



Medical Gas 2018 Mock Exam

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. An existing system that is not in strict compliance with the provisions of this code shall be permitted to be continued in use as long as the _____ has determined that such use does not constitute a distinct hazard to life.
- a. architect
 - b. authority having jurisdiction
 - c. engineer
 - d. nursing staff
- _____ 2. Cylinder and cryogenic liquid container outlet connections shall be designed as to render the attachment point _____ when removal of the outlet connection is attempted.
- a. reusable
 - b. unusable
 - c. unsuitable
 - d. universal
- _____ 3. Which of the following systems shall not be permitted to be located in an outdoor enclosure?
- a. Manifolds for gas cylinders
 - b. Medical air sources
 - c. Bulk cryogenic liquid systems
 - d. Manifolds for cryogenic liquid containers
- _____ 4. What is required of the alarm system if another alarm condition occurs while the audible alarm is manually silenced?
- a. Nothing, the visual indicator is still active
 - b. The visual indicator must blink
 - c. The audible signal will beep
 - d. Re-initiation of the audible signal
- _____ 5. Cylinders in use and in storage shall be prevented from reaching temperatures in excess of _____.
- a. 120°F
 - b. 125°F
 - c. 130°F
 - d. 150°F
- _____ 6. Locations for central supply systems shall have electrical devices protected from _____.
- a. moisture
 - b. freezing temperatures
 - c. physical damage
 - d. unauthorized use
- _____ 7. Mechanical exhaust for central supply locations shall not be more than _____.
- a. 50 cfm
 - b. 72 cfm
 - c. 100 cfm
 - d. 500 cfm
- _____ 8. For purposes of this code, an oxygen enriched atmosphere is an atmosphere where the total concentration of oxygen exceeds _____ by volume.
- a. 23.5%
 - b. 23.6%
 - c. 19.5%
 - d. 93%

- ___ 18. A(n) _____ can be used as a substitute for the EOSC at a category 1 facility.
- a. main line valve
 - b. in-building emergency reserve
 - c. bulk oxygen source
 - d. emergency plan
- ___ 19. Final line pressure controls shall be sized to ___ of the peak calculated demand.
- a. 50%
 - b. 100%
 - c. 110%
 - d. Not specified
- ___ 20. Bulk cryogenic liquid systems shall be installed in accordance with ____.
- a. NFPA 45
 - b. NFPA 55
 - c. CGA 50
 - d. CGA 55
- ___ 21. Central supply systems for nitrous oxide and carbon dioxide using cylinders or portable containers shall be prevented from reaching temperatures lower than ___°F.
- a. 125
 - b. 32
 - c. 20
 - d. -20
- ___ 22. Installers of Category 1 medical gas piping systems must be qualified to ASSE 6010. What is the certification requirement for installers of a Category 3 system?
- a. 6010
 - b. 6020
 - c. 6030
 - d. Category 3 does not require certification
- ___ 23. When is the initial pressure test conducted by the installer?
- a. after installation of the alarm sensors
 - b. before blowdown of the distribution piping
 - c. after blowdown of the distribution piping
 - d. before installation of station rough-in assemblies
- ___ 24. In those portions of the system intended to handle oxygen at pressures greater than 350 psi, the interconnecting hose shall not contain _____ materials.
- a. brass
 - b. copper
 - c. polymeric
 - d. stainless steel
- ___ 25. The master alarm system shall activate when the pressure in the main supply lines increase or decrease by _____ percent.
- a. 10
 - b. 20
 - c. 40
 - d. 50
- ___ 26. When designing and constructing central supply systems, the storage shall _____.
- a. have a minimum of two entry/exits if outdoors
 - b. secure all cylinders
 - c. have a minimum 1-hour fire resistance rating
 - d. all of the above

- _____ 37. Receivers for medical air shall be equipped with _____.
- a. relief valves
 - b. automatic and manual drains
 - c. sight glass
 - d. all of the above
- _____ 38. A wireless communication device is employed in a medical gas or vacuum warning system. Which type of supervision is required for this device?
- a. A visual indicator shall be located in the maintenance/engineering department.
 - b. The device shall be installed at the medical gas or vacuum source
 - c. The device shall be located at a nurse's station
 - d. It will be supervised such that failure of communication shall initiate an alarm.
- _____ 39. How many hours must the medical air compressor system be operating normally before air quality test can be performed?
- a. 2
 - b. 8
 - c. 12
 - d. 24
- _____ 40. Where medical gas systems operate at pressures other than the standard gauge pressures, which of these is required to be listed on the station outlet identification?
- a. Gas registration number and a toll-free number to call for information
 - b. Name of the gas
 - c. Nonstandard operating pressure
 - d. Both B and C
- _____ 41. Brazing procedures and brazer performance for the installation of medical gas and vacuum piping shall be qualified in accordance with _____.
- a. ASME Section IX
 - b. ASSE 6010
 - c. AWS B31.3
 - d. none of the above
- _____ 42. In a non-anesthetizing area, on which side of a zone valve shall the area alarm pressure/vacuum sensor be located?
- a. source
 - b. station outlet/inlet
 - c. upstream side
 - d. NFPA 99 does not specify a requirement
- _____ 43. Medical air compressor air intake shall be located outdoors a minimum distance of _____ above the ground level.
- a. 10 ft
 - b. 20 ft
 - c. 25 ft
 - d. There is no height requirement
- _____ 44. Which of the following conditions must be met where medical gas and vacuum systems are installed by non-certified personnel?
- a. An installer certified to ASSE 6010 must be present to oversee the installation
 - b. An ASSE 6020 inspector is present on the job site to inspect the installation
 - c. The installer must be an employee of an authorized Medical Gas contractor
 - d. Installation by anyone other than 6010 certified personnel is NOT permitted

- ___ 54. The medical air intake shall be located a minimum of _____ from all doors, windows or other openings in the building.
- a. 10 ft
 - b. 15 ft
 - c. 20 ft
 - d. 25 ft
- ___ 55. In a facility where medical gas or vacuum systems are present and the failure of such equipment or system is likely to cause imminent major injury or death to patients or caregivers, the system shall be designed to meet which Category of requirements?
- a. 1
 - b. 2
 - c. 3
 - d. 4
- ___ 56. Category 1 medical-surgical vacuum sources shall, at a minimum, consist of _____ or more vacuum pumps.
- a. one
 - b. two
 - c. three
 - d. four
- ___ 57. Who shall be responsible for developing an emergency plan in the event of medical air loss at a Category 2 facility?
- a. Authority having jurisdiction
 - b. Head or maintenance
 - c. Facility staff
 - d. Chief engineer
- ___ 58. Piping between the vacuum pump and the source shutoff valve shall be permitted to be _____.
- a. brass pipe
 - b. galvanized steel pipe
 - c. black steel pipe
 - d. all of the above
- ___ 59. Computer systems used as a master alarm shall be continuously attended or shall provide remote signaling of responsible parties through _____.
- a. pagers
 - b. telephone
 - c. cell phone
 - d. any of the above
- ___ 60. ASSE 6000 Annex J provides "Recommended Guidelines for Conducting Planned Medical Gas Systems Shutdown and Temporary Backfeed". Annex J guidelines do NOT include a list of responsibilities for which types of worker?
- a. Installer
 - b. Medical Gas Generalist
 - c. Shutdown Coordinator
 - d. Verifier
- ___ 61. An assembly of equipment that holds a capacity of oxygen greater than _____ is defined as a Bulk Oxygen System.
- a. 3000 ft³
 - b. 10,000 ft³
 - c. 20,000 ft³
 - d. 28,000 ft³
- ___ 62. The medical-surgical vacuum exhaust shall be turned down and screened. The screening shall be fabricated using what type of material?
- a. steel mesh
 - b. steel wire
 - c. any non-corroding material
 - d. all of the above

- _____ 71. Inspection and testing shall be performed on all new piped gas systems, additions, renovations, temporary installations or repaired systems to assure the facility that all applicable provisions of NFPA 99C have been adhered to and system integrity has been achieved or maintained. What is required of the individual doing the testing or inspecting?
- a. Have two years experience
 - b. Have a documented procedure
 - c. Be a certified tester
 - d. none of the above
- _____ 72. Liquid containers shall have additional product identification (such as a 360 degree wrap-a-round tape for medical liquid containers) visible from all directions with a minimum of _____ high letters.
- a. 1"
 - b. 2"
 - c. 3"
 - d. none of the above
- _____ 73. Vacuum piping for _____ shall be connected separately from the medical surgical system directly to the receiver tank through its own isolation valve and fluid trap located at the receiver.
- a. A teaching laboratory
 - b. A location requiring seismic restraint
 - c. The standing vacuum test
 - d. Each WAGD system
- _____ 74. The vacuum exhaust shall not discharge _____.
- a. in a place of public assembly
 - b. outside
 - c. on a roof
 - d. at a different level from air intakes
- _____ 75. Which of these operations would NOT breach the vacuum system?
- a. Addition of a system component
 - b. Removal of system component
 - c. Replacement of system component with an identical one
 - d. Testing a system component with a leak detecting solution
- _____ 76. Which is a permitted use of the medical-surgical vacuum system?
- a. Liquid or debris disposal
 - b. Non-medical or non-surgical applications
 - c. Vacuum steam condensate return
 - d. Waste anesthetic gas disposal
- _____ 77. Which of the following is an instrument air quality requirement?
- a. It shall be filtered to .7 micron
 - b. It shall be dry to a dew point of -30°F
 - c. It shall be compliant with instrument Air section in ANSI/ISA S-7.0.01
 - d. It shall be compliant with medical air USP
- _____ 78. The standing pressure test for positive pressure medical gas piping shall be conducted with the source valve closed and the piping system subjected to which test time and pressure?
- a. 8 hours at 150 psi
 - b. 8 hours at 20% above operating pressure
 - c. 24 hours at 150 psi
 - d. 24 hours at 20% above normal operating pressure

- _____ 88. A valve installed in each medical gas and vacuum piping system shall be tested to verify which of the following?
- Date of installation
 - Pressure Range
 - Flow and pressure drops
 - Proper operation and rooms or areas of control
- _____ 89. Manifolds for gas cylinders shall actuate a(an) _____ signal and shall activate an indicator at all _____ alarm panels to indicate when or just before changeover from on header to the other.
- Area; Master
 - Local; Master
 - Master; Area
 - Master; Local
- _____ 90. All valves except zone valve box assemblies shall be _____.
- located in a secure area
 - locked or latched in the operating position
 - labeled indicating contents and location served
 - all of the above
- _____ 91. With the approval of the authority having jurisdiction, in what areas shall the shutoff valves be permitted to be secured to prevent inappropriate access?
- critical care
 - maternity
 - anesthetizing
 - psychiatric or pediatric
- _____ 92. New or replacement shutoff valves for medical gas pressure piping systems shall _____.
- be quarter turn valves
 - be of brass or bronze construction
 - have extensions for brazing
 - all of the above
- _____ 93. The reserve header in a cryogenic liquid cylinder manifold system shall have sufficient cylinder connections for an average day's supply, but NOT fewer than how many connections?
- 1
 - 2
 - 3
 - 4
- _____ 94. In central supply systems using gas cylinders, each header shall have a _____ valve to prevent backflow and to permit service to the header.
- Ball
 - Bypass
 - Check
 - Relief
- _____ 95. Those sections or portions of the piping system that serve a room or group of rooms on the same story of the facility. This is the definition of which of the following?
- Branch (lateral) lines
 - Main lines
 - Risers
 - Vent Lines
- _____ 96. The vertical pipes connecting the system main line(s) with the branch lines on the various levels of the facility. This is the definition of which of the following?
- Branch (lateral) lines
 - Main lines
 - Risers
 - Vent Lines

- _____ 105. In compliance with NFPA 70, the new alarm wiring is being run installed underground from the initiating device at the source to a junction box located where the wiring first enters the building. NFPA 99 permits what minimum number of sets of wires to connect the initiating device with the junction box for each signal?
- a. 1
 - b. 2
 - c. 3
 - d. 4
- _____ 106. Which of the following filler metals shall be used to braze copper-to-copper joints in medical gas/vacuum distribution piping?
- a. BAg series
 - b. BAu series
 - c. BCuP series
 - d. BNi series
- _____ 107. NFPA 99 requires tubing to be cut square using a sharp tubing cutter that shall be free from grease, oil or other lubricants not suitable for oxygen service. What sort of treatment is permitted of the tube ends before brazing?
- a. May be reamed
 - b. May be deburred or rolled smooth
 - c. May be re-cleaned
 - d. none of the above
- _____ 108. To assure that all ambient air has been removed from the pipeline prior to brazing, a/an _____ shall be used to verify the effectiveness of the nitrogen purge.
- a. oxygen analyzer
 - b. nitrogen analyzer
 - c. air analyzer
 - d. breathalyzer
- _____ 109. Factory installed tubes on station inlets shall be NOT less than _____ with 0.4 inch minimum inside diameter.
- a. 1/4 NPS
 - b. 3/8 NPS
 - c. 1/2 NPS
 - d. 1/8 NPS
- _____ 110. The minimum backfilled cover for buried piping shall be 36 in., except that a minimum cover shall be reduced to _____ where physical damage is otherwise prevented.
- a. 24 in
 - b. 20 in
 - c. 18 in
 - d. 16 in
- _____ 111. The installation of medical gas and vacuum systems shall be made by experienced, qualified and competent installers. The installers shall meet the requirements of _____.
- a. ASME Section IX
 - b. ASSE Standard 6010
 - c. AWS B31.3
 - d. none of the above
- _____ 112. After completion of all installer-performed tests which of the following methods shall be used to determine that no cross-connection exists?
- a. Individual pressurization
 - b. Pressure differential
 - c. Both A and B
 - d. Either A or B
- _____ 113. In an Emergency Oxygen Supply Connection the check valves are required to be constructed of which of the following materials?
- a. Brass, bronze or stainless steel
 - b. Brass or bronze
 - c. Materials per the EOSC manufacturer's recommendations
 - d. NFPA 99 does NOT establish any material requirements for these check valves

- ____ 123. A medical gas master or area alarm panel should be set to actuate a(an) _____ indicator when the communication with an alarm-initiating device is disconnected.
- a. Audible
 - b. Audible and visual
 - c. High and low
 - d. Visual
- ____ 124. Area alarms shall monitor _____ in the area served.
- a. high pressure in positive pressure medical gas lines
 - b. low pressure in positive pressure medical gas lines
 - c. low vacuum pressure in medical-surgical vacuum lines
 - d. all of the above
- ____ 125. Communication devices that do not use electrical wiring for signal transmission can use _____.
- a. fiber optic
 - b. wireless
 - c. A & B
 - d. none of the above
- ____ 126. Fittings for positive pressure medical gas systems shall be cleaned for oxygen service by _____ in accordance with CGA G-4.1.
- a. the manufacturer
 - b. a supplier
 - c. a third party agency other than the manufacturer
 - d. all of the above
- ____ 127. It is the responsibility of the _____ to furnish documentation certifying that all installed piping materials are cleaned for oxygen service.
- a. authority having jurisdiction
 - b. installer
 - c. contractor
 - d. verifier
- ____ 128. A low-pressure, vacuum-insulated vessel containing gases in liquid form. This is an NFPA 99 definition for which of the following.
- a. Appliance
 - b. Container
 - c. Cylinder
 - d. Safety Can
- ____ 129. Which of the following fittings is NOT permitted for joining vacuum distribution pipeline systems?
- a. Non-removable push-fit
 - b. Axially swaged
 - c. Memory metal
 - d. Welded
- ____ 130. Copper tube hangers for medical gas and vacuum distribution piping shall be _____.
- a. supported from the building structure
 - b. sized for copper tube
 - c. plastic coated in potentially damp locations
 - d. all of the above
- ____ 131. Where existing, the portion of the supply equipment that automatically supplies the system when the primary and secondary are unable.
- a. Emergency supply
 - b. Reserve supply
 - c. Secondary source
 - d. Back-up source

Name: _____

ID: A

- ___ 142. Refer to Drawing #1. The sensor indicated at #8 is the _____.
a. master alarm sensor
b. local alarm sensor
c. area alarm sensor
d. none of the above
- ___ 143. Refer to Drawing #1. Items 2 and 12 would be best described as _____.
a. pressure indicators
b. area alarm sensors
c. master alarm sensors
d. zone valve sensors
- ___ 144. Refer to Drawing #1. Item #10 is a _____ valve.
a. in-line shutoff
b. service
c. riser
d. main line
- ___ 145. Refer to Drawing #1. Item #4 is a _____ valve.
a. in-line shutoff
b. service
c. riser
d. main line
- ___ 146. Refer to Drawing #2. The minimum distance requirement at #4 is
a. 10 ft
b. 15 ft
c. 20 ft
d. 25 ft
- ___ 147. Refer to Drawing #2. The minimum distance requirement at #3 is
a. 10 ft
b. 15 ft
c. 20 ft
d. 25 ft
- ___ 148. Refer to Drawing #2. The minimum distance requirement at #2 is
a. 10 ft
b. 15 ft
c. 20 ft
d. 25 ft
- ___ 149. Refer to Drawing #2. The minimum distance requirement at #1 is
a. 10 ft
b. 15 ft
c. 20 ft
d. 25 ft
- ___ 150. Refer to Drawing #3. Item 4 is a _____.
a. Relief valve
b. Filter
c. Demand check
d. Sensor

29.	ANS: D KEY: Distribution	PTS: 1	REF: 5.1.10.2.1 (1)
30.	ANS: C KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.4 (F)
31.	ANS: D KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.8 (3)
32.	ANS: D KEY: Medical Air, Alarm	PTS: 1	REF: 5.1.3.6.3.12 (E)
33.	ANS: C KEY: Distribution	PTS: 1	REF: 5.1.10.4.3.13
34.	ANS: D KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.2 (5)
35.	ANS: D KEY: Distribution	PTS: 1	REF: 5.1.10.11.5.3
36.	ANS: C	PTS: 1	REF: 5.1.11 KEY: Distribution
37.	ANS: D KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.6 (3)
38.	ANS: D	PTS: 1	REF: 5.1.9.1 (12) KEY: Alarm
39.	ANS: C KEY: Verification	PTS: 1	REF: 5.1.12.4.14.3 (E)
40.	ANS: D	PTS: 1	REF: 5.1.11.3.2 KEY: Distribution
41.	ANS: A KEY: Distribution	PTS: 1	REF: 5.1.10.11.11.1
42.	ANS: B	PTS: 1	REF: 5.1.9.4.4 KEY: Alarms
43.	ANS: B KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.11 (C)
44.	ANS: D	PTS: 1	REF: 5.1.10.11.10 KEY: Distribution
45.	ANS: B	PTS: 1	REF: 5.1.3.7.4(4) KEY: Vacuum
46.	ANS: D KEY: Central Supply	PTS: 1	REF: Removed in Previous Code
47.	ANS: C KEY: Distribution	PTS: 1	REF: 5.1.10.11.3.1
48.	ANS: D	PTS: 1	REF: 5.1.12.4.7.2 KEY: Verification
49.	ANS: A KEY: Distribution	PTS: 1	REF: 5.1.11.1.1 (2)
50.	ANS: D	PTS: 1	REF: 5.1.10.4.6.1 KEY: Distribution
51.	ANS: D KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.4 (B)
52.	ANS: A KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.4 (C) (2)
53.	ANS: D KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.11 (B)
54.	ANS: A KEY: Medical Air	PTS: 1	REF: 5.1.3.6.3.11 (D)
55.	ANS: A	PTS: 1	REF: 4.1.1 KEY: Administration

88.	ANS: D	PTS: 1	REF: 5.1.12.4.4	KEY: Testing
89.	ANS: B	PTS: 1	REF: 5.1.3.5.12.6	KEY: Central Supply
90.	ANS: D	PTS: 1	REF: 5.1.4.1.2 & .3	
	KEY: Valve			
91.	ANS: D	PTS: 1	REF: 5.1.4.1.4	KEY: Valve
92.	ANS: D	PTS: 1	REF: 5.1.4.1.6	KEY: Valve
93.	ANS: C	PTS: 1	REF: 5.1.3.5.13.4(2)	
	KEY: Central Supply			
94.	ANS: C	PTS: 1	REF: 5.1.3.5.10 (6)	
	KEY: Central Supply			
95.	ANS: A	PTS: 1	REF: 3.3.144.1	KEY: Definition
96.	ANS: C	PTS: 1	REF: 3.3.144.3	KEY: Definition
97.	ANS: D	PTS: 1	REF: 5.1.4.5.2	KEY: Valve
98.	ANS: A	PTS: 1	REF: 5.1.4.6.1(2)	KEY: Valve
99.	ANS: B	PTS: 1	REF: 5.1.4.6.2	KEY: Valve
100.	ANS: B	PTS: 1	REF: 5.1.12.4.9.2	KEY: Testing
101.	ANS: C	PTS: 1	REF: 5.1.10.4.5.1	KEY: Distribution
102.	ANS: C	PTS: 1	REF: 5.1.11.1.2	KEY: Distribution
103.	ANS: C	PTS: 1	REF: 5.1.14.5.8	KEY: Operation
104.	ANS: C	PTS: 1	REF: 5.1.11.3.2	KEY: Distribution
105.	ANS: A	PTS: 1	REF: 5.1.9.2.3.1 (D) (2)	
	KEY: Alarm			
106.	ANS: C	PTS: 1	REF: 5.1.10.4.1.7	KEY: Distribution
107.	ANS: B	PTS: 1	REF: 5.1.10.4.2.3	KEY: Distribution
108.	ANS: A	PTS: 1	REF: 5.1.10.4.5.5	KEY: Distribution
109.	ANS: B	PTS: 1	REF: 5.1.5.12	KEY: Outlet
110.	ANS: C	PTS: 1	REF: 5.1.10.11.5.5	
	KEY: Distribution			
111.	ANS: B	PTS: 1	REF: 5.1.10.11.10.2	
	KEY: Distribution			
112.	ANS: D	PTS: 1	REF: 5.1.12.4.3	KEY: Testing
113.	ANS: B	PTS: 1	REF: 5.1.4.9	KEY: Valve
114.	ANS: C	PTS: 1	REF: 5.1.5.3	KEY: Outlet
115.	ANS: A	PTS: 1	REF: 5.1.3.3.2 (2)	KEY: Central Supply
116.	ANS: A	PTS: 1	REF: 5.1.10.1.3	KEY: Distribution
117.	ANS: D	PTS: 1	REF: 1.2	KEY: Administration
118.	ANS: D	PTS: 1	REF: 5.1.8.1.3	KEY: Distribution
119.	ANS: A	PTS: 1	REF: 3.2.6	KEY: Definitions
120.	ANS: C	PTS: 1	REF: 5.1.8.2.3	KEY: Distribution
121.	ANS: C	PTS: 1	REF: 5.1.6.9	KEY: Distribution
122.	ANS: D	PTS: 1	REF: 5.1.8.1.4	KEY: Distribution
123.	ANS: B	PTS: 1	REF: 5.1.9.1 (5)	KEY: Alarm
124.	ANS: D	PTS: 1	REF: 5.1.9.4.2 & 3	
	KEY: Alarm			
125.	ANS: C	PTS: 1	REF: 5.1.9.1 (11)	KEY: Alarm