bulb) and external static pressure
- B. The compressor oil pressure
- C. The refrigerant glide
- D. The condenser approach temperature

123. A receiver-bypass / "winter control" valve on an air-cooled system functions to:

- A. Maintain minimum head pressure in cold ambient by backing liquid up in the condenser
- B. Increase suction superheat in summer
- C. Eliminate the need for a metering device
- D. Lower the condensing temperature below ambient

124. The primary purpose of insulating the suction line is to:

- A. Increase the discharge temperature

- B. Prevent heat gain and condensation/sweating on the cold line
- C. Raise the condensing pressure
- D. Reduce the latent heat of the refrigerant

125. When a system's low-side pressure rises into a vacuum on the high side during operation, the most likely cause is:

- A. An overcharged condenser
- B. Excessive subcooling
- C. A flooded evaporator
- D. A severe liquid-line or metering-device restriction blocking flow

## Practice Exam 20: Answer Key and Explanations

1. A — CFCs and HCFCs contain chlorine, which migrates to the stratosphere and catalyzes the destruction of ozone molecules. A single chlorine atom can destroy thousands of ozone molecules before being deactivated, which is why these refrigerants are regulated and phased out under Canadian environmental law.
2. C — On an R-134a P-T chart, approximately 35 psig corresponds to a saturation temperature near 40°F. Converting gauge pressure to saturation temperature lets the technician determine the actual evaporating condition, which is the foundation of superheat and diagnostic calculations.
3. A — The metering device drops high-pressure liquid to low-pressure liquid, creating the pressure differential that allows boiling in the evaporator. By controlling the rate of refrigerant entering the evaporator, it matches refrigerant flow to the heat load being absorbed.
4. A — A scroll compressor running in reverse cannot develop a pressure differential, producing a loud noise without proper pumping. Reverse rotation from a phase reversal must be corrected immediately by swapping two supply legs, or the compressor can overheat and fail.

5. C — The TXV bulb senses suction-line temperature at the evaporator outlet, which together with the equalized pressure determines superheat. The valve modulates flow to maintain a stable superheat setpoint, ensuring the evaporator is fully used without flooding the compressor.

6. B — Latent heat of vaporization is the energy absorbed during the liquid-to-vapour phase change at constant temperature. This is the heat-transfer mechanism that makes refrigeration possible, since the bulk of cooling occurs as liquid refrigerant boils in the evaporator.

7. B — A reading of 0.2 megohms is far below the acceptable insulation resistance and indicates a grounded or deteriorating winding. Healthy hermetic windings typically read in the high megohm or infinite range; low readings warn of imminent motor failure.

8. C — Subcooling lowers the liquid temperature below saturation so it remains fully liquid despite line pressure drops. This prevents premature flashing (flash gas) ahead of the metering device, ensuring solid liquid feed and full metering-device capacity.

9. C — Flowing dry nitrogen displaces oxygen so that the heated copper cannot form internal oxide scale. This scale would otherwise flake off and circulate as a contaminant, plugging metering devices and filter driers.

10. D — A capillary tube is a fixed-bore device with no moving parts that meters flow purely by its length and diameter. Because it cannot adjust to load changes, the system charge must be precise for correct operation.

11. C — On a TXV/receiver system, subcooling is the reliable charge indicator because the receiver masks superheat as a charging guide. Comparing measured liquid-line subcooling to the manufacturer's specification confirms the correct charge.

12. D — WHMIS 2015 requires an accessible Safety Data Sheet for every hazardous product used on site, including refrigerants and chemicals. This ensures workers can identify hazards, handling precautions, and first-aid measures.

13. B — A dirty or restricted condenser reduces heat rejection, forcing condensing temperature and pressure to climb. In normal ambient conditions, elevated head pressure points to airflow or coil-surface problems rather than charge.

14. B — Superheat is the number of degrees a vapour's temperature rises above its saturation temperature at the same pressure. It confirms that all liquid has boiled off, protecting the compressor from liquid floodback.

15. D — The oil pressure safety switch opens to stop the compressor when net oil pressure falls below a safe threshold. Loss of lubrication causes rapid bearing and mechanical damage, so this control is essential protection.

16. D — A deep vacuum boils off moisture and pulls out non-condensable gases such as air. Removing these contaminants prevents acid formation, corrosion, and abnormal high-side pressures after startup.

17. B — Zeotropic blends have components that boil at different rates, so removing vapour changes the remaining blend's composition (fractionation). Charging as liquid keeps the blend proportions intact and preserves rated performance.

18. B — The crankcase heater keeps the oil warm so refrigerant vapour does not migrate to and condense in the cooler oil during off-cycles. This prevents oil dilution and foaming/slugging at startup that would damage the compressor.

19. A — A cooling tower rejects heat primarily by evaporating a small fraction of the circulating water, which carries away large amounts of latent heat. This evaporative cooling lets the water-cooled condenser operate at lower temperatures than dry air-cooled designs.

20. D — Hunting is a cyclic over- and under-feeding by the TXV that produces oscillating superheat. It is often caused by an oversized valve, poor bulb contact, or improper superheat adjustment, and it degrades stable evaporator control.

21. A — Canadian regulations require technicians who handle refrigerants to hold an ozone-depletion-prevention/refrigerant-handling certification. This ensures only trained, certified personnel recover and charge ozone-depleting and high-GWP refrigerants.

22. B — Hot gas defrost routes hot discharge vapour into the evaporator coil to melt frost quickly from the inside. It is faster and more efficient than electric defrost in many low-temperature systems.

23. B — Compression ratio is absolute discharge pressure divided by absolute suction pressure (both in psia). It indicates the work the compressor must do; high ratios raise discharge temperature and reduce volumetric efficiency.

24. C — Flash gas forms when liquid refrigerant boils early due to a pressure drop or inadequate subcooling. The resulting vapour bubbles in the liquid line reduce the metering device's feed and starve the evaporator.

25. C — Volumetric efficiency falls as compression ratio rises because more re-expanding clearance gas reduces the cylinder's effective intake. Higher ratios mean less fresh vapour pumped per stroke and lower capacity.

26. B — A pump-down closes the liquid-line solenoid while the compressor keeps running, drawing refrigerant into the receiver/condenser. Storing the charge on the high side keeps liquid out of the compressor during the off-cycle.

27. A — The psychrometric chart relates air properties such as dry-bulb, wet-bulb, relative humidity, dew point, and enthalpy. It is the core tool for analyzing air conditioning loads and air-mixing processes.

28. B — A suction accumulator temporarily holds liquid refrigerant and meters it back slowly so it cannot slug the compressor. This protects against floodback during defrost recovery and rapid load changes.

29. D — A fixed-orifice piston cannot modulate with load, so the system depends entirely on a correct charge. Over- or undercharge directly degrades capacity and superheat because the device cannot compensate.

30. D — If the liquid-line solenoid fails closed, no refrigerant reaches the evaporator and the low side falls until the compressor cuts out on low pressure. The symptom mimics a pump-down because flow is blocked at the valve.

31. B — Measuring superheat requires a suction-line temperature reading plus the saturation temperature derived from suction pressure. The difference between actual line temperature and saturation temperature is the operating superheat.

32. C — Triple evacuation breaks each vacuum with dry nitrogen, which dilutes and helps sweep out residual moisture before re-evacuating. Repeating the cycle dramatically improves dehydration over a single pull.

33. A — Short cycling on the low-pressure control usually means a restriction or low charge causes the suction pressure to fall rapidly. The control cuts out, pressure rebounds, and the cycle repeats, signaling a refrigerant-side fault.

34. A — The liquid-line filter drier removes both moisture and particulate contaminants. Keeping the system dry and clean prevents acid formation and protects the metering device from plugging.

35. D — Suction header pressure on a rack is set to satisfy the highest evaporating temperature required by the connected cases. Floating it to that level avoids overcooling low-temp loads while still meeting demand efficiently.

36. A — Non-condensables collect in the condenser and add their partial pressure to the refrigerant, raising head pressure above normal. They also blanket heat-transfer surface, reducing capacity and efficiency.

37. C — Recovery cylinders must not be filled past 80% liquid to leave room for liquid thermal expansion. Overfilling risks hydrostatic rupture as temperature rises—a serious safety hazard.

38. A — Latent heat of vaporization decreases as saturation pressure and temperature rise toward the critical point, where it reaches zero. This is why operating closer to the critical point reduces refrigerating effect per pound.

39. C — A PSC motor that hums but won't start typically has a failed run capacitor, since the capacitor provides the phase shift needed for starting torque. Without it, the motor cannot develop rotation and may overheat.

40. C — A plugged external equalizer makes the valve sense the wrong reference pressure, causing it to read excess superheat and underfeed the evaporator. The valve effectively throttles closed, starving the coil.

41. B — A discharge-line oil separator captures entrained oil and returns it to the crankcase, keeping oil circulation in the system low. This protects the compressor against oil loss and prevents oil logging in the evaporator.

42. C — A heat reclaim system captures rejected condenser heat and uses it for space or water heating. This recovers energy that would otherwise be wasted, improving overall efficiency.

43. B — A steady stream of bubbles in the sight glass indicates flash gas, typically from a low charge or insufficient subcooling. A properly charged liquid line should appear clear and full.

44. A — The defrost termination control ends defrost when the coil reaches a set temperature, and the fan delay keeps fans off until the coil re-cools. This prevents blowing warm, moisture-laden air into the case after defrost.

45. D — A CSCR motor uses the start capacitor to provide high starting torque, then a potential relay drops it out once the motor is up to speed. The run capacitor remains in circuit to improve running efficiency.

46. D — After a leak, a zeotropic blend may have fractionated, so the correct practice is to recover the remaining charge and recharge with virgin blend by weight. Topping up with vapour would skew the blend composition and performance.

47. C — Too little superheat means liquid is not fully boiled off in the evaporator, allowing liquid floodback to the compressor. Floodback dilutes oil and can mechanically damage the compressor.

48. C — Condenser approach is the difference between condensing temperature and the entering temperature of the cooling medium. A widening approach signals fouling or reduced heat-transfer performance.

49. A — An evaporator pressure regulator maintains a minimum pressure (and thus temperature) in a higher-temperature evaporator on a shared suction. This prevents that case from over-cooling while lower-temp loads pull suction down.

50. B — If the pump is shut off while still connected under vacuum, oil can be drawn backward into the system. Isolating the pump first prevents oil contamination of the evacuated system.

51. C — COP is the ratio of useful refrigerating effect to the work input required to produce it. A higher COP means more cooling delivered per unit of energy consumed.

52. A — A liquid-line solenoid is wired to open on a call for cooling and close when satisfied or for pump-down. This stops refrigerant feed during off-cycles, supporting pump-down compressor protection.

53. D — High superheat at the evaporator outlet means the coil is underfed, often from a low charge or restriction. The refrigerant boils off too early, leaving part of the coil starved and warm.

54. D — The four-way reversing valve switches the direction of discharge and suction gas to alternate between heating and cooling. This lets the same components serve both modes in a heat pump.

55. B — Refrigerant piping through a fire-rated assembly must be sealed with an approved fire-stop system to preserve the wall's fire rating. This maintains compartmentation and code compliance.

56. D — A cross-charged bulb tailors the valve's response to prevent flooding during low-load or low-temperature pull-down conditions. It limits opening force at low temperatures, protecting the compressor.

57. A — Repeated internal-overload trips warrant checking operating amperage, supply voltage, and for refrigerant or airflow restrictions that overload the motor. These are the common root causes of thermal overload.

58. B — A flooded evaporator is kept mostly full of liquid using a level-control device, unlike a dry-expansion coil that maintains superheat. Flooded designs offer high heat-transfer efficiency in large chillers.

59. A — Because most refrigerants are heavier than air, the leak-detector probe should move slowly along the underside of joints where leaking gas settles. Moving too fast or above components misses the accumulating refrigerant.

60. C — High superheat combined with low suction pressure indicates a starved evaporator from a restriction or stuck-closed valve. Too little refrigerant reaches the coil, so pressure drops and superheat climbs.

61. B — Staging compressors in a parallel rack lets capacity follow the load, improving part-load efficiency. Running only the compressors needed avoids wasteful cycling and energy use.

62. A — Oil must be miscible with the refrigerant so it travels with the suction vapour and returns to the compressor. Without adequate oil return, the compressor can run dry and fail.

63. C — Wattage well below nameplate indicates the compressor is lightly loaded, often from a low charge or an unloaded condition. The motor is doing less work than rated, reflecting reduced mass flow.

64. D — If condenser fans run continuously in cold weather, head pressure drops too low and the TXV loses the pressure differential needed to feed liquid. Head-pressure control is required to maintain adequate liquid feed.

65. A — The dew point is the temperature at which air becomes saturated and water vapour begins to condense. It defines when condensation forms on cold surfaces such as suction lines and coils.

66. B — A liquid receiver stores the system charge during pump-down and accommodates normal charge fluctuations. It ensures a steady liquid supply to the metering device under varying load.

67. B — Two-stage compression with an intercooler reduces interstage and discharge temperatures, improving efficiency at the high compression ratios needed for low-temperature work. Lower discharge temperatures protect the oil and compressor.

68. C — Defrosting too often wastes energy and reduces net refrigeration time because each defrost adds heat to the case. Excess defrost cycles cut effective capacity without improving frost control.

69. D — Brazing filler is drawn into the joint gap by capillary action when the base metal reaches proper temperature. A correctly sized gap and clean surfaces are essential for full capillary penetration.

70. D — High amperage and high head pressure point to a condenser problem such as a dirty coil or non-condensables raising condensing pressure. The compressor works harder against the elevated head, drawing more current.

71. B — A high-pressure cylinder in a hot environment can over-pressurize and rupture as the contents expand. This is why cylinders must be kept cool, secured, and never overfilled.

72. B — Air-cooled condenser capacity depends directly on the ambient air temperature and the airflow across the coil. Hotter air or reduced airflow lowers heat rejection and raises head pressure.

73. D — A TEV with a maximum-operating-pressure charge limits how high suction pressure can rise, protecting the compressor motor from overload during pull-down. The valve throttles to cap the load during high-suction conditions.

74. C — Refrigerant must be recovered into an approved recovery cylinder before isolating a compressor for replacement. Venting is prohibited and recovery is required to protect the environment and comply with regulations.

75. A — A balanced-port TXV reduces the influence of varying liquid-line pressure on valve position, giving steadier control. This improves performance on systems with wide head-pressure swings.

76. C — A liquid-suction heat exchanger subcools the liquid line while superheating the suction gas. This boosts refrigerating effect and helps ensure dry suction vapour returns to the compressor.

77. D — A compressor drawing locked-rotor amperage and not starting is mechanically seized or held by a stuck contactor. The motor cannot rotate, so it draws full inrush current without turning.

78. D — The wet-bulb temperature is always equal to or lower than the dry-bulb because evaporative cooling lowers the wet-bulb reading. They are equal only at 100% relative humidity (saturation).

79. C — A manual-reset high-pressure lockout forces a technician to inspect the system after a serious high-pressure trip. Requiring manual reset prevents repeated dangerous cycling and ensures the fault is investigated.

80. C — On larger systems, recovering liquid first using the push-pull method is much faster than vapour recovery alone. Moving liquid directly speeds the process and reduces machine run time.

81. B — Keeping lines clean and dry prevents acid formation, restrictions, and metering-device fouling. Moisture and debris are leading causes of premature system failure.

82. C — Floating head pressure lets condensing pressure drop in cooler weather while still holding a minimum needed for liquid feed. Lower head pressure reduces compressor work and saves energy.

83. A — Adaptive defrost logic monitors actual coil/frost conditions and defrosts only when needed rather than on a fixed clock. This minimizes unnecessary defrosts and improves efficiency.

84. D — In a flooded evaporator, a high-glide blend produces a temperature gradient as it boils, causing uneven coil temperatures. This complicates level and temperature control compared with a single-component refrigerant.

85. B — If the coil is energized but contacts don't close, the contacts are likely burned, pitted, or mechanically stuck. Damaged contacts interrupt power to the load despite a good coil.

86. D — In a heat pump, liquid-line check valves route refrigerant through the correct metering device for each mode. They ensure proper flow direction as the system switches between heating and cooling.

87. B — Low suction, low head, and high superheat together indicate an undercharge or a liquid-line restriction. Insufficient refrigerant reaches the evaporator, so all pressures fall and superheat rises.

88. B — A neutral to slightly reducing (carburizing) flame is preferred for silver brazing copper to avoid oxidizing the joint. An oxidizing flame promotes scale and weak joints.

89. D — A discharge muffler dampens the pressure pulsations created by the compressor's pumping action. Reducing these pulsations lowers noise and vibration in the discharge line.

90. D — A flooded chiller controls capacity through compressor capacity modulation and refrigerant-level control in the shell. Matching capacity to load maintains the desired leaving-water temperature.

91. A — Mixed refrigerants cannot be reliably separated in the field, so the system must be recovered and recharged with the correct virgin refrigerant. Operating on a mixed charge gives unpredictable pressures and poor performance.

92. B — On a cap-tube system matched to a precise charge, an overcharge floods the evaporator and raises suction pressure. Excess refrigerant cannot be stored, so it backs into the low side and risks floodback.

93. C — The king valve isolates the receiver's liquid outlet, allowing pump-down and downstream service. Closing it traps the charge in the receiver while work proceeds.

94. C — Additional subcooling increases the refrigerating effect per pound by delivering colder liquid to the evaporator. More heat is absorbed per unit mass, raising system capacity.

95. A — A capacitance reading well below the rated microfarads means the capacitor is weak or failed and should be replaced. A degraded capacitor reduces motor torque and efficiency.

96. D — A defrost heater stuck on (failed termination/timer) overheats the case and can spoil product. Excess heat input drives case temperature above setpoint until the fault is corrected.

97. B — Horizontal suction lines should pitch downward toward the compressor to help oil drain back with the returning vapour. Proper slope prevents oil from pooling and ensures lubrication return.

98. A — A pressure-temperature chart lets the technician find the saturation temperature for a measured pressure of a specific refrigerant. This relationship underpins superheat, subcooling, and charging diagnostics.

99. B — Liquid slugging forces incompressible liquid into the cylinders, which can break valves or connecting rods. Because liquid cannot be compressed, the sudden hydraulic load damages compressor components.

100. D — A condenser flooding valve backs liquid up in the condenser during cold weather to maintain adequate head pressure. Sufficient head pressure preserves the differential the TXV needs to feed the evaporator.

101. B — Venting refrigerant is prohibited because it harms the ozone layer and climate, so refrigerant must always be recovered. Regulations require recovery to prevent atmospheric release.

102. C — After a hermetic burnout, the system must be cleaned with burnout (suction- and liquid-line) driers and checked until acid is removed. Failing to remove acid and contaminants will quickly destroy the replacement compressor.

103. A — Net refrigerating effect is the heat absorbed in the evaporator per pound of refrigerant circulated. It directly determines how much refrigerant flow is needed to meet a given cooling load.

104. C — An undersized expansion valve cannot pass enough refrigerant at full load, so the evaporator is underfed and superheat runs high. Capacity falls because the valve restricts flow below demand.

105. C — Adding a trace of refrigerant to a nitrogen pressure test lets an electronic detector locate leaks. The nitrogen provides test pressure while the trace gas reveals leak points.

106. A — Scroll compressors have fewer moving parts and can tolerate limited liquid floodback better than reciprocating units. This makes them quieter and more reliable in many applications.

107. D — A hot-gas bypass valve adds artificial load to the evaporator to prevent low-suction cutout at light load. It keeps the system running smoothly when actual demand drops very low.

108. B — Fixed-orifice charging uses a chart based on indoor wet-bulb and outdoor dry-bulb conditions to determine target superheat. These conditions set the correct charge because the orifice cannot self-adjust.

109. A — Scale on a water-cooled condenser's tubes insulates the heat-transfer surface, raising condensing temperature and pressure. Poor heat rejection forces the high side up and reduces efficiency.

110. C — An overfeeding TXV gives low superheat and a cold, sweating or frosting suction line back toward the compressor. Excess liquid leaving the evaporator threatens floodback and compressor damage.

111. A — The maximum allowable working pressure is the pressure a vessel is rated to safely contain. Exceeding it risks vessel rupture, so it sets a hard safety limit for the component.

112. D — A deep vacuum for refrigeration work is generally considered to be below 500 microns of mercury. Reaching this level confirms moisture and non-condensables have been adequately removed.

113. D — Thermistors and RTDs provide accurate temperature inputs to electronic controllers. Precise temperature sensing enables tight control of superheat, defrost, and case temperatures.

114. C — Oil equalization between parallel compressors prevents one from losing oil while another floods. Balanced oil levels protect every compressor on the shared suction from lubrication failure.

115. C — High discharge temperature with normal pressures points to high returning superheat or a high compression ratio. Excess heat of compression raises discharge temperature and can break down oil.

116. D — An electronic expansion valve uses electronic actuation for faster, more precise superheat control than a mechanical TXV. This allows tighter regulation and better part-load performance.

117. D — An overcharged TXV system shows high head pressure and high subcooling because excess liquid backs up in the condenser. The flooded condenser raises both pressure and subcooling readings.

118. A — Before opening any system, recover the refrigerant and confirm the system is at the proper pressure for the task. This protects the technician, prevents venting, and ensures safe service.

119. A — A TXV bulb that loses its charge has no opening force, so the valve closes and starves the evaporator. Without bulb pressure, the spring holds the valve shut and refrigerant feed stops.

120. D — Brazed-plate heat exchangers are compact and highly efficient and operate with a low refrigerant charge. Their high surface-area-to-volume ratio makes them effective in modern chillers.

121. C — Low-pressure cycling with a clean coil and normal load indicates a low charge or a liquid-line restriction. Reduced refrigerant feed drops suction pressure until the control cuts out.

122. A — Evaporator airflow is commonly assessed using the temperature split between return and supply air plus external static pressure. These readings reveal whether airflow matches the coil's design.

123. A — A winter/receiver-bypass control maintains minimum head pressure in cold ambient by backing liquid into the condenser. Adequate head pressure preserves the differential needed for proper liquid feed.

124. B — Suction-line insulation prevents heat gain into the cold vapour and stops condensation/sweating on the line. This protects capacity and prevents water damage from dripping condensation.

125. D — A severe liquid-line or metering-device restriction blocks flow, so the low side is pulled into a vacuum while flow is choked. The starved evaporator and deep low-side vacuum point directly to a blockage.