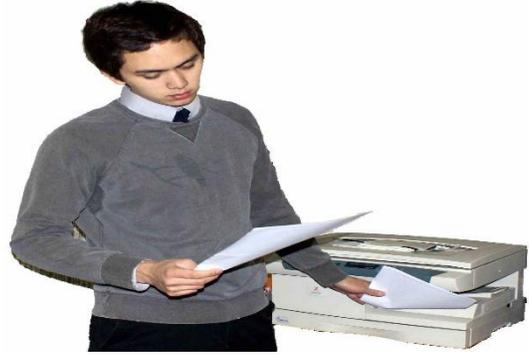


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7. Upon passing, you will proceed to the next section. If failed to pass, you will be moved to the beginning of that section for more review.

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Quiz 1

1. Chapter 11 covers the following areas of refrigeration systems:
 - design
 - installation
 - construction
 - repair
 - all of the answers provided
2. Refrigerant storage systems are considered part of the refrigeration system when they are _____.
 - permanently installed
 - temporarily installed
 - either of the answers provided
 - neither of the answers provided
3. Factory-built equipment that has been tested and meets UL 207, 412, 471 or 1995 and is installed per manufacturer's direction is deemed to meet Chapter 11 requirements.
 - True
 - False
4. Only exposed copper tubing in a refrigeration system that is subject to physical damage shall be protected in an approved manner.
 - True
 - False
5. Water supply and discharge connections associated with refrigeration systems shall be made in accordance with this code and the _____.
 - International Plumbing Code
 - National Plumbing Code
 - Universal Plumbing Code
 - Uniform Plumbing Code

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6. Fuel gas devices, equipment and appliances used with refrigeration systems shall be installed in accordance with the _____.
 - International Fuel Gas Code
 - National Combustion Code
 - NEC
 - Uniform Plumbing Code
7. Ammonia-refrigeration systems are not covered by IMC Chapter 11.
 - True
 - False
8. The 2015 IMC Chapter 11 requires that mechanical refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.
 - True
 - False
9. When changing refrigerant type in a system, the maximum system size must not exceed _____ of Group A1 without prior notification to the code official.
 - 30 pounds
 - 100 pounds
 - 220 pounds
 - 500 pounds
10. When changing refrigerant type in a system, the maximum system size must not exceed _____ of any Group other than A1 refrigerant without prior notification to the code official.
 - 30 pounds
 - 100 pounds
 - 220 pounds
 - 500 pounds
11. Notification of refrigerant discharge shall be provided in accordance with the _____.
 - International Fire Code
 - International Plumbing Code
 - National Plumbing Code
 - Universal Plumbing Code
2. A refrigerant classification in accordance with _____.
 - Section 1103.1
 - Section 1103.2
 - Section 1103.3
 - Section 1104.4
3. The maximum allowable quantity of refrigerant is determined in accordance with _____, based on type of refrigerant, system classification and occupancy.
 - Section 1103.1
 - Section 1103.2
 - Section 1103.3
 - Section 1104
4. The system enclosure requirements are determined in accordance with _____.
 - Section 1103.1
 - Section 1103.2
 - Section 1103.3
 - Section 1104
5. Refrigeration equipment and appliance location and installation shall be subject to the limitations of _____.
 - Chapter 2
 - Chapter 3
 - Chapter 4
 - Chapter 11
6. Non-factory-tested, field-erected equipment and appliances shall be pressure tested in accordance with _____.
 - Section 1108
 - Section 1109
 - Section 1110
 - not covered in the IMC
7. The refrigerant shall be designed to utilize, or converted to utilize. Refrigerants not identified in Table 1103.1 shall be approved before use.
 - True
 - False
8. Refrigerants, including refrigerant blends, with different designations in ASHRAE 34 shall not be mixed in a system.
 - True
 - False

Quiz 2

1. A refrigeration system's classification is determined in accordance with _____.
 - Section 1103.1
 - Section 1103.2
 - Section 1103.3
 - Section 1104.4

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9. Adding a second refrigerant is allowed when permitted by the equipment or appliance manufacturer to improve oil return at low temperatures.
 - True
 - False
10. Which of the following types of refrigerant may NOT be used in a system?
 - New
 - Recycled
 - Recovered
 - Reclaimed
11. New refrigerants shall be of a purity level specified by the equipment or appliance manufacturer.
 - True
 - False
12. Refrigerants that are recovered from refrigeration and air-conditioning systems shall not be reused in other than the system.
 - True
 - False
13. Recovered refrigerants shall be _____ and _____ before reuse.
 - strained – relabeled
 - weighed – marked
 - dried – tested
 - filtered – dried
14. A clearly contaminated recovered refrigerant can be reused _____.
 - when it is filtered
 - when it is dried
 - when it is reclaimed in accordance with Section 1102.2.2.3
 - never in a new system
 - never in any system
15. Used refrigerants shall be reused in a different owner's equipment or appliances.
 - True
 - False
16. Contaminated refrigerants shall not be used unless tested and found to meet the purity requirements of ARI 700.
 - True
 - False

Quiz 3

1. Occupancy classification is determined by the locations of refrigerating systems that consider the ability of people to respond to potential exposure to refrigerants.
 - True
 - False
2. When equipment is located outside a building and is within _____ of any building opening, the equipment shall be governed by the occupancy classification of the building.
 - 10 feet
 - 20 feet
 - 30 feet
 - 50 feet
 - 100 feet
3. Institutional occupancy is that portion of premises from which, because they are disabled, debilitated or confined, occupants cannot readily leave without the assistance of others. An example would be a _____.
 - residential home
 - nursing home
 - grade school
 - high school
 - college dorm
4. A public assembly occupancy is that portion of premises where large numbers of people congregate, and from which occupants cannot quickly vacate. An example would be a/n _____.
 - auditorium
 - ballroom
 - classroom
 - passenger depot
 - all of the answers provided
5. A residential occupancy must provide occupants with _____.
 - provisions for living
 - provisions for sleeping
 - provisions for eating
 - provisions for cooking
 - all of the answers provided

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6. Which of the following is NOT a commercial occupancy?
 - an office building
 - a professional building
 - a market
 - a large mercantile
 - a non-industrial storage area
7. A large mercantile occupancy is where more than _____ persons congregate on levels above or below street level to purchase personal merchandise.
 - 100
 - 250
 - 500
 - 650
8. An industrial occupancy _____ open to the public, where access by authorized persons is controlled, and is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.
 - is
 - is not
9. Mixed occupancy occurs when _____ or more occupancies are located within the same building.
 - 2
 - 3
 - 4
 - 5
10. Refrigeration systems shall be classified according to the degree of probability that refrigerant has leaked from a failed connection entering an occupied area. The distinction is based on the basic design of the components.
 - True
 - False
11. Which of the following would be an example of a low-probability system?
 - A double-indirect open spray system
 - An indirect closed system
 - An indirect-vented closed system
 - All of the answers provided
 - None of the answers provided
12. An example of a high-probability system would be a direct and indirect open spray system.
 - True
 - False

Quiz 4

1. The location of refrigeration systems exceeding allowable amounts as shown in Table 1103.1 shall be _____.
 - only outdoors
 - only in a machinery room
 - outdoors or in a machinery room
 - none of the answers provided
2. Refrigeration equipment that has less than 6.6 pounds of refrigerant does not need to be located in a machinery room.
 - True
 - False
3. In a nursing home, the amount of refrigerant normally allowed in Table 1103.1 is reduced by _____.
 - 10 percent
 - 50 percent
 - 75 percent
 - 100 percent
4. The maximum amount of A2, B2, A3, B3 refrigerant allowed in an institutional occupancy must be less than _____ except in kitchens, laboratories and mortuaries.
 - 100 pounds
 - 250 pounds
 - 500 pounds
 - 550 pounds
 - 1,000 pounds
5. The refrigerate machinery room is separated from other occupancies by construction with tight-fitting doors.
 - True
 - False
6. Machinery room is not required if access is restricted to authorized personnel.
 - True
 - False
7. The floor area per occupant is not less than _____ square feet where machinery is located on floor levels with exits more than 6.6 feet above the ground.
 - 25
 - 50
 - 75
 - 100
 - 200

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8. Where provided with egress directly to the outdoors or into approved building exits, does the minimum floor area apply?
 - Yes
 - No
9. Refrigerant detectors are installed as required for machinery rooms in accordance with Section 1105.3.
 - True
 - False
10. Surfaces having temperatures exceeding _____ and open flames, are not present where any group A2, B2, A3 or B3 refrigerant is used.
 - 300°F
 - 500°F
 - 800°F
 - 1,200°F
11. Class 1, Division 2, hazardous locations. If all the refrigeration from Groups A2, B2, A3 or B3 from a single independent circuit were released, it would not exceed 25% LFL.
 - True
 - False
12. All refrigerant-containing parts in the system which are greater than 100 HP, except for evaporators or dehumidification or condensers used for heating, must be located outdoors or in a machinery room.
 - Yes
 - No
3. Group A3 and B3 refrigerants may be used in any application.
 - True
 - False
4. The total of all Group A2, B2, A3 and B3 refrigerants other than R-717, ammonia, shall not exceed _____ except where approved.
 - 500 pounds
 - 610 pounds
 - 970 pounds
 - 1,100 pounds
 - 1,357 pounds
5. If there is any device which has an open flame or a surface temperature greater than 800°F when used in a room containing more than 6.6 pounds, then a hood and exhaust system must be installed which exhausts to the outdoors.
 - True
 - False
6. The following are exceptions where a hood and exhaust system shall not be required _____.
 - where the refrigerant is R-717, R-718, or R-744
 - where the combustion air is ducted from the outdoors in a manner that prevents leaked refrigerant from being combusted
 - where a refrigerant detector is used to stop the combustion in the event of a refrigerant leak
 - all of the answers provided
7. When calculating the volume for non-communicating spaces, do not communicate through permanent openings or HVAC ducts, the volume of the largest, enclosed occupied space shall be used to determine the permissible quantity of refrigerant in the system.
 - True
 - False
8. When calculating the volume of communicating spaces, where an evaporator or condenser is located in an air duct system, the volume of the smallest, enclosed occupied space served by the duct system, shall be used to determine the maximum allowable quantity of refrigerant in the system.
 - True
 - False

Quiz 5

1. Air-conditioning systems for human comfort that are used in high-probability systems, shall not use what refrigerant types?
 - B1
 - B2
 - B3
 - all of the answers provided
 - none of the answers provided
2. In nonindustrial occupancies, Group A2 and B2 refrigerants shall not be used in high-probability systems where the quantity of refrigerant in any independent refrigerant circuit exceeds the amount shown in Table 1104.3.2.
 - True
 - False

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9. Where the space above a suspended ceiling is continuous and part of the supply or return air plenum system, this space shall be included in the calculation of the volume of the enclosed space.
- True
 - False

Quiz 6

1. Ducts and air handlers in a machinery room that operate at a lower pressure than the room, shall be sealed to prevent any refrigerant leakage from entering the airstream.

- True
- False

2. Refrigerant detectors are required in machinery rooms.

- True
- False

3. The frequency of periodic tests of the mechanical ventilating system is _____.

- monthly
- semi-annually
- annually
- performed with the manufacturer's specifications and as required by the AHJ

4. Generally, a gas fired water heater may be installed and operate in a machinery room.

- True
- False

5. A gas fired water heater may be installed and operate in a machinery room if _____.

- the refrigerant is carbon dioxide or water
- the combustion air is ducted from outside the machinery room and sealed in order to prevent any refrigerant leakage from entering the combustion chamber
- a refrigerant vapor detector is employed to automatically shut off the combustion process in the event of refrigerant leakage
- all of the answers provided
- none of the answers provided

6. Machinery rooms shall be mechanically ventilated to the outdoors.

- True
- False

7. If a refrigerating system is located outdoors more than 20 feet from any building opening and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided.

- True
- False

8. Exhaust from mechanical ventilation systems shall be discharged not less than _____ from a property line or openings into buildings.

- 10 feet
- 20 feet
- 25 feet
- 50 feet

9. Openings for makeup air shall be located to avoid intake of exhaust air.

- True
- False

10. Supply and exhaust ducts to the machinery room shall serve no other area.

- True
- False

11. Supply and exhaust ducts to the machinery room shall be covered with corrosion-resistant screens of not less than _____ mesh.

- 1/4 inch
- 1/2 inch
- 1 inch
- 1-1/2 inch

12. When a machinery room is occupied, mechanical ventilation must _____.

- exceed 0.5 cfm per square foot of machinery room area
- exceed 20 cfm per person
- be of a volume that limits the room temperature rise to 18°F, taking into account the ambient heating effect of all machinery in the room
- all of the answers provided
- none of the answers provided

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13. Pressure relief devices, fusible plugs and purge systems located within the machinery room shall terminate outside of the structure at a location not less than _____ above the adjoining grade level.
 - 10 feet
 - 15 feet
 - 20 feet
 - 30 feet
 - 50 feet
14. Pressure relief devices, fusible plugs and purge systems located within the machinery room shall terminate outside of the structure at a location not less than _____ from any window, ventilation opening or exit.
 - 10 feet
 - 15 feet
 - 20 feet
 - 30 feet
 - 50 feet
15. Refrigeration systems containing more than _____ of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with Section 606.10 of the International Fire Code.
 - 5.0 pounds
 - 6.0 pounds
 - 6.6 pounds
 - 10 pounds
3. An exception(s) to a continuously running ammonia room ventilation fan would be _____.
 - if the ammonia machinery room is equipped with a vapor detector that would automatically start the ventilation system at the emergency rate, and that will also actuate an alarm at a detection level not to exceed 1,000 ppm
 - if the ammonia machinery room conforms to the Class 1, Division 2, hazardous location classification requirements of NFPA 70
 - either of the answers provided
 - neither of the answers provided
4. If a flammable refrigerant, Group A2, A3, B2, and B3 is used, the machinery room shall conform to the Class 1, Division 2, hazardous location classification requirements of the NFPA 70.
 - True – always the case
 - False – flammable refrigerants must never be used
 - True – with the exception of ammonia machinery rooms
5. Remote control of the mechanical equipment and appliances located in the machinery room shall comply with _____.
 - A. Section 1106.5.1
 - B. Section 1106.5.2
 - C. Section 1106.5.3
 - D. Section 1106.5.4
 - E. Only A and B

Quiz 7

1. In a machinery room, there shall not be an open flame-producing device or continuously operating hot surface over 800°F permanently installed in the room.
 - True
 - False
2. If exceptions to the code are not considered, in an ammonia machinery room, the ventilation system shall be operated continuously at the ventilation rate.
 - True
 - False
6. A clearly identified switch of the break-glass type shall provide off-only control of _____ located in the machinery room.
 - refrigerant compressors
 - refrigerant pumps
 - automatic refrigerant valves
 - all of the answers provided
 - none of the answers provided
7. A clearly identified switch of the break-glass type shall provide on-only control of the machinery room ventilation fans.
 - True
 - False
8. Refrigeration units and systems shall be provided with approved emergency signs, charts, and labels in accordance with the International Fire Code.
 - True
 - False

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Quiz 8

1. Rigid or flexible metal enclosures or pipe ducts shall be provided for soft, annealed copper tubing, and used for refrigerant piping erected on the premises and containing other than Group A1 or B1 refrigerants.
 - True
 - False
2. Enclosures shall not be required for connections between condensing units and the nearest riser box(s), provided such connections do not exceed _____ in length.
 - 3 feet
 - 6 feet
 - 10 feet
 - 12 feet
3. Refrigeration piping that may sweat from the surrounding air, and which may cause safety hazards or structural problems will need to be protected in an approved manner.
 - True
 - False
4. Carbon steel pipe of at least Schedule _____ shall be used for Group A2, A3, B2 or B3 refrigerant liquid lines for sizes 1.5 inches and smaller.
 - 40
 - 60
 - 80
 - 120
5. Carbon steel pipe of at least Schedule _____ shall be used for Group A1 or B1 refrigerant liquid lines 6 inches and smaller.
 - 40
 - 60
 - 80
 - 120
6. Type F steel pipe shall be used for refrigerant lines having an operating temperature less than 20°F.
 - True
 - False
7. Red brass shall not consist of less than _____ copper and conform to ASTM B 42 and ASTM B 43.
 - 50%
 - 75%
 - 80%
 - 90%

8. Only ACR hard drawn copper tubing/pipe can be used for refrigeration systems.
 - True
 - False
9. Type ACR annealed tubing is the only pipe that can be used for water condenser connecting pipe.
 - True
 - False
10. Copper tubing for systems erected on the premises should be _____.
 - Type K
 - Type L
 - Type M
 - all of the answers provided
 - none of the answers provided

Quiz 9

1. Copper tubing joints used in refrigerating systems containing Group A2, A3, B2 or B3 refrigerants shall be soldered.
 - True
 - False
2. Type 3003-0 aluminum tubing with high-pressure fittings shall not be used with _____.
 - methyl chloride
 - R-22
 - R-410A
 - all of the answers provided
 - none of the answers provided
3. Joints and all refrigerant-containing parts of a refrigerating system located in an air duct of an air-conditioning system, shall be leak proof at a pressure of _____ of the higher of the design pressure or pressure relief device setting.
 - 110%
 - 150%
 - 175%
 - 200%
4. Refrigerant pipe joints erected on the premises shall be exposed for visual inspection prior to being covered or enclosed.
 - True
 - False

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5. All systems containing more than 6.6 pounds of a refrigerant that use positive-displacement compressors shall have stop valves installed _____.
 - at the inlet of each compressor, compressor unit or condensing unit
 - at the discharge outlet of each compressor, compressor unit or condensing unit and of each liquid receiver
 - either of the answers provided
 - neither of the answers provided
6. Stop valves are not required on refrigeration systems _____.
 - that have a refrigerant pump-out function capable of storing the entire refrigerant charge in a receiver or heat exchanger
 - that are equipped with provisions for pump-out of the refrigerant using either portable or permanently installed recovery equipment
 - that are self-contained
 - all of the answers provided
 - none of the answers provided
7. All systems containing _____ or more of a refrigerant, other than systems utilizing non-positive displacement compressors, shall have stop valves on each inlet of each liquid receiver.
 - 10 pounds
 - 50 pounds
 - 100 pounds
 - 250 pounds
8. Stop valves used with soft annealed copper tubing or hard-drawn copper tubing 7/8-inch OD standard size or smaller shall be securely mounted, independent of tubing fastenings or supports.
 - True
 - False
9. Stop valves shall be identified where their intended purpose is not obvious. Numbers shall not be used to label the valves, unless a key to the numbers is located near the valves.
 - True
 - False

Quiz 10

1. Every refrigerant-containing part of every system that is erected on the premises, except compressors, condensers, vessels, evaporators, safety devices, pressure gauges and control mechanisms that are listed and factory tested, shall be tested and proved tight after complete installation.
 - True
 - False
2. Pressure testing shall include both the high and low-pressure sides of each system at not more than the design pressure or the setting of the pressure relief device(s).
 - True
 - False
3. The design pressures for testing shall be those listed on the condensing unit, compressor or compressor unit nameplate, as required by ASHRAE 15.
 - True
 - False
4. A pressure testing exception is acceptable for gas bulk storage tanks that are not permanently connected to a refrigeration system.
 - True
 - False
5. A pressure testing exception would be a field erected limited-charge system equipped with a pressure relief device. It must be pressure tested at least _____ times the pressure setting of the relief device.
 - 1.5
 - 2.0
 - 2.5
 - 3.0
6. In field-testing systems using centrifugal or other non-positive displacement compressors, the entire system shall be defined as the low-side pressure for field test purposes.
 - True
 - False

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7. Tests shall be performed with an inert dried gas including, but not limited to, nitrogen and carbon dioxide. Oxygen, air, combustible gases and mixtures containing such gases shall be used.
 - True
 - False
8. The use of air is allowed to test R-717, ammonia, however the system provided that they are subsequently evacuated before charging with refrigerant.
 - True
 - False
9. When pressure testing a unit, the means used to build up the test pressure shall have either a pressure-limiting device or a pressure-reducing device and a gauge on the outlet side.
 - True
 - False
10. A certificate of test shall be provided for all systems containing _____ or more of refrigerant. The certificate shall give the name of the refrigerant and the high and low side test pressures.
 - 10 pounds
 - 20 pounds
 - 50 pounds
 - 55 pounds
 - 70 pounds
11. Emergency devices and systems shall be periodically tested in accordance with the manufacturer's instructions, and as required by the code official that follow _____.
 - treatment and flaring systems
 - valves and appurtenances necessary to the operation of emergency refrigeration control boxes
 - fans and associated equipment intended to operate emergency ventilation systems
 - detection and alarm systems
 - all of the answers provided