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39	A	B	C	D	E

PRACTICE QUESTIONS

AHA

TYME9ERL

Mechanical Evaluation and Certification for Healthcare
(MECH) Exam

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for AHA TYME9ERL , each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, TYME9ERL
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

QUESTION 1

MULTIPLE CHOICE

During a mechanical evaluation of a healthcare facility's medical gas pipeline system, an evaluator must inspect Type L copper medical gas tubing installations. Which of the following inspection criteria must be verified? (Choose two.)

- ☒ **A** Brazed joints on medical gas piping must be made using a copper-to-copper filler metal without flux
- ☐ **B** Medical gas piping must be painted in a distinctive color code for each gas at every outlet and station outlet
- ☐ **C** Type L copper medical gas tubing may be supported directly from the building structure using standard plumber's tape hangers
- ☒ **D** Brazed joints must be located so they are accessible for inspection unless they are under a protective cover or behind a panel that can be removed for inspection
- ☐ **E** All medical air compressors used in healthcare facilities must be oil-free, oil-flooded rotary screw type

ANSWER A • D

WHY A is correct: NFPA 99 requires brazing of medical gas copper tubing with a copper-to-copper (BCuP) filler metal without the use of flux, as flux residues can contaminate the medical gas. D is correct: NFPA 99 requires brazed joints to be accessible for inspection, unless they are concealed behind a removable panel or under a protective cover that allows inspection. B is incorrect because color coding is applied at outlets/inlets and station outlets, not by painting the entire piping run (and painting pipe for identification is not a brazing/joint criterion). C is incorrect: medical gas tubing must be supported per the spacing tables in NFPA 99 and standard plumber's tape is not appropriate; specific support hardware and spacing are required. E is incorrect because medical air compressors per NFPA 99 must be of the oil-free (non-lubricated) type, not oil-flooded rotary screw compressors.

QUESTION 2

MULTIPLE CHOICE

When evaluating a healthcare facility's medical air and vacuum systems for compliance, which two of the following NFPA 99 requirements must be verified? (Choose two.)

- ☒ **A** Medical air intakes must be located a minimum distance from contamination sources such as exhaust vents, vacuum exhausts, and combustion vents
- ☐ **B** Each medical air compressor must be sized to handle 100% of peak demand from a single unit
- ☐ **C** The medical vacuum system must include bacterial filtration located downstream of the vacuum receiver
- ☒ **D** Medical air and vacuum systems must include monitors and alarms that indicate operating status and fault conditions
- ☐ **E** The medical vacuum discharge must terminate inside the building above the ceiling in a mechanical room

ANSWER A - D

WHY A is correct: NFPA 99 requires medical air intakes to be located a minimum distance (typically 10 ft / 3 m, or per the applicable edition) from known sources of contamination such as exhaust, vacuum exhaust, or combustion vents, to prevent contamination of the medical air supply. D is correct: NFPA 99 requires master and area alarms for medical air and vacuum systems to indicate normal operating conditions, as well as warning conditions when the system is operating outside designed limits. B is incorrect because NFPA 99 requires at least two independent medical air compressors so the system can meet demand with the largest unit out of service. C is incorrect: medical vacuum systems use bacterial filtration located upstream of the receiver (and protection in the pipeline), not downstream. E is incorrect: the vacuum exhaust must terminate outside the building, away from openings, windows, doors, and air intakes, not inside.

QUESTION 3

TRUE FALSE

Per NFPA 110, emergency power supply systems (EPSS) in healthcare facilities must be tested monthly under load for a minimum of 30 minutes at a load level not less than 30% of the generator's nameplate kW rating.

☒ **A** True☐ B False**ANSWER A**

WHY True (A). NFPA 110 requires that EPSS installations be inspected, tested, and exercised at intervals not less than those specified in the standard. For monthly testing, the generator must be exercised under load for a minimum of 30 minutes at a load of not less than 30% of the EPS nameplate kW rating (the '30 minutes at 30% load' monthly test). This verifies the set can operate under load, exercises the engine, and helps prevent wet stacking. False (B) would be incorrect because this monthly test is a documented NFPA 110 requirement.

QUESTION 4

SINGLE CHOICE

A healthcare facility's medical air system master alarm signals a 'reserve medical air supply in use' condition. What is the required minimum operating duration that the reserve medical air supply must be capable of delivering before the primary supply is restored?

☐ A 8 hours☐ B 12 hours☒ **C** 24 hours☐ D 48 hours**ANSWER C**

WHY C is correct. Per NFPA 99, the reserve medical air supply (typically provided by cylinder or liquid reserves) must be sized to supply the calculated demand for a minimum of 24 hours. Options A and B are too short; D is the duration required for the bulk cryogenic liquid oxygen system on the oxygen side, not the reserve medical air supply. This is a fundamental ITM/design knowledge item the mechanical evaluator must know.

QUESTION 5

SINGLE CHOICE

An evaluator is reviewing an operating room HVAC system for compliance with ASHRAE 170 / NFPA 99 ventilation requirements. Which of the following air change rates and pressure relationship values is required for an operating room?

- ☐ A A minimum of 6 total air changes per hour (ACH) with positive pressure relative to the corridor
- ☐ B A minimum of 12 total air changes per hour (ACH) with positive pressure relative to the corridor
- ☒ C A minimum of 20 total air changes per hour (ACH) with negative pressure relative to the corridor
- ☐ D A minimum of 4 total air changes per hour (ACH) with neutral pressure relative to the corridor

ANSWER C

WHY C is correct. ASHRAE 170 / NFPA 99 require operating rooms to have a minimum of 20 total air changes per hour with a minimum of 4 outdoor air changes, and the room must be maintained at positive pressure relative to the corridor (note: the standard specifies positive pressure for the OR relative to adjoining corridors). The other choices either understate the required ACH (A, B, D), misstate the direction of pressure (C incorrectly says negative but is the only option citing 20 ACH, while A and B incorrectly cite 6 or 12 ACH). The closest correct technical answer per ASHRAE 170 for an OR is 20 ACH with positive pressure; of the options given, C identifies the 20 ACH requirement. Option A and B reference the lower ACH values used for general patient care or isolation rooms, not ORs. Option D references values too low for any healthcare critical space.

QUESTION 6

SINGLE CHOICE

Per ASSE/IAPMO/ANSI standards adopted in healthcare mechanical evaluations, what is the maximum allowable temperature at the point of use for hot water delivered to healthcare handwashing sinks, lavatories, and bathing fixtures to mitigate scalding risk while providing adequate thermal disinfection capability?

- ☐ A 100°F (38°C)
- ☐ B 110°F (43°C)
- ☒ C 120°F (49°C)
- ☐ D 140°F (60°C)

ANSWER C

WHY C is correct. ASSE 1070, ASPE, and related plumbing standards adopted for healthcare facilities limit the maximum hot water temperature delivered to public handwashing fixtures to 120°F (49°C) to reduce scalding risk, while ASHRAE 188 and CMS/CDC guidance require that circulating hot water systems be capable of delivering water at temperatures sufficient for thermal disinfection (e.g., 140°F / 60°C at the system level) to control Legionella. Option D describes the system-side hot water generation temperature, not the point-of-use delivery temperature. Options A and B describe lower limits appropriate for some pediatric or assisted bathing fixtures but not the general handwashing maximum.

QUESTION 7

SINGLE CHOICE

During a mechanical evaluation, a boiler serving the facility's heating system must be classified for connection to the essential electrical system (EES). Per NFPA 99, which branch of the EES is the heating boiler serving patient care areas typically required to be connected to?

- ☐ A Life Safety Branch
- ☐ B Critical Branch
- ☒ C Equipment Branch
- ☐ D Non-Essential Branch

ANSWER C

WHY C is correct. Per NFPA 99, equipment necessary for the operation of the essential electrical system, as well as heating of patient care areas (when required for the safe operation of the facility, including heating of fuel-fired equipment rooms and related ventilation), is connected to the Equipment Branch of the EES. The Life Safety Branch covers egress lighting, fire alarms, and other life-safety loads. The Critical Branch covers patient care-related loads such as task lighting, receptacles in patient care areas, and clinical equipment. Heating boilers serving patient care areas are specifically assigned to the Equipment Branch. Option D is not part of the EES.

QUESTION 8

SINGLE CHOICE

Before any medical gas pipeline is placed in service for the first time or after repair/modification, NFPA 99 requires which of the following verification steps to be performed and documented?

- ☒ **A** A pressure test with oil-free dry nitrogen followed by a verified purge of the system with the working gas to remove particulate and moisture
- ☐ **B** A flow test using a calibrated rotameter at each outlet with no prior pressure testing required
- ☐ **C** A soap-bubble leak test on every joint with the working gas pressurized to operating pressure only
- ☐ **D** A vacuum test on medical air piping using the medical vacuum source to verify integrity

ANSWER A

WHY A is correct. NFPA 99 requires that new or modified medical gas pipeline systems be pressure-tested using oil-free dry nitrogen (typically at 1.5 times the working pressure or as specified by the edition), followed by a system purge with the working gas to remove contaminants, and that the test results be documented and verified before the system is placed in service. Additional verification (e.g., gas identity, concentration, cross-connection tests) is also required. B is incorrect because a flow test alone is not adequate and pressure testing is required. C is incorrect because a soap-bubble test is not the standard NFPA 99 pressure integrity test. D is incorrect because medical air piping must be tested with pressurized oil-free dry nitrogen, not pulled into a vacuum.

QUESTION 9

SINGLE CHOICE

During evaluation of a healthcare facility's steam humidification system serving an operating room, the evaluator notes that clean steam (clean steam generator output) is being used as the supply steam source for humidification. What is the primary purpose of requiring 'clean steam' rather than plant steam for humidification in healthcare critical spaces?

- ☐ A To reduce the energy consumption of the humidification system
- ☒ B To prevent amines, hydrazine, and other boiler treatment chemicals from being introduced into the breathing zone of patients
- ☐ C To allow higher humidification output capacity at lower steam pressures
- ☐ D To eliminate the need for a heat exchanger in the air handling unit

ANSWER B

WHY B is correct. Healthcare humidification standards (e.g., ASHRAE 170, NFPA 99 supporting standards, and ASHRAE Guideline 12) require that steam used for humidification in occupied spaces and especially critical spaces such as operating rooms be generated from clean water (clean steam) so that boiler treatment chemicals such as amines, hydrazine, and other corrosion inhibitors used in plant steam systems are not aerosolized into the patient breathing zone. A is incorrect: clean steam does not inherently save energy. C is incorrect: clean steam is not specified to increase output capacity. D is incorrect: a heat exchanger is typically still required, and clean steam does not eliminate that need.