PRACTICE EXAM 28: RACM RED SEAL SIMULATION (125 QUESTIONS)

1. All of the following are steps in a proper lockout procedure EXCEPT:

A. Isolating each energy source at its disconnect or valve

B. Leaving the equipment energized to test the controls first

C. Applying a personal lock and identifying tag

D. Verifying the zero-energy state with a meter

2. Each of the following is a valid reason to verify zero energy with a meter EXCEPT:

A. A disconnect can appear open yet still be live

B. The tag colour confirms the circuit is dead

C. Verification prevents fatal shock when opening panels

D. Capacitors may retain a charge after power is removed

3. Which statement about recovery cylinders is NOT correct?

A. They may be filled completely to 100% of capacity

B. They are filled to no more than 80% of capacity

C. The 80% limit leaves vapour space for liquid expansion

D. Overfilling risks a hydrostatic rupture

4. All of the following require a Safety Data Sheet on site EXCEPT:

A. Refrigerant

B. Brazing flux

C. A box wrench

D. Cleaning solvent

5. Which of the following is NOT an appropriate response to feeling lightheaded in an enclosed room with a refrigerant odour?

A. Putting on a dust mask and continuing to work

B. Leaving the space immediately

C. Ventilating before re-entry

D. Treating the space as oxygen-deficient

6. Each of the following is a function of a WHMIS 2015 supplier label EXCEPT:

A. Identifying the hazardous product

B. Showing the hazard pictograms

C. Providing precautionary statements

D. Recording the system's refrigerant charge

7. All of the following are correct capacitor-handling practices EXCEPT:

A. Touching the terminals immediately after lockout to check for charge

B. Discharging it through a resistor before handling

C. Treating it as charged even after power is removed

D. Confirming zero stored voltage before contact

8. Which is NOT a feature of effective apprentice mentoring?

A. Having the apprentice bypass safety controls to save time

B. Explaining the reasoning behind each step

C. Demonstrating, then supervising practice

D. Giving constructive feedback

9. Each of the following belongs in a refrigerant-handling record EXCEPT:

A. The refrigerant type

B. The ambient barometric pressure

C. The quantity recovered

D. The quantity charged

10. All of the following are required before brazing near combustibles EXCEPT:

A. Clearing combustible materials

B. Arranging a fire watch

C. Recording the compressor amperage

D. Having an extinguisher on hand

11. Which instrument is NOT used to measure the quantity it is paired with?

A. Clamp ammeter — running current

B. Micron gauge — motor winding resistance

C. Multimeter on ohms — continuity

D. Manifold gauge — system pressure

12. Each of the following is correct PPE practice for breaking into a charged liquid line EXCEPT:

A. Relying on a dust mask to protect against frostbite

B. Wearing gloves rated for refrigerant

C. Wearing eye protection rated for refrigerant

D. Anticipating the instant-frostbite hazard

13. All of the following describe the verification step of lockout EXCEPT:

A. It confirms isolation achieved zero energy

B. It is performed with the appropriate instrument

C. It is the last step before work begins

D. It is optional once a tag is applied

14. Each of the following describes correct tube preparation EXCEPT:

A. Cutting copper with a hacksaw to save time

B. Cutting with a tubing cutter for a square end

C. Reaming the burr with the end facing down

D. Forming a 45-degree flare for mechanical joints

15. Which statement about brazing is NOT correct?

A. The torch flame should melt the filler rod directly

B. The base metal must reach filler flow temperature

C. Capillary action draws the filler into the joint

D. A nitrogen purge prevents internal oxide scale

16. All of the following indicate a leak during testing EXCEPT:

A. A temperature-corrected pressure drop over 24 hours

B. A standing vacuum rising continuously without stabilizing

C. A standing vacuum that rises and then holds steady

D. Bubbles forming at a joint under nitrogen pressure

17. Each of the following is a correct reason to purge with dry nitrogen while brazing EXCEPT:

A. It displaces oxygen in the line

B. It prevents copper-oxide scale

C. It keeps the inside of the tube clean

D. It tests the finished joint to design pressure

18. Which is NOT part of the correct system-finishing sequence?

A. Leak testing with nitrogen first

B. Charging before evacuating

C. Evacuating to a deep vacuum

D. Charging only after evacuation

19. All of the following are properties of soft annealed copper EXCEPT:

A. It can be bent by hand

B. It can be flared by hand

C. It cannot be joined by brazing

D. It is supplied in coils

20. Each of the following results from an oversized suction line EXCEPT:

A. Refrigerant velocity dropping too low to return oil

B. Excessive pressure drop and lost capacity

C. Oil pooling in low points

D. The compressor being starved of lubrication

21. Which statement about a refrigeration flare is NOT correct?

A. It is formed at a 45-degree angle

B. It is a mechanical, gasket-free joint

C. It can be opened and remade for service

D. It is the standard joint for permanent buried connections

22. All of the following are reasons to use dry nitrogen rather than oxygen for pressure testing EXCEPT:

A. Oxygen can ignite explosively with refrigeration oil

B. Nitrogen is inert

C. Nitrogen does not introduce moisture

D. Oxygen reaches test pressure more safely

23. Each of the following describes ACR refrigeration tubing EXCEPT:

A. It is sized by actual outside diameter

B. It is supplied cleaned and capped

C. It is sized by nominal inside diameter like plumbing copper

D. It is kept dry with a nitrogen charge

24. Which is NOT a correct purpose of reaming a cut tube?

A. To increase the tube's outside diameter

B. To remove the internal burr

C. To prevent flow turbulence at the cut

D. To stop chips from circulating

25. All of the following cause a cold, leaking brazed joint EXCEPT:

A. Heating the base metal fully to flow temperature

B. Melting the rod only in the flame

C. Failing to bring the fitting up to temperature

D. Withdrawing heat too soon

26. Each of the following describes a swaged joint EXCEPT:

A. One tube end is expanded into a socket

B. It is a mechanical joint requiring no heat or filler

C. The socket is about one tube diameter deep

D. A same-size tube is inserted and brazed

27. Which statement about a standing vacuum test is NOT correct?

A. A rise that levels off proves the system is dry and tight

B. A rise that levels off indicates moisture boiling off

C. A continuous rise indicates a leak

D. A held deep vacuum indicates a tight, dry system

28. All of the following describe correct suction-line installation EXCEPT:

A. Installing it dead level with no slope

B. Sloping it toward the compressor

C. Adding a P-trap at the base of a riser

D. Insulating it to prevent sweating

29. Each of the following is a hand-bending consideration for soft copper EXCEPT:

A. Using a tube bender to form a smooth radius

B. Avoiding kinks that restrict flow

C. Keeping bends as gradual as routing allows

D. Heating the tube cherry-red before every bend

30. Which is NOT a correct brazing-purge practice?

A. Using a low, steady nitrogen flow

B. Using high-pressure nitrogen to speed the work

C. Maintaining the purge throughout heating

D. Regulating the nitrogen to a few psi

31. All of the following are consequences of skipping the deburr step EXCEPT:

A. A flow restriction at the cut

B. A stronger, smoother joint

C. Chips circulating through the system

D. Turbulence at the tube end

32. Each of the following describes the correct finishing order EXCEPT:

A. Leak test, then evacuate, then charge

B. Each step depends on the prior one passing

C. Evacuation follows a successful leak test

D. Charging may precede evacuation if time is short

33. All of the following are true of one ton of refrigeration EXCEPT:

A. It equals 12,000 BTU/h

B. It is roughly 3.517 kW

C. It equals 1,000 BTU/h

D. It is based on melting one ton of ice in 24 hours

34. Which statement about oversizing a comfort-cooling system is NOT correct?

A. It improves dehumidification

B. It causes short-cycling

C. It leaves the space cold and clammy

D. It stresses the compressor with frequent starts

35. Each of the following is an authoritative basis for sizing decisions EXCEPT:

A. The manufacturer's installation instructions

B. The exam content outline for the trade

C. The calculated load

D. A past job's rule of thumb used without verification

36. All of the following are components of a cooling load EXCEPT:

A. Sensible load

B. Latent load

C. The control transformer's VA rating

D. Infiltration load

37. Which statement about a thermostat differential is NOT correct?

A. A smaller differential reduces short-cycling

B. It is the gap between cut-in and cut-out

C. An adequate differential prevents rapid cycling

D. It protects the compressor from frequent starts

38. Each of the following is true of safety controls EXCEPT:

A. They are wired in series

B. They are wired in parallel so loads stay independent

C. Any one opening stops the equipment

D. They protect equipment and people

39. All of the following describe a pump-down sequence EXCEPT:

A. The liquid-line solenoid closes first

B. The compressor pumps the evaporator down

C. The low-pressure control stops the compressor

D. The condenser fan closes the solenoid

40. Which statement about a TXV is NOT correct?

A. It modulates flow to hold constant superheat

B. It uses a sensing bulb on the suction line

C. It suits varying-load applications

D. It maintains a constant evaporator pressure regardless of load

41. Each of the following is a function of the sequence of operation EXCEPT:

A. Listing the system's bill of materials

B. Describing how the system starts and cycles

C. Describing how the system shuts down

D. Serving as the commissioning reference

42. All of the following indicate pneumatic controls EXCEPT:

A. Compressed-air signal lines

B. Air-positioned actuators

C. Networked microprocessors reading sensors

D. Common use in older large buildings

43. Which is NOT a true statement about the product load in a walk-in cooler?

A. It includes heat removed from the stored product

B. It can include heat of respiration from produce

C. It is the heat drawn by the control transformer

D. It is part of the total refrigeration load

44. Each of the following is a reason for adequate condenser clearance EXCEPT:

A. Ensuring unrestricted airflow

B. Allowing the condenser to reject heat

C. Preventing recirculation of hot discharge air

D. Providing storage space for the recovery cylinder

45. All of the following are operating controls EXCEPT:

A. A thermostat cycling the compressor

B. A low-pressure control in a pump-down circuit

C. A high-pressure cutout protecting the compressor

D. An operating control maintaining conditions

46. Which statement about a DDC Building Automation System is NOT correct?

A. It uses networked microprocessors

B. It enables centralized scheduling and monitoring

C. It relies on compressed-air signals to function

D. It reads sensors and drives outputs

47. Each of the following is part of planning an installation EXCEPT:

A. Charging the system to specification

B. Establishing the load and conditions

C. Developing the equipment layout

D. Accounting for applicable codes

48. All of the following describe an automatic expansion valve (AXV) EXCEPT:

A. It maintains a constant evaporator pressure

B. It suits constant-load applications

C. It is a metering device

D. It maintains constant superheat like a TXV

49. Which is NOT a correct statement about latent load?

A. It is associated with removing moisture

B. It is the heat that raises dry-bulb temperature

C. It rises with high occupancy

D. It must be considered in equipment selection

50. Each of the following results from matching components to the load EXCEPT:

A. Rated performance at design conditions

B. Proper interaction among the four components

C. Performance verified at commissioning

D. Elimination of the need for any safety controls

51. All of the following are safe rigging practices EXCEPT:

A. Using rated, inspected slings

B. Controlling the load with a tag line

C. Standing under the load to center it

D. Knowing the load's weight and centre of gravity

52. Which statement about suction-line insulation is NOT correct?

A. It causes the line to sweat and drip

B. It prevents heat gain

C. It prevents surface condensation

D. It helps maintain capacity

53. Each of the following results from setting equipment out of level EXCEPT:

A. Poor oil return

B. Standing condensate

C. Uneven loading of components

D. Increased airflow across the coil

54. All of the following correct a reverse-running three-phase compressor EXCEPT:

A. Swapping any two of the three supply leads

B. Reversing the phase sequence

C. Replacing the compressor as the first step

D. Correcting the lead order at the panel

55. Which statement about a control transformer is NOT correct?

A. It steps line voltage down to control voltage

B. It powers thermostats and relay coils

C. It increases compressor starting torque

D. It typically supplies 24 V control circuits

56. Each of the following describes correct evaporator airflow EXCEPT:

A. Adequate airflow keeps the coil at design temperature

B. Too little airflow freezes the coil

C. Too much airflow reduces dehumidification

D. Less airflow always improves comfort

57. All of the following are reasons to keep refrigerant lines short EXCEPT:

A. To increase the system's subcooling

B. To limit pressure drop

C. To reduce the refrigerant charge

D. To improve performance

58. Which is NOT a correct wiring practice for a high-pressure cutout?

A. Wiring it in series in the control circuit

B. Allowing it to interrupt the circuit on high pressure

C. Wiring it in parallel with the compressor load

D. Ensuring it can stop the compressor

59. Each of the following describes a roof curb EXCEPT:

A. It supports the unit

B. It electrically disconnects the unit

C. It weatherproofs the opening

D. It provides a path for penetrations

60. All of the following must be connected when installing an electronic expansion valve EXCEPT:

A. The temperature and pressure sensors

B. The stepper-motor leads

C. A pneumatic air line to a compressor

D. The controller wiring

61. Which statement about an uninsulated suction line in an occupied space is NOT correct?

A. It sweats and drips condensate

B. It raises the compressor discharge pressure

C. Its surface falls below the air's dew point

D. It risks water damage

62. Each of the following is a correct separation practice for control wiring EXCEPT:

A. Keeping line- and low-voltage wiring separated

B. Combining line and low voltage freely in one bundle

C. Following code for separation

D. Preventing interference between circuits

63. All of the following protect joint integrity over the system's life EXCEPT:

A. Vibration-isolation loops near the compressor

B. Properly spaced line supports

C. Correct slope for oil return

D. Leaving lines unsupported to allow flexing

64. Which is NOT a correct reason for a condensate pan and drain?

A. The evaporator dehumidifies the air

B. Condensate must drain away

C. The system runs on three-phase power

D. Standing water would cause damage

65. Each of the following results from a boxed-in condenser location EXCEPT:

A. Recirculation of hot discharge air

B. Lower head pressure

C. Raised condensing pressure

D. Reduced capacity

66. All of the following describe correct oil-return installation EXCEPT:

A. Sloping horizontal runs toward the compressor

B. Adding a P-trap at the base of a riser

C. Sizing the line for adequate velocity

D. Oversizing the riser to reduce pressure drop

67. Which statement about integrating controls is NOT correct?

A. Integration connects controls so the system follows its sequence

B. A correctly piped system cannot fail from a control wiring error

C. A miswired control can defeat the sequence

D. Integration is verified against the sequence of operation

68. Each of the following is energized by the line-voltage circuit EXCEPT:

A. The 24 V thermostat

B. The compressor

C. The condenser fan motor

D. The compressor contactor's load contacts

69. All of the following correct a reverse-running three-phase fan and compressor EXCEPT:

A. Adding refrigerant to each circuit

B. Swapping any two incoming supply leads

C. Reversing the phase sequence at the supply

D. Correcting the lead order

70. Which is NOT a correct location for the named accessory?

A. Filter-drier in the liquid line

B. Suction accumulator at the compressor discharge

C. Receiver downstream of the condenser

D. Accumulator on the suction side ahead of the compressor

71. Each of the following is a function of an economizer EXCEPT:

A. Providing ventilation air

B. Allowing free cooling when conditions permit

C. Introducing outdoor air

D. Storing the system's refrigerant charge

72. All of the following describe undersized ductwork EXCEPT:

A. It is noisy and restrictive

B. It reduces airflow

C. It improves dehumidification and comfort

D. It can freeze the evaporator coil

73. Which statement about rigging planning is NOT correct?

A. Standing under a suspended load is acceptable if brief

B. The load's weight must be known

C. The centre of gravity must be known

D. Gear must be rated and inspected

74. Each of the following is a correct purpose of line supports and vibration isolation EXCEPT:

A. Preventing sagging of the lines

B. Protecting joints from fatigue

C. Absorbing compressor vibration

D. Increasing the refrigerant charge

75. All of the following describe a correct pre-charge installation state EXCEPT:

A. The system has passed its leak test

B. The system has been charged before evacuation

C. The system has been evacuated to a deep vacuum

D. The vacuum has held

76. Which is NOT a correct statement about setting equipment level?

A. It ensures proper oil return

B. It allows condensate to drain

C. It promotes even component loading

D. It is unnecessary for hermetic compressors

77. All of the following are reasons to let a system stabilize before recording readings EXCEPT:

A. Early readings are always more accurate than later ones

B. Pressures shift until equilibrium is reached

C. Temperatures shift during the first minutes

D. Premature readings cause unnecessary charge changes

78. Which statement about superheat is NOT correct?

A. It equals suction-line temperature minus saturation temperature

B. It is measured on the liquid line at the condenser outlet

C. It confirms no liquid returns to the compressor

D. It is measured on the suction side

79. Each of the following describes subcooling EXCEPT:

A. It equals condensing saturation temperature minus liquid-line temperature

B. It confirms solid liquid feeds the metering device

C. It is measured on the suction line at the evaporator outlet

D. It is measured on the high/liquid side

80. All of the following indicate an undercharge EXCEPT:

A. Low superheat with high subcooling

B. High superheat with low subcooling

C. A starved evaporator

D. A condenser short of liquid

81. Which is NOT a correct verification method?

A. On a fixed-orifice system, verify charge by superheat

B. On a TXV system, verify charge by superheat

C. On a TXV system, verify charge by subcooling

D. The TXV already controls superheat itself

82. Each of the following is correct when charging a zeotropic blend EXCEPT:

A. Charging it as a vapour from the cylinder top

B. Charging it as a liquid

C. Preserving the blend composition

D. Avoiding fractionation

83. All of the following must be confirmed before charging EXCEPT:

A. The refrigerant type against the nameplate

B. That the system held a deep vacuum

C. The color of the liquid line as proof of refrigerant type

D. That the leak test passed

84. Which statement about commissioning the controls is NOT correct?

A. Safety controls need not be tested if the system runs

B. The full sequence of operation is verified

C. A high-pressure cutout is proven to stop the compressor

D. Operating controls are confirmed to cycle correctly

85. Each of the following is part of describing overall performance EXCEPT:

A. Suction and discharge pressures

B. The wiring-diagram revision date

C. Superheat and subcooling

D. Temperature split and current

86. All of the following indicate an overcharge EXCEPT:

A. Low superheat with high subcooling

B. High superheat with low subcooling

C. A flooded condenser

D. An overfed evaporator

87. Which is NOT a correct instrument for calibrating an enthalpy control?

A. A thermometer for temperature

B. A psychrometer for humidity

C. A micron gauge for total heat content

D. A multimeter for the control's output

88. Each of the following is confirmed first at three-phase start-up EXCEPT:

A. Correct compressor rotation

B. The thermostat differential setting

C. Correct fan rotation

D. That no safety controls trip

89. All of the following point to a dirty condenser or non-condensables EXCEPT:

A. High head pressure

B. High subcooling

C. Normal-to-low suction

D. Low subcooling with high superheat

90. Which statement about air balancing is NOT correct?

A. It ensures each space receives its design airflow

B. It corrects poor distribution within a building

C. It sets the refrigerant charge by weight

D. It is part of completing commissioning

91. Each of the following is a reason to record the refrigerant charge EXCEPT:

A. It is a regulatory requirement

B. It is a service baseline

C. It determines the supply-duct sizing

D. It documents the charged quantity

92. All of the following indicate a compressor overload at commissioning EXCEPT:

A. Current well above nameplate RLA

B. Current well below nameplate RLA

C. Excessive electrical draw

D. A possible mechanical load problem

93. Which is NOT a correct statement about the commissioning report?

A. It is the baseline of normal readings

B. It is the building's occupancy permit

C. It records pressures, superheat, and subcooling

D. It aids future service diagnosis

94. Each of the following confirms proper evacuation before charging EXCEPT:

A. The standing vacuum held at a deep micron level

B. The vacuum did not rise after isolating the pump

C. The micron gauge read a deep vacuum

D. The recovery cylinder was full

95. All of the following are verified during control commissioning EXCEPT:

A. Operating controls cycle within their differentials

B. Safety controls trip at their setpoints

C. Defrost initiates and terminates correctly

D. The safety controls are bypassed for the season

96. Which statement about a temperature split far below design is NOT correct?

A. It can indicate a charge problem

B. It proves the nameplate is wrong

C. It can indicate an airflow problem

D. It can indicate a capacity problem

97. Each of the following describes verifying a reversing valve at commissioning EXCEPT:

A. Exercising the thermostat's O or B terminal

B. Confirming the valve shifts between modes

C. Using the thermostat's G terminal to shift the valve

D. Confirming the solenoid energizes

98. All of the following are consistent with a leaking reversing valve EXCEPT:

A. High suction pressure

B. A warm suction line

C. Very low head pressure with high subcooling

D. Reduced heating capacity

99. Which is NOT a correct response to a system found low on charge?

A. Locating the leak

B. Repairing the leak

C. Evacuating and recharging after repair

D. Repeatedly topping it up without repair

100. Each of the following is consistent with a failed start capacitor EXCEPT:

A. The compressor hums

B. The compressor fails to start

C. The compressor runs efficiently at rated speed

D. The overload trips in seconds

101. All of the following result from a heavily fouled condenser EXCEPT:

A. High head pressure

B. Increased compressor strain

C. Higher energy use

D. A frozen evaporator coil from airflow loss

102. Which statement about a partial liquid-line restriction at the filter-drier is NOT correct?

A. It produces no temperature change across the drier

B. It produces a cold spot across the drier

C. It produces a temperature drop across the drier

D. It can mimic a metering-device restriction

103. Each of the following describes a heat pump that fails to initiate defrost EXCEPT:

A. The outdoor coil ices over

B. Heating capacity collapses

C. The system stays in defrost too long, blowing cool air

D. Frost insulates the coil

104. All of the following are required before replacing a burned-out compressor EXCEPT:

A. Simply installing the new unit without further checks

B. Finding why the compressor failed

C. Correcting the underlying cause

D. Cleaning up acid contamination

105. Which is NOT a correct conclusion when a low-pressure control cuts out but the measured pressure is normal?

A. The system has genuinely lost its charge

B. The control may be faulty

C. The wiring may be at fault

D. The control is not responding to a real condition

106. Each of the following is a correct measurement-safety rule EXCEPT:

A. Resistance is measured on a de-energized circuit

B. Continuity is measured on a live, loaded circuit

C. Current is measured live with a clamp ammeter

D. Voltage is measured on a live circuit with care

107. All of the following result from non-condensables in a system EXCEPT:

A. Abnormally high head pressure

B. Reduced efficiency

C. Abnormally low head pressure

D. Air occupying condenser space

108. Which statement about low suction, high superheat, and low subcooling is NOT correct?

A. It indicates an undercharge or leak

B. The evaporator is starved

C. The condenser is short of liquid

D. It indicates an overcharge

109. Each of the following describes failure to terminate defrost EXCEPT:

A. The system stays in defrost too long

B. The outdoor coil ices over from no defrost

C. Cool air is blown indoors

D. Energy is wasted

110. All of the following are detected by a megohmmeter EXCEPT:

A. Declining winding-insulation resistance

B. Insulation breaking down toward failure

C. A trend across successive PM visits

D. The refrigerant charge weight

111. Which is NOT a correct troubleshooting principle?

A. Replacing the most expensive component first

B. Separating symptom from root cause

C. Verifying the complaint before acting

D. Reading the system's pressures and temperatures together

112. Each of the following is consistent with an overcharge EXCEPT:

A. Low superheat

B. High subcooling

C. A flooded condenser

D. High superheat with low subcooling

113. All of the following describe normal heat-pump defrost behaviour EXCEPT:

A. A brief reversal to cooling

B. The outdoor fan stopping

C. The compressor drawing zero current throughout

D. Steam rising from the outdoor coil

114. Which statement about a tripped safety control is NOT correct?

A. It should be bypassed with a jumper to keep running

B. It is often the indicator of a real fault

C. The first step is to measure the sensed condition

D. Repeated resets without diagnosis are wrong

115. Each of the following describes the reversing-valve solenoid control EXCEPT:

A. It is controlled by the thermostat's O or B terminal

B. It is controlled by the thermostat's G fan terminal

C. It switches the system between heating and cooling

D. It is energized to shift the valve

116. All of the following confirm a motor's running current EXCEPT:

A. An ohmmeter reading taken on a live circuit

B. A clamp ammeter around one conductor

C. A reading taken while the motor runs

D. A comparison to nameplate RLA

117. Which is NOT a correct refrigerant-handling practice during service?

A. Capturing refrigerant in a rated recovery cylinder

B. Never venting refrigerant

C. Storing recovered refrigerant in a disposable cylinder

D. Logging the recovered quantity

118. Each of the following describes the first step in systematic troubleshooting EXCEPT:

A. Gathering information about the symptom

B. Replacing the costliest part immediately

C. Reviewing the system's history

D. Verifying the reported complaint

119. All of the following are correct capacitor-handling rules EXCEPT:

A. A capacitor stores a dangerous charge after power off

B. It must be discharged before handling

C. A resistor is used to discharge it

D. It may be handled immediately once the disconnect is open

120. Which statement about a partial restriction's symptom pattern is NOT correct?

A. There is a cold spot at the restriction

B. There is a temperature drop across it

C. The restriction raises the system's efficiency

D. It can resemble a starved evaporator

121. Each of the following describes an overload tripping with seized bearings EXCEPT:

A. The trip is a symptom of a real fault

B. The mechanical fault must be corrected

C. The overload should be bypassed to keep running

D. Bypassing would let the motor destroy itself

122. All of the following indicate a dirty condenser on a mild day EXCEPT:

A. High head pressure

B. Low subcooling with high superheat

C. High subcooling

D. Impaired heat rejection

123. Which is NOT a correct statement about frost on a heat pump's outdoor coil in heating?

A. It is normal in heating mode

B. The defrost cycle manages it

C. The outdoor coil runs below freezing as the evaporator

D. It always indicates a refrigerant leak

124. Each of the following supports reading pressures, superheat, and subcooling together EXCEPT:

A. Each fault produces a characteristic pattern

B. A single reading cannot reveal the pattern

C. The combination guides the diagnosis

D. Pattern reading removes the need to find the root cause

125. All of the following are correct when a safety control's sensed condition is genuinely out of range EXCEPT:

A. The control is defective and must be replaced

B. The control is working correctly

C. A real fault must be diagnosed

D. The trip is a valid protective response

Practice Exam 28: Answer Key and Explanations

1. B — Leaving equipment energized to test controls is not a lockout step; lockout isolates and de-energizes all energy before work. Isolating, locking/tagging, and verifying zero energy are the genuine steps.

2. B — Tag colour does not confirm a circuit is dead; only a meter test does. A disconnect can appear open yet be live, capacitors retain charge, and verification prevents shock — the three valid reasons.

3. A — Filling a recovery cylinder to 100% is incorrect; the limit is 80% to leave vapour space for liquid expansion. Overfilling risks a hydrostatic rupture.

4. C — A box wrench is an inert hand tool with no SDS requirement. Refrigerant, brazing flux, and solvent are hazardous products that require an SDS.

5. A — Putting on a dust mask and continuing is inappropriate because a mask cannot remedy oxygen displacement. Leaving, ventilating, and treating the space as oxygen-deficient are correct.

6. D — A supplier label does not record the system's refrigerant charge; it identifies the product, shows pictograms, and gives precautionary statements. Charge records belong in the refrigerant log.

7. A — Touching the terminals to check for charge is unsafe; a capacitor is discharged through a resistor first and treated as charged until confirmed otherwise. The other practices are correct.

8. B — Having an apprentice bypass safety controls is never acceptable mentoring. Explaining reasoning, demonstrating with supervised practice, and giving feedback are sound.

9. B — Ambient barometric pressure does not belong in a refrigerant-handling record; the type and quantities recovered and charged do. The log documents regulatory compliance.

10. C — Recording the compressor amperage is not a brazing fire-prevention step. Clearing combustibles, arranging a fire watch, and having an extinguisher are required.

11. B — A micron gauge measures vacuum, not motor winding resistance; resistance is a multimeter function. The other instrument-to-quantity pairings are correct.

12. A — Relying on a dust mask for frostbite protection is incorrect; a mask does not protect against liquid-refrigerant contact. Refrigerant-rated gloves and eye protection do.

13. D — Verification is never optional; a tag does not substitute for confirming zero energy. It is performed with an instrument as the last step before work.

14. A — Cutting copper with a hacksaw is incorrect because it leaves filings and a ragged edge. A tubing cutter, downward reaming, and a 45-degree flare are correct practices.

15. A — Melting the filler rod directly in the flame is wrong; the base metal must reach flow temperature so the metal melts the rod, enabling capillary action. The other statements are correct.

16. C — A standing vacuum that rises and then holds steady indicates moisture, not a leak. A pressure drop, a continuously rising vacuum, and joint bubbles all indicate leaks.

17. D — A brazing purge does not pressure-test the joint; it displaces oxygen and prevents oxide scale, keeping the tube clean. Pressure testing is a separate step.

18. B — Charging before evacuating is not part of the correct sequence; the order is leak test, evacuate, then charge. The other statements are correct.

19. C — Soft annealed copper can be brazed, so "cannot be joined by brazing" is false. It can be bent and flared by hand and is supplied in coils.

20. B — Excessive pressure drop results from an undersized line, not an oversized one. An oversized line drops velocity, pools oil, and starves the compressor of lubrication.

21. D — A flare is not the standard joint for permanent buried connections; brazed joints are used there. A flare is a 45-degree mechanical joint that can be opened and remade.

22. D — Oxygen does not reach test pressure "more safely"; it can ignite explosively with refrigeration oil and must never be used. Nitrogen is inert and moisture-free.

23. C — ACR copper is sized by actual outside diameter, not nominal inside diameter like plumbing copper. It is supplied cleaned, capped, and nitrogen-charged.

24. A — Reaming does not increase the tube's outside diameter; it removes the internal burr, prevents turbulence, and stops chips from circulating.

25. A — Heating the base metal fully to flow temperature produces a sound joint, not a cold one. Melting the rod in the flame, under-heating the fitting, or withdrawing heat early cause cold joints.

26. B — A swaged joint is brazed, so describing it as "a mechanical joint requiring no heat or filler" is false. The end is expanded into a one-diameter-deep socket and brazed.

27. A — A rise that levels off indicates moisture, not a dry, tight system, so that statement is false. A held deep vacuum indicates tight and dry; a continuous rise indicates a leak.

28. A — Installing a suction line dead level is incorrect; it should slope toward the compressor for oil return. Trapping risers and insulating are correct practices.

29. D — Heating soft copper cherry-red before every bend is incorrect; a tube bender forms a smooth radius without heating. Avoiding kinks and gradual bends are correct.

30. B — Using high-pressure nitrogen during brazing is wrong; it can blow filler out and overpressurize the heated line. A low, steady, few-psi flow maintained throughout is correct.

31. B — Skipping the deburr does not create a stronger, smoother joint; it leaves a restriction, circulating chips, and turbulence. The burr harms the joint and flow.

32. D — Charging before evacuation is never acceptable, so that statement is false. The correct order is leak test, evacuate, then charge, each depending on the prior step.

33. C — One ton of refrigeration is 12,000 BTU/h, not 1,000 BTU/h, so that statement is false. It is about 3.517 kW and based on melting one ton of ice in 24 hours.

34. A — Oversizing degrades dehumidification rather than improving it, so that statement is false. It short-cycles, leaves the space clammy, and stresses the compressor.

35. D — A past-job rule of thumb used without verification is not an authoritative sizing basis. The manufacturer's instructions, the exam-blueprint content, and the calculated load are valid.

36. C — The control transformer's VA rating is an electrical-supply figure, not a cooling-load component. Sensible, latent, and infiltration loads make up the cooling load.

37. A — A smaller differential increases short-cycling rather than reducing it, so that statement is false. An adequate differential is the gap that prevents rapid cycling and protects the compressor.

38. B — Safety controls are wired in series, not in parallel, so that statement is false. Series wiring lets any one control stop the equipment; loads are wired in parallel.

39. D — The condenser fan does not close the solenoid in a pump-down; the liquid-line solenoid closes first, the compressor pumps down, and the low-pressure control stops it.

40. D — A TXV maintains constant superheat, not constant evaporator pressure, so that statement is false. The AXV maintains constant evaporator pressure. The other statements describe the TXV correctly.

41. A — Listing the bill of materials is not a function of the sequence of operation, which describes how the system starts, cycles, and shuts down and serves as the commissioning reference.

42. C — Networked microprocessors reading sensors describe DDC, not pneumatic controls, so that statement is false. Pneumatic controls use compressed-air signals and air-positioned actuators.

43. C — The product load is heat removed from the stored product, not heat drawn by the control transformer, so that statement is false. It can include respiration heat and is part of the total load.

44. D — Providing storage space for the recovery cylinder is not a reason for condenser clearance; clearance ensures airflow, heat rejection, and no recirculation of hot air.

45. C — A high-pressure cutout protecting the compressor is a safety control, not an operating control, so it is the exception. The others maintain operating conditions.

46. C — A DDC system uses electronic networked microprocessors, not compressed-air signals, so that statement is false. It enables centralized scheduling and reads sensors to drive outputs.

47. A — Charging the system is a commissioning task, not part of planning the installation. Establishing the load, developing the layout, and accounting for codes are planning steps.

48. D — An AXV does not maintain constant superheat like a TXV; it maintains constant evaporator pressure. It is a metering device suited to constant-load applications.

49. B — The heat that raises dry-bulb temperature is sensible, not latent, so that statement is false. Latent load is moisture removal, rises with occupancy, and affects selection.

50. D — Matching components to the load does not eliminate the need for safety controls, so that statement is false. It produces rated performance, proper interaction, and verifiable commissioning.

51. C — Standing under a load to center it is never acceptable, so it is the exception. Rated slings, tag-line control, and knowing the weight and centre of gravity are correct.

52. A — Insulation prevents the suction line from sweating and dripping, so "causes the line to sweat" is false. It prevents heat gain and condensation and helps maintain capacity.

53. D — Setting equipment out of level does not increase airflow across the coil; it causes poor oil return, standing condensate, and uneven loading.

54. C — Replacing the compressor as the first step is wrong; reverse rotation is corrected by swapping two leads. Reversing the phase sequence at the panel is the proper fix.

55. C — A control transformer does not increase compressor starting torque; it steps voltage down to power 24 V controls. Starting torque comes from capacitors and the motor design.

56. D — Less airflow does not always improve comfort; too little freezes the coil. Adequate airflow holds design temperature, and too much reduces dehumidification.

57. A — Keeping lines short is not done to increase subcooling; it limits pressure drop, reduces charge, and improves performance. Subcooling is set by condenser conditions and charge.

58. C — Wiring a high-pressure cutout in parallel with the load is incorrect; it must be in series to interrupt the control circuit and stop the compressor.

59. B — A roof curb does not electrically disconnect the unit; it supports it, weatherproofs the opening, and provides a penetration path. Disconnection is a separate device.

60. C — An electronic expansion valve has no pneumatic air line; it needs its sensors, stepper-motor leads, and controller wiring. Pneumatic lines belong to pneumatic controls.

61. B — An uninsulated suction line does not raise the compressor discharge pressure; it sweats and drips because its surface falls below the dew point, risking water damage.

62. B — Combining line and low voltage freely in one bundle is incorrect; code requires they be separated for safety and to prevent interference.

63. D — Leaving lines unsupported to allow flexing harms joint integrity, so it is the exception. Vibration loops, proper supports, and correct slope all protect the system.

64. C — A condensate pan is required because the coil dehumidifies and produces water, not because the system is three-phase. The water must drain to prevent damage.

65. B — A boxed-in condenser raises head pressure, it does not lower it, so that is the exception. Recirculated hot air raises condensing pressure and cuts capacity.

66. D — Oversizing the riser to reduce pressure drop harms oil return, so it is the exception. Sloping runs, trapping risers, and sizing for velocity all aid oil return.

67. B — A correctly piped system can still fail from a control wiring error, so "cannot fail" is false. Integration connects controls to follow the sequence, verified against it.

68. A — The 24 V thermostat is on the low-voltage control circuit, not the line-voltage circuit. The compressor, fan motor, and contactor load contacts are line-voltage.

69. A — Adding refrigerant does not correct reverse rotation, so it is the exception. Swapping two supply leads reverses the phase sequence and fixes both fan and compressor.

70. B — A suction accumulator is on the suction side ahead of the compressor, not at the discharge, so that location is wrong. The filter-drier and receiver locations are correct.

71. D — Storing the refrigerant charge is not an economizer function; it provides ventilation, free cooling, and outdoor-air introduction.

72. C — Undersized duct does not improve dehumidification and comfort; it is noisy, restricts airflow, and can freeze the coil.

73. A — Standing under a suspended load is never acceptable, even briefly, so that statement is false. Knowing the weight and centre of gravity and using rated, inspected gear are correct.

74. D — Supports and vibration isolation do not increase the refrigerant charge; they prevent sagging, protect joints from fatigue, and absorb vibration.

75. B — Charging before evacuation is never a correct pre-charge state, so it is the exception. A correct state is a passed leak test, a deep evacuation, and a held vacuum.

76. D — Levelling is not unnecessary for hermetic compressors; all equipment must be level for oil return, drainage, and even loading.

77. A — Early readings are not more accurate than later ones; the system must stabilize because pressures and temperatures shift until equilibrium. Premature readings cause needless charge changes.

78. B — Superheat is measured on the suction side, not on the liquid line at the condenser outlet, so that statement is false. It equals line minus saturation temperature and confirms no liquid returns.

79. C — Subcooling is measured on the high/liquid side at the condenser outlet, not on the suction line, so that statement is false. It confirms solid liquid feeds the metering device.

80. A — Low superheat with high subcooling indicates an overcharge, not an undercharge, so it is the exception. High superheat with low subcooling, a starved evaporator, and a condenser short of liquid indicate undercharge.

81. B — Verifying charge by superheat on a TXV system is incorrect because the valve already controls superheat; subcooling is used instead. Superheat is the method on fixed-orifice systems.

82. A — Charging a zeotropic blend as a vapour is incorrect because it fractionates the blend; it must be charged as a liquid to preserve composition.

83. C — Liquid-line color is not proof of refrigerant type; the nameplate is. A held vacuum and a passed leak test are also correctly confirmed before charging.

84. A — Safety controls must be tested even if the system runs, so "need not be tested" is false. The full sequence is verified and the high-pressure cutout proven to stop the compressor.

85. B — The wiring-diagram revision date does not describe performance; pressures, superheat, subcooling, temperature split, and current do.

86. B — High superheat with low subcooling indicates an undercharge, not an overcharge, so it is the exception. Low superheat with high subcooling, a flooded condenser, and an overfed evaporator indicate overcharge.

87. C — A micron gauge measures vacuum, not total heat content, so it is not used to calibrate an enthalpy control. A thermometer, psychrometer, and multimeter are the correct instruments.

88. B — The thermostat differential setting is not confirmed at three-phase start-up; correct rotation and that no safety controls trip are. Rotation is the priority check.

89. D — Low subcooling with high superheat points to an undercharge, not a dirty condenser, so it is the exception. High head, high subcooling, and normal-to-low suction point to a dirty condenser or non-condensables.

90. C — Air balancing does not set the refrigerant charge by weight; it ensures each space receives its design airflow and corrects distribution.

91. C — The refrigerant charge record does not determine supply-duct sizing; it is a regulatory requirement, a service baseline, and a record of the charged quantity.

92. B — Current well below nameplate RLA does not indicate an overload, so it is the exception. Current well above RLA, excessive draw, and a possible mechanical load problem indicate overload.

93. B — The commissioning report is not the building's occupancy permit; it is the baseline of normal readings, records the key measurements, and aids future diagnosis.

94. D — A full recovery cylinder does not confirm proper evacuation; a held deep vacuum that did not rise after isolating the pump does.

95. D — Bypassing safety controls for the season is never part of commissioning, so it is the exception. Verifying operating-control cycling, safety trips, and defrost are correct.

96. B — A low temperature split does not prove the nameplate is wrong; it indicates a charge, airflow, or capacity problem.

97. C — Using the G fan terminal to shift the reversing valve is incorrect; the O or B terminal controls it. Exercising O/B and confirming the shift and solenoid energization are correct.

98. C — Very low head pressure with high subcooling is not consistent with a leaking reversing valve, so it is the exception. High suction pressure, a warm suction line, and reduced heating capacity are.

99. D — Repeatedly topping up without repair is the incorrect response, as it vents refrigerant and lets the fault continue. Locating, repairing, evacuating, and recharging are correct.

100. C — A compressor running efficiently at rated speed is not consistent with a failed start capacitor, so it is the exception. Humming, failing to start, and tripping the overload are.

101. D — A fouled condenser does not freeze the evaporator coil from airflow loss; that is an air-side fault. It causes high head pressure, compressor strain, and higher energy use.

102. A — "No temperature change across the drier" is false for a restriction; a partial restriction produces a cold spot and a temperature drop, and can mimic a metering-device restriction.

103. C — Staying in defrost too long describes failure to terminate, not failure to initiate, so it is the exception. Failure to initiate ices the coil, collapses capacity, and lets frost insulate it.

104. A — Installing the new compressor without further checks is incorrect; the failure cause must be found and corrected and acid contamination cleaned first.

105. A — A genuine loss of charge is not the conclusion when the measured pressure is normal; that points to a faulty control or wiring not responding to a real condition.

106. B — Continuity is measured on a de-energized circuit, not a live, loaded one, so that statement is false. Resistance is measured dead; current and voltage are measured live.

107. C — Non-condensables raise head pressure, they do not lower it, so abnormally low head pressure is the exception. Air occupies condenser space and reduces efficiency.

108. D — Low suction, high superheat, and low subcooling indicate an undercharge or leak, not an overcharge, so the overcharge statement is false. The evaporator is starved and the condenser short of liquid.

109. B — The outdoor coil icing over from no defrost describes failure to initiate, not failure to terminate, so it is the exception. Failure to terminate stays in defrost too long, blows cool air, and wastes energy.

110. D — A megohmmeter does not detect the refrigerant charge weight; it detects declining winding-insulation resistance and its trend toward failure.

111. A — Replacing the most expensive component first is not a sound troubleshooting principle. Separating symptom from root cause, verifying the complaint, and reading the system together are.

112. D — High superheat with low subcooling indicates an undercharge, not an overcharge, so it is the exception. Low superheat, high subcooling, and a flooded condenser indicate overcharge.

113. C — A compressor drawing zero current throughout is not normal defrost; the compressor runs during defrost. A brief reversal to cooling, the outdoor fan stopping, and steam rising are normal.

114. A — Bypassing a safety control with a jumper is never correct, so that statement is false. A trip is often a real-fault indicator; the first step is measuring the sensed condition.

115. B — The reversing-valve solenoid is controlled by the O or B terminal, not the G fan terminal, so that statement is false. It switches heating and cooling and is energized to shift the valve.

116. A — An ohmmeter reading on a live circuit does not confirm running current and is unsafe, so it is the exception. A clamp ammeter on a running motor compared to RLA does.

117. C — Storing recovered refrigerant in a disposable cylinder is incorrect and unsafe; it must go in a rated recovery cylinder, never vented, with the quantity logged.

118. B — Replacing the costliest part immediately is not the first troubleshooting step. Gathering information, reviewing history, and verifying the complaint are.

119. D — Handling a capacitor immediately once the disconnect is open is incorrect; it stores a dangerous charge and must be discharged through a resistor first.

120. C — A restriction reduces capacity and performance, it does not raise efficiency, so that statement is false. It produces a cold spot, a temperature drop, and can resemble a starved evaporator.

121. C — Bypassing the overload to keep running is incorrect, so it is the exception. The trip is a symptom of a real mechanical fault that must be corrected, and bypassing would destroy the motor.

122. B — Low subcooling with high superheat indicates an undercharge, not a dirty condenser, so it is the exception. High head, high subcooling, and impaired heat rejection indicate a dirty condenser.

123. D — Frost on the outdoor coil in heating does not always indicate a leak; it is normal, managed by defrost, because the coil runs below freezing as the evaporator.

124. D — Pattern reading does not remove the need to find the root cause; it helps identify it. Each fault produces a characteristic pattern a single reading cannot reveal, guiding the diagnosis.

125. A — When the sensed condition is genuinely out of range, the control is not defective, so "must be replaced" is false. The control is working correctly and a real fault must be diagnosed.

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