LEVEL III — SIMULATION EXAM 3 (115 QUESTIONS)

Time Limit: 170 Minutes

Allowed References: NFPA 72 (2022), NFPA 70 (2020), Ugly's Electrical References (2020)

DOMAIN 3.1 — INSTALLATION (Questions 1–40)

1. A fire alarm designer is specifying pathway survivability for a 28-story high-rise with voice evacuation. The design uses 2-hour CI cable for all riser circuits. At Floor 14, both the outgoing and return CI cable paths cross through a common unrated corridor ceiling space spanning 50 feet. Both paths are in separate cable trays but share the same physical space. What is the impact on the system's Class A and Level 2 protection?

A. Level 2 is maintained by the CI cable but Class A diversity is compromised at the shared crossing

B. Both Level 2 and Class A are lost because CI cable requires rated construction around it

C. Both Level 2 and Class A are maintained because separate cable trays constitute separate paths

D. Level 2 is lost but Class A is maintained because the paths are in separate trays

2. A fire alarm designer is performing a battery calculation for a voice evacuation system in a building with no generator. System loads on the main panel: panel/SLC standby = 1.20A, voice amplifier standby = 2.10A, network standby = 0.55A. Alarm loads: NAC = 5.5A, voice = 12.0A. A remote power supply on Floor 10 has its own batteries. Using 24-hour standby, 15-minute alarm, and 20% safety factor, what loads go into the main panel calculation?

A. All system loads including the remote power supply must be on the main panel batteries

B. Only the panel/SLC standby and NAC alarm — voice amplifier has its own internal battery

C. Only loads directly powered by the main panel batteries — the remote supply calculates separately

D. All standby loads system-wide but only the main panel alarm loads

3. A fire alarm designer is evaluating SLC loading for a large system. The panel has two loops: SLC 1 = 192 devices/138 mA (max 198/150 mA), SLC 2 = 110 devices/82 mA. A renovation adds 30 devices at 22 mA. The designer considers adding 6 to SLC 1 (reaching 198) and 24 to SLC 2. What primary concern should the designer raise?

A. The 160 mA combined loading across both loops exceeds the panel's total system capacity

B. SLC 1 at maximum device count has zero capacity for future additions or replacement needs

C. Splitting the renovation across loops creates addressing conflicts and programming errors

D. NFPA 72 prohibits adding devices to any loop above 95% capacity

4. A fire alarm designer is specifying the releasing system for a clean agent suppression system. The data center has three separate server rooms, each with independent agent storage, nozzles, and cross-zone detection. The designer proposes a single releasing panel with three independent programs. During design review, a reviewer asks what prevents a wiring error on Room 1's releasing circuit from affecting Room 2. What is the critical design feature?

A. The releasing panel's software automatically isolates adjacent rooms during alarm conditions

B. Cross-zone programs share detection zones between rooms for mutual fault verification

C. Each room's cross-zone uses different detector technologies preventing simultaneous activation

D. Each room must have completely independent releasing circuit outputs on separate panel terminals

5. A fire alarm designer is specifying detection for an 85-foot atrium in a corporate headquarters. The atrium has a skylight ceiling, glass walls, and open balconies. Aesthetic requirements prohibit visible equipment on walls and balconies. Spot detectors at the ceiling are impractical due to stratification. What detection approach addresses both concerns?

A. Aspirating detection with sampling pipes concealed in architectural elements at multiple heights

B. Projected beam detectors recessed into decorative columns at three elevations

C. Ceiling-mounted spot detectors with extended-range sensing rated for 85-foot heights

D. Linear heat detection concealed behind glass wall panels at 20-foot intervals

6. A fire alarm designer calculates NAC voltage drop: 12 AWG (1.98 Ω/1000 ft), round-trip 1,900 feet, 2.0 amps. R = 3.762 Ω. V_drop = 7.524V. End voltage = 16.48 VDC. Devices listed 16-33 VDC. The margin is 0.48V above minimum. Should the designer approve?

A. Yes, the calculation meets the minimum and satisfies all code requirements

B. Yes, but only if a 10% safety margin is added to the conductor resistance

C. No, the 0.48V margin will erode from aging, temperature rise, and future additions

D. No, 12 AWG cannot be used for NAC runs exceeding 1,500 feet per NEC

7. A fire alarm designer is developing notification for a hospital with defend-in-place. The hospital has patient care floors, surgical suites, an ED, a NICU, and administrative offices. Which area requires the most restrictive notification approach?

A. Patient care floors because notification must balance fire safety with patient vulnerability

B. Surgical suites because audible notification during procedures poses direct patient safety risk

C. The ED because transient and unfamiliar occupants require immediate full notification

D. Administrative offices because high ambient noise requires louder notification appliances

8. A fire alarm designer is specifying the system for a convention center ballroom that divides into twelve independent event spaces using acoustically rated partitions. Each space has a separate entrance when deployed. How must the notification design address these partitions?

A. Only the fully open configuration requires notification design consideration

B. A central high-output device covers all twelve configurations from the ballroom center

C. Only alternating spaces need coverage since adjacent spaces share notification output

D. Each enclosed space must have independent notification when its partitions are deployed

9. A fire alarm designer is specifying communication paths for a high-rise with central station monitoring. The existing DACT's copper lines are being discontinued. The designer evaluates: (1) IP only, (2) cellular only, (3) dual-path IP/cellular. What provides the most robust monitoring?

A. Dual-path IP/cellular because it provides redundancy with continuous monitoring on both paths

B. Cellular only because modern cellular exceeds DACT reliability significantly

C. All three are equally compliant provided each meets technology requirements

D. IP only with 200-second supervision satisfies all single-path system requirements

10. A fire alarm designer is developing elevator recall for a building with four banks. Banks A-C serve the tower. Bank D is freight. The machine room is on the penthouse level. When the machine room detector activates, all banks must recall to alternate floors. The designer proposes Banks A-C to the lobby alternate and Bank D to the loading dock level. Is this valid?

A. No, all four banks must recall to the same single alternate floor

B. No, machine room detection should trigger primary floor recall, not alternate

C. Yes, different banks may recall to different alternate floors based on function

D. Yes, but only if each alternate floor has smoke detection confirming safety

11. A fire alarm designer is specifying detection for a heritage building with ornate plaster ceilings and landmark restrictions prohibiting surface-mounted equipment. What detection approach satisfies both code and preservation?

A. Detection requirements may be waived entirely for landmark-protected buildings

B. Aspirating detection with sampling pipes threaded through existing architectural cavities

C. Battery-powered wireless detectors adhered to the ceiling with removable adhesive

D. Surface-mounted detectors painted to match the ceiling with preservation board approval

12. A fire alarm designer is evaluating speech intelligibility requirements. STI of 0.50 minimum is specified. Three spaces present challenges: a marble lobby (reverberation), a parking garage (noise plus reflective surfaces), and a generator room (115 dB ambient). For which space is 0.50 STI most impractical?

A. The marble lobby because reverberation degrades clarity beyond acoustic correction

B. The parking garage because noise plus reflective surfaces create the worst combination

C. All three present equal challenges requiring the same acoustic treatment

D. The generator room because 115 dB ambient overwhelms voice notification capability

13. A fire alarm designer is specifying conduit fill for 1-inch EMT carrying ten 14 AWG THHN, four 12 AWG THHN, and four 18 AWG THHN (18 total). Mixed sizes prevent Annex C use. What method must be used?

A. Calculate total conductor area from Chapter 9 Table 5 and compare to the 40% fill allowance

B. Compare each size to its individual Annex C maximum — if all pass the installation complies

C. Use the Annex C table for 12 AWG as the controlling calculation

D. Add counts and compare total to the smallest Annex C maximum present

14. A fire alarm designer is developing the fire command center per NFPA 72 Section 23.10. The panel is in the basement mechanical room. The FCC is in the lobby. The building owner asks whether a permanently wall-mounted commercial tablet running the manufacturer's monitoring software can serve as the repeater. What is correct?

A. Yes, if the tablet remains permanently mounted and powered at all times

B. Yes, if the tablet app displays full system status with alarm, trouble, and supervisory

C. No, the FCC requires a permanently installed fire alarm panel or dedicated repeater

D. No, but a desktop computer with dedicated software could serve as the repeater

15. A fire alarm designer is developing the fire pump monitoring interface. The controller provides pump running, power available, phase reversal, and controller trouble contacts. The engineer asks why "pump running" needs fire alarm monitoring when the controller already tracks it. What is correct?

A. Pump running monitoring is optional per NFPA 72 when the controller tracks it internally

B. Fire alarm monitoring provides building-wide supervisory awareness for maintenance and emergency response

C. The panel must independently verify pump operation before allowing suppression activation

D. Pump running monitoring is required only for diesel-driven fire pumps per NFPA 72

16. A fire alarm designer is specifying visible notification for a 60,000-square-foot open office with a 12-foot ceiling. Interior divisions are only 5.5-foot cubicle partitions. How should the designer treat these partitions?

A. Each cubicle cluster must be treated as a separate room requiring its own strobe

B. A 50% candela increase compensates for light absorption by partition fabric

C. Ceiling-mounted strobes are required because wall units cannot cover over partitions

D. Partitions below wall strobe mounting height do not affect visible coverage calculations

17. A fire alarm designer is developing the releasing system for a pre-action sprinkler using double-interlock. During design review, the mechanical engineer asks what happens if only detection activates without air pressure drop. What is correct per NFPA 72?

A. The valve remains closed — double-interlock requires both detection AND pressure drop

B. The valve opens on detection alone as a precautionary measure to fill piping

C. Detection primes the pilot solenoid for faster response when heads fuse

D. The panel generates an alarm but holds the release for a 60-second confirmation period

18. A fire alarm designer is specifying the system for a nursing home using defend-in-place. When a smoke detector activates on a resident floor, notification is limited to the alarm floor. The administrator asks whether adjacent floors should be notified to prepare for resident relocation. What determines the answer?

A. NFPA 72 always requires notification on the alarm floor plus one above and below

B. Only the alarm floor is notified in all defend-in-place nursing home implementations

C. The building's approved fire safety plan determines the specific notification scope

D. The fire department determines scope during each individual event

19. A fire alarm designer is specifying the releasing circuit for a clean agent system in an occupied data center. Per NFPA 72, the system must include pre-discharge warning, time delay, and abort. The design uses a 25-second countdown. What determines whether 25 seconds is adequate?

A. NFPA 72 specifies a fixed 30-second minimum for all occupied spaces

B. Room size, exit count, travel distance, and expected occupant count determine adequacy

C. The agent manufacturer specifies countdown based on concentration rate

D. The fire department determines delay based on their response time

20. A fire alarm designer is specifying the system for a 30-story residential tower using defend-in-place. A smoke alarm on Floor 20 notifies Floors 19, 20, and 21 only. The building manager asks why all floors are not notified. What is the primary rationale?

A. Residential towers are exempt from full notification per NFPA 72 Chapter 29

B. Full notification is required only in buildings taller than 35 stories

C. Defend-in-place reduces system cost by requiring fewer appliances

D. Simultaneous evacuation of all floors creates dangerous stairwell congestion

21. A fire alarm designer is developing PAS for a hospital. During the 180-second investigation period, a second smoke detector in a different zone activates. Per NFPA 72, what must happen?

A. PAS must immediately cancel and general alarm notification must activate

B. The investigation period extends by 180 seconds for the second zone

C. PAS continues because the investigation is already in progress

D. The 180-second period restarts from zero using the second activation

22. A fire alarm designer specifies white devices throughout a building per the architect's request. Per NFPA 72 Section 17.14.8, which device type must remain red?

A. Horn/strobe devices for universal emergency identification

B. All fire alarm devices per NFPA 72 universal identification rules

C. Manual fire alarm stations per the code requirement

D. Smoke detectors must maintain the manufacturer's standard listed color

23. A fire alarm designer is developing notification for a performing arts center. Theater ambient is 95 dB. Orchestra pit reaches 108 dB. Per NFPA 72, what minimum audible levels are required and what design implication exists?

A. Theater 100 dB, pit 113 dB — achievable with high-output horns

B. Theater 110 dB, pit 123 dB — both impractical, requiring enhanced visible notification

C. Theater 95 dB, pit 108 dB — matching ambient is adequate during performances

D. Theater 110 dB, pit 123 dB — achievable with speaker arrays at close spacing

24. A fire alarm designer is evaluating voice evacuation speaker circuit approaches for a 35-story building. Option A: central amplifiers on Floor 1 with 850-foot runs. Option B: remote amplifiers on Floors 12 and 24 with maximum 350-foot runs. What is Option B's primary advantage?

A. Option B eliminates battery backup requirements at remote amplifier locations

B. Option B allows smaller gauge speaker wire throughout the building

C. Option B eliminates pathway survivability requirements on speaker circuits

D. Option B reduces line losses providing consistent audio levels across all floors

25. A fire alarm designer is specifying the kitchen hood suppression interface. The fire alarm monitors the suppression system through a monitor module. When the suppression activates, what responses must the panel initiate per a typical sequence?

A. Only supervising station signal because kitchen suppression events are supervisory

B. Building notification, station signal, and HVAC shutdown per the approved sequence

C. Only local kitchen notification because the suppression addressed the fire

D. No response because the suppression operates independently from fire alarm

26. A fire alarm designer is specifying cable for a data center with a raised floor plenum and overhead cable trays. The overhead space has dedicated ducted return (non-plenum). What cable types are required?

A. FPLP in the raised floor plenum and FPL minimum in the non-plenum overhead space

B. FPLP in both because all concealed data center spaces are plenums

C. FPL in both because data centers are general-purpose environments

D. FPLR in both because the raised floor creates a riser application

27. A fire alarm designer is specifying the system for a building with three sprinkler risers. Each riser has waterflow and tamper switches. The designer places each on an individual zone — six total. The fire captain requests zone-specific waterflow notification corresponding to each riser's coverage area. What operational advantage does this provide?

A. Zone-specific notification is required by NFPA 72 for buildings with multiple risers

B. Zone-specific response is prohibited because all waterflow must trigger building-wide notification

C. Zone-specific notification directs occupants to evacuate only the affected riser area

D. Individual zones eliminate the need for tamper monitoring on the same risers

28. A fire alarm designer is specifying detection for a cold storage facility. Freezer at -28°F. Loading docks fluctuate between 0°F and 95°F. Per NFPA 72, what minimum heat detector activation temperature is required for the loading dock?

A. 135°F because it is the universal standard commercial rating

B. 200°F because fluctuating environments require high-temperature ratings

C. 95°F for immediate response to any temperature above normal

D. At least 115°F to maintain the 20°F margin above the 95°F maximum ambient

29. A fire alarm designer is developing elevator recall for MRL elevators with drive equipment at the top of each hoistway. Per NFPA 72 Section 21.3, the drive area is treated as the machine room. When the drive area detector activates, what recall is required?

A. Phase I recall to the primary floor identical to the lobby detector

B. Phase I recall to an alternate floor because smoke near the drive may affect the primary floor

C. Immediate shunt trip disconnecting power before recall initiates

D. Only a supervisory signal because MRL drive detection is informational

30. A fire alarm designer is specifying mass notification integrated with voice evacuation per NFPA 72 Chapter 24. When mass notification overrides fire alarm audio, what fire alarm function must continue?

A. The fire alarm signal must continue transmitting to the supervising station

B. Fire alarm visual notification must continue on all floors

C. The panel must generate a trouble signal for the override duration

D. The panel must transfer all output control to mass notification

31. A fire alarm designer is developing the releasing circuit for a pre-action sprinkler. Per NFPA 72, the circuit must be supervised. If the circuit develops an open fault, what must the panel do?

A. Immediately open the valve as a precautionary safety measure

B. Transmit an alarm signal because releasing faults are emergency conditions

C. Generate a trouble signal indicating the releasing circuit has lost continuity

D. Disable detection in the pre-action zone to prevent unmonitored release

32. A fire alarm designer is specifying detection for a building with a swimming pool, a dry sauna, and a commercial bakery. Each space produces conditions incompatible with smoke detectors. What detection is most appropriate for all three?

A. Aspirating detection with sampling units outside each space

B. Heat detection because all three environments cause smoke detector problems

C. Multi-criteria detectors with particle discrimination algorithms

D. Flame detection because combustible materials produce visible flame first

33. A fire alarm designer specifies ADA-accessible hotel guest room notification. Room is 15 × 17 feet with 9-foot ceiling. Per NFPA 72, 15 cd wall strobe covers up to 20 × 20 feet. What additional notification is required beyond the standard strobe?

A. A ceiling-mounted strobe at 177 cd directly above the bed

B. A low-frequency 520 Hz audible generator near the bed

C. A second wall strobe at double candela on the wall nearest the bed

D. A supplemental device effective for waking sleeping hearing-impaired occupants

34. A fire alarm designer specifies voice evacuation using 70.7V distribution. Two speakers on Floor 11 are wired in parallel without impedance-matching transformers. What is the primary risk?

A. The low impedance load can cause amplifier distortion, overheating, and damage

B. The speakers produce distorted audio at double the intended volume

C. The speakers produce no audio because 70.7V requires transformers for output

D. The parallel connection creates a supervision gap the panel cannot detect

35. A fire alarm designer specifies beam detectors for an exhibit hall measuring 380 × 220 feet with 46-foot ceilings. Beams span the 380-foot dimension with 48-foot lateral spacing. What must be verified?

A. The 48-foot spacing does not exceed the 30-foot standard spot detector spacing

B. The beam count equals at least one per 5,000 square feet of floor area

C. The 48-foot spacing does not exceed the manufacturer's listed maximum for the 46-foot ceiling

D. The spacing matches the fire sprinkler spacing for consistent protection

36. A fire alarm designer is developing a phased construction project. Phase 1 (Floors 1-12) is operational. Phase 2 (Floors 13-24) construction begins. Phase 2 activities generate dust near the Phase 1 boundary. What coordination is required for Phase 1 during Phase 2 construction?

A. Phase 1 must be completely shut down during Phase 2 construction

B. Phase 1 zones adjacent to construction must be bypassed with the monitoring station notified

C. No coordination needed because separate SLC loops isolate the phases

D. Phase 1 detectors near the boundary should be temporarily replaced with heat detectors

37. A fire alarm designer is evaluating SLC distribution for a renovation adding 40 devices at 30 mA. The panel has three loops: SLC 1 = 188/140 mA, SLC 2 = 180/132 mA, SLC 3 = 90/65 mA (all max 198/150 mA). Which distribution provides the best future flexibility?

A. 10 on SLC 1 reaching 198, 18 on SLC 2 reaching 198, and 12 on SLC 3

B. Split 14/14/12 evenly across all three loops for balanced counts

C. 8 on SLC 1, 8 on SLC 2, and 24 on SLC 3 — keeping all loops below maximum

D. All 40 on SLC 3 because it has the most remaining capacity

38. A fire alarm designer specifies the central station connection per NFPA 72 Section 26.3.4. What is the maximum time for the operator to initiate the required response after receiving an alarm?

A. 90 seconds from receipt to initiation of the required response action

B. 60 seconds from receipt to acknowledgment at the console

C. 120 seconds from receipt to completion of fire department notification

D. 30 seconds from receipt to first contact with emergency dispatch

39. A fire alarm designer specifies the system for a building with an emergency generator. Per NEC Article 700, what is the maximum ATS transfer time?

A. 30 seconds for all emergency loads per the standard requirement

B. 60 seconds with panel batteries bridging the extended transfer

C. 10 seconds per NEC Article 700 for all emergency system loads

D. 120 seconds because panels have internal batteries for the transition

40. A fire alarm designer specifies in-rack detection for a warehouse with 52-foot ceilings and racks to within 3 feet of the ceiling. In-rack detectors are at 17-foot and 35-foot elevations. What is the purpose of in-rack detection?

A. In-rack detectors provide redundancy for ceiling detector malfunctions

B. In-rack detectors identify fires at storage levels before smoke reaches the 52-foot ceiling

C. NFPA 72 mandates in-rack detection for all racks above 25 feet

D. In-rack detectors compensate for beam detector sensitivity reduction from dust

DOMAIN 3.2 — MAINTENANCE AND INSPECTION (Questions 41–78)

41. A fire alarm technician performs annual releasing system testing. Solenoid disconnected, substitute load installed. Cross-zone logic, countdown, abort, and releasing circuit supervision verified. What additional test remains in the protected space?

A. The releasing solenoid must be reconnected for live discharge verification

B. The cross-zone test must be repeated with zones in opposite activation order

C. The substitute load voltage must be measured with a calibrated instrument

D. The pre-discharge warning appliances must be verified for adequate output

42. A fire alarm designer reviews a sensitivity report for a 9-year-old system with 550 detectors. Report shows 25 detectors between 3.8% and 5.5% (above 3.7% max) and 7 detectors between 0.1% and 0.4% (below 0.5% min). What action is required?

A. All 32 out-of-range detectors — both high and low — require investigation and correction

B. Only the 25 high-reading detectors need cleaning — low readings indicate better sensitivity

C. All 550 detectors must be cleaned because 32 out-of-range indicates building-wide issues

D. Panel sensitivity thresholds should be expanded to accommodate the 9-year drift

43. A fire alarm technician tests the voice evacuation live microphone from the FCC. Audio heard on Floors 1-14 but not Floors 15-30. Pre-recorded message plays on all 30 floors. What is the most likely cause?

A. Amplifiers for Floors 15-30 have a fault blocking live audio but passing recorded

B. Microphone output power is insufficient for the total building speaker load

C. The live microphone routing is programmed to broadcast only to Floors 1-14

D. Speaker circuits on Floors 15-30 have frequency-dependent impedance faults

44. A fire alarm technician tests elevator recall. Four banks with selective recall. Activating Bank A: only Bank A recalls. Activating Bank D: Banks C and D both recall. Only Bank D's relay activated. Where is the problem?

A. Panel programming activates both C and D outputs for Bank D's zone

B. Elevator controllers for Banks C and D share a common recall input wired in parallel

C. Bank D's SLC communication interferes with Bank C's module polling

D. Bank D's detector generates a building-wide alarm code

45. A fire alarm technician tests AC power supervision. AC disconnected. After 3 hours 15 minutes, no trouble has appeared. Per NFPA 72 Section 10.6.9, what is the maximum delay?

A. No delay — trouble must appear immediately upon power disconnection

B. 6 hours per extended allowance for modern digital panels

C. 24 hours matching battery standby duration for consistency

D. 3 hours — the 3:15 delay exceeds the maximum and must be corrected

46. A fire alarm technician discovers a smoke detector covered with a latex exam glove by nursing staff during renovation. The covering has been in place for nine weeks. What must be documented?

A. The detector has been disabled for nine weeks — a significant impairment requiring immediate correction

B. Latex gloves permit smoke entry and the detector remains functional

C. The covering is acceptable during active renovation if logged in maintenance records

D. The glove may remain until renovation completes to prevent construction alarms

47. A fire alarm technician tests a double-interlock pre-action system. Detector activates. Panel processes alarm. Valve does not open. Is this correct?

A. No, detection should open the valve as the first interlock for all pre-action types

B. No, detection should at least energize the pilot solenoid for faster response

C. Yes, double-interlock requires both detection AND air pressure drop

D. Yes, but only because the system was in maintenance mode during testing

48. A fire alarm technician tests communication — IP primary, cellular secondary. IP test succeeds. Disconnects IP, tests cellular. After 200 seconds, panel shows "IP COMMUNICATION FAILURE." Cellular test then succeeds. What has been verified?

A. Both paths function and the 200-second IP supervision timing meets NFPA 72

B. Only IP works because cellular was tested under abnormal conditions

C. IP supervision timing should be 60 seconds — the 200-second result is non-compliant

D. Cellular has unacceptable delay before it can transmit

49. A fire alarm technician discovers the event log has been full for eleven months, overwriting entries. Building management unaware. What is the impact?

A. The full log causes panel processing delays affecting response speed

B. The panel must be replaced with a model having larger log capacity

C. The log has no operational impact because the panel functions independently

D. Eleven months of diagnostic history lost — log must be downloaded and cleared

50. A fire alarm technician tests semiannual detectors on Floor 12. Seven adjacent detectors take 28 to 42 seconds to activate. Other Floor 12 detectors activate in 3 to 7 seconds. What does the delayed response indicate?

A. The SLC polling rate for those addresses is configured slower

B. The seven detectors likely have contaminated sensing chambers

C. The aerosol can was running low during those seven tests

D. HVAC airflow is diluting smoke before reaching detectors

51. A fire alarm technician tests power transfer. After disconnecting AC, voltage: 0 min = 26.8V, 5 min = 26.4V, 10 min = 26.0V, 15 min = 25.6V. After reconnecting, charger activates. Are these acceptable?

A. Yes, the gradual 1.2V decline is normal for batteries under standby load

B. No, the 1.2V drop indicates batteries are near end of life

C. Yes, but only if voltage recovers above 27.0V within 30 minutes

D. No, voltage should remain constant during standby

52. A fire alarm technician discovers a smoke detector covered with a clear plastic food container with holes by kitchen staff. What must be documented?

A. The holes allow smoke entry and the modification is acceptable

B. The container may remain if the detector activates during testing

C. The unauthorized modification renders the detector non-compliant and must be removed

D. The container may remain if kitchen staff sign an acknowledgment

53. Per NFPA 72 Table 14.4.3.2, what is the required testing frequency for releasing device circuits?

A. Semiannually because releasing circuits are more critical than detection

B. Monthly because the suppression system must always be ready

C. Only during initial acceptance with no recurring testing required

D. Annually as part of the comprehensive releasing system functional test

54. A fire alarm technician tests notification. A speaker on a 70.7V circuit produces clear but reduced volume. Circuit voltage at the speaker reads 70.0 VAC. What is the most likely cause?

A. The amplifier has a partial fault reducing output to this speaker

B. The speaker's internal wattage tap is set lower than others on the circuit

C. The 70.0 VAC is below the speaker's minimum threshold

D. The speaker wire has a high-resistance splice reducing power delivery

55. A fire alarm technician tests visible notification in a hospital corridor. Two strobes visible from the same location flash 0.5 seconds apart on different NAC circuits. What code requirement is violated?

A. The synchronization requirement — strobes in the same field of view must flash together

B. The candela requirement because unsynchronized output produces uneven coverage

C. The flash rate requirement because combined offset exceeds 2 flashes per second

D. The mounting height requirement because improper mounting creates timing offsets

56. A fire alarm technician discovers two pull stations in a school painted orange to match school colors. Paint covers housing, handle, and labels. What must be documented?

A. Pull stations function if they activate during testing and paint is cosmetic

B. Only labels need restoration — housing color does not affect operation

C. School should repaint red within 30 days per correction schedule

D. Painted pull stations must be replaced because paint obscures required red color and labels

57. A fire alarm technician performs a battery load test. Starting 26.8 VDC. After test under full alarm load, ending 18.8 VDC. Manufacturer minimum is 20.4 VDC. What must be documented?

A. Batteries passed because 18.8 VDC exceeds the industry minimum of 18 VDC

B. Test is inconclusive and must be repeated after batteries fully recharge

C. Batteries failed — 18.8 VDC is below the 20.4 VDC minimum

D. Batteries can remain in service for 30 days while replacements are ordered

58. A fire alarm technician tests HVAC shutdown. Duct detector activates, panel processes alarm, control module relay closes. AHU does not shut down. Where is the fault?

A. In the duct detector generating an incorrect signal type

B. In the wiring between the control module relay and the AHU controller

C. In the panel programming — output may not be linked to the duct zone

D. In the SLC communication — module may not have received the command

59. A fire alarm technician discovers the Record of Completion was last updated eight years ago. Four renovations added 75 devices and changed the sequence three times. What is needed?

A. The Record must be updated to reflect the current system per NFPA 72 Section 7.8

B. Annual testing records capture modifications making the update optional

C. The original Record remains valid as the initial compliance baseline

D. A new Record is needed only if the panel was physically replaced

60. A fire alarm system log shows 180 "WATERFLOW — ALARM" entries over six months with no fires and no head activations. Engineer reports municipal pressure surges. What should be recommended?

A. Replace all switches with models having built-in pressure compensation

B. Disconnect switches until the pressure issue is resolved permanently

C. Increase panel alarm threshold for waterflow zones to filter brief events

D. Investigate pressure surges and adjust waterflow switch retard delay settings

61. A fire alarm technician discovers a renovation enclosed a corridor smoke detector behind a new wall. Detector communicates normally. What must be documented?

A. Detector can remain because it communicates normally

B. Panel descriptor should be updated to reflect the concealed position

C. Detector must be relocated to the occupied corridor and concealed space evaluated

D. Concealed detector provides dual coverage for both spaces

62. A fire alarm technician tests a tamper switch on an OS&Y valve. After two revolutions from fully open, supervisory signal appears. Per NFPA 72, does this pass?

A. No, switch must activate after one revolution for OS&Y valves

B. Yes, activation within two revolutions meets NFPA 72

C. No, requirement is activation within one and a half revolutions

D. Yes, but only for OS&Y — butterfly valves have stricter requirements

63. A fire alarm technician tests a horn/strobe. Temporal-three sounds correctly. Strobe flashes at 0.8 flashes per second. Per NFPA 72, what should be documented?

A. The strobe fails — NFPA 72 requires 1 to 2 flashes per second and 0.8 is below minimum

B. Strobe passes because any rate below 2 per second is acceptable

C. Flash rate is irrelevant if candela meets room coverage requirements

D. Rate is acceptable for sleeping areas but fails for commercial applications

64. A fire alarm technician discovers a tamper switch generates alarm instead of supervisory. Contact closure confirmed at panel. What is the most likely cause?

A. Tamper requires different EOLR than alarm circuits

B. Panel cannot distinguish alarm from supervisory on same input type

C. Tamper wiring polarity is reversed causing misclassification

D. Tamper input is programmed as alarm rather than supervisory

65. A fire alarm system has IP primary and cellular secondary. "IP COMMUNICATION FAILURE" active 60 days. Cellular functions. What should be documented?

A. Cellular provides complete monitoring so IP failure is not urgent

B. IP trouble should be repaired at owner's convenience next quarter

C. System has operated without redundancy for 60 days — a significant impairment

D. No documentation needed because system functions with cellular

66. A fire alarm technician discovers a decorative shelf over a corridor horn/strobe blocking both outputs completely. What must be documented?

A. Only strobe obstruction is significant because horn sound travels around obstacles

B. Shelf obstructs both audible and visible notification and must be removed

C. Device is functional if it activates during testing regardless of obstruction

D. Building management may apply for AHJ variance to keep the shelf

67. A fire alarm technician performs battery load test. Starting 27.0 VDC. After test, ending 19.4 VDC. Manufacturer minimum 20.4 VDC. What must be documented?

A. The batteries failed — 19.4 VDC is below the 20.4 VDC minimum

B. Batteries passed because 19.4 exceeds industry minimum of 18 VDC

C. Test inconclusive — must be repeated after batteries recharge

D. Batteries can remain in service for 60 days while replacements ordered

68. A fire alarm technician discovers a smoke detector relocated from ceiling to a desk at 28 inches above floor by building staff. What must be documented?

A. Detector at desk height may detect smoke faster because smoke fills entire room

B. Relocation is acceptable if staff document the reason in the log

C. Detector should be raised to 60 inches for improved coverage

D. Detector at desk height is non-functional and must be reinstalled at the ceiling

69. Per NFPA 72 Table 14.4.3.2, supervisory devices must be tested at what minimum frequency?

A. Monthly to ensure valve positions remain correct

B. Semiannually to match smoke detector testing frequency

C. Annually as part of the comprehensive system functional test

D. Quarterly to coincide with building maintenance schedules

70. A fire alarm technician discovers the FCC graphic annunciator has eight burned-out LED indicators. What must be documented?

A. LEDs are cosmetic and do not affect system operation

B. Burned-out LEDs prevent firefighters from identifying alarms in those zones and must be repaired

C. Only LEDs in occupied zones need repair — mechanical zone LEDs may remain

D. Annunciator must be replaced entirely because component repair is not supported

71. Per NFPA 72 Table 14.4.3.2, releasing device circuits must be tested at what frequency?

A. Semiannually because releasing circuits are more critical

B. Monthly to ensure suppression system readiness

C. Only during initial acceptance with no recurring testing

D. Annually as part of the comprehensive releasing system test

72. A fire alarm technician discovers the panel room contains paint, chemicals, and boxes. Working clearance is 19 inches. What violations exist?

A. Both storage and inadequate clearance violate NEC Article 110 working space requirements

B. Only chemical storage is a concern — other items and clearance are acceptable

C. Room may be used for storage if chemicals are in sealed containers

D. Only 19-inch clearance violates code — organized storage is permitted

73. Per NFPA 72 Table 14.4.3.2, what is the required testing frequency for smoke detectors?

A. Annually as part of the comprehensive system functional test

B. Quarterly to coincide with building maintenance schedules

C. Semiannually using approved aerosol smoke or calibrated test source

D. Monthly for continuous reliable detection throughout the building

74. A fire alarm technician tests stairwell pressurization. Detector activates, fans start. Floor 6 door requires more force. Floor 18 door opens normally. What should be documented?

A. Only fan activation requires documentation — door resistance is mechanical scope

B. Both observations should be documented because inconsistent pressurization suggests duct or damper issue

C. Some variation is expected and both floors pass

D. Only Floor 6 observation matters because it confirms positive pressure

75. A fire alarm technician discovers the panel clock shows 1:00 PM when actual time is 2:48 PM — a 108-minute discrepancy. What must be documented?

A. Time discrepancies under 2 hours are within acceptable tolerance

B. Clock error only affects display and has no operational significance

C. Only the AHJ can determine whether correction is required

D. The 108-minute discrepancy affects event log accuracy and must be corrected

76. A fire alarm technician tests access control interface. Alarm activates. 17 of 19 locks release but 2 remain locked. What must be investigated?

A. Control module outputs, wiring, and power supply to the two non-releasing locks

B. Panel programming because the two locks may not be in the response matrix

C. Access control firmware needing updates for fire alarm compatibility

D. NAC circuits because locks may be wired to the notification circuit

77. A fire alarm technician tests a waterflow switch. Inspector's test valve open, water flows. After 89 seconds, "WATERFLOW — ALARM" appears. Per NFPA 72, does this pass?

A. No, alarm must appear within 60 seconds per standard timing

B. No, alarm must appear within 30 seconds for wet-pipe systems

C. Yes, 89 seconds is within the 90-second maximum

D. Yes, but the 89-second response indicates retard delay at maximum

78. A fire alarm technician performs sensitivity testing. One detector reads 0.3% — below the 0.5% minimum. What does this indicate?

A. Detector is at peak sensitivity representing ideal conditions

B. The detector is outside listed parameters and must be investigated for a fault

C. Low readings are always acceptable because they indicate enhanced capability

D. Panel sensitivity calibration has drifted and needs manufacturer adjustment

DOMAIN 3.3 — SUBMITTAL PREPARATION AND SYSTEM LAYOUT (Questions 79–100)

79. A fire alarm designer calculates NAC voltage drop: 14 AWG (3.14 Ω/1000 ft), round-trip 1,000 feet, 2.5 amps on 24 VDC. What is the end-of-circuit voltage?

A. 21.50 VDC providing generous margin above minimum

B. 19.50 VDC providing comfortable margin above 16 VDC

C. 16.15 VDC — barely above 16 VDC minimum with thin margin

D. 16.15 VDC — while compliant, margin is dangerously thin and redesign recommended

80. A fire alarm designer calculates battery capacity: panel/SLC standby = 0.85A, voice standby = 1.15A, NAC alarm = 4.5A, voice alarm = 9.0A. Building has generator. 4-hour standby, 15-minute alarm, 20% safety factor. Minimum capacity?

A. Approximately 13.7 Ah after applying all three factors correctly

B. 24.00 Ah using 24-hour standby because generators do not reduce voice requirements

C. 11.38 Ah using correct durations without safety factor

D. 16.20 Ah using 4-hour standby with 5-minute alarm instead of 15-minute

81. A fire alarm sequence shows duct detector triggering HVAC shutdown only — no notification, recall, or station signal. Reviewer flags missing station transmission. What is correct?

A. Duct detectors never transmit because they are supervisory-class devices

B. Reviewer is incorrect — duct signals transmit automatically regardless of matrix

C. Duct detector signal should transmit to the supervising station even without notification

D. Station transmission applies only when duct detectors are configured as alarm inputs

82. A fire alarm conduit schedule shows 1-inch EMT with nine 14 AWG THHN and seven 16 AWG THHN (16 total). Annex C max: 14 AWG = 22, 16 AWG = 31. Mixed sizes. How must fill be verified?

A. Compare each size individually — since both below maximums, it passes

B. Calculate total conductor area from Chapter 9 Table 5 and compare to 40% fill limit

C. Add counts (9+7=16) and compare to smaller Annex C max of 22

D. Use Annex C for 14 AWG only since larger conductor controls fill

83. A fire alarm floor plan shows a 90-degree L-shaped corridor — 200 feet longer leg, 130 feet shorter leg. Detectors at 30-foot spacing with detector at corner. Is corner detector necessary?

A. No, detectors along each leg provide coverage through direction change

B. No, corner detectors create unnecessary redundant coverage

C. Yes, but only if corridor width exceeds 10 feet at the intersection

D. Yes, corner detector ensures detection at the turn where leg coverage may be limited

84. A fire alarm device schedule shows 193 devices on SLC 1 (max 198). Renovation adds 16 devices. How should designer advise?

A. All 16 should go on a new SLC to preserve remaining capacity on SLC 1

B. Add 5 to SLC 1 reaching 198 and place 11 on new loop — noting zero flexibility at max

C. All 16 can be added by requesting firmware extending capacity

D. Install monitor modules consolidating devices to free addresses

85. A fire alarm riser shows remote NAC power supplies on Floors 8, 16, and 24 of a 30-story building. Each has own batteries. What must be calculated separately?

A. Voltage drop from main panel to each remote location

B. Combined calculation averaging loads across all three remotes

C. A separate battery calculation based on each remote panel's specific loads

D. Conduit fill for supervised circuit to each remote

86. A fire alarm specification requires Record of Completion per NFPA 72. What must it contain?

A. Only installer's license and signature certifying compliance

B. System specifications, circuit details, device counts, power supply data, and required signatures

C. Only AHJ's inspection report and acceptance test determination

D. Design engineer's calculations and specification references

87. A fire alarm specification requires all cable above ceilings in conduit. Spaces are non-plenum. NEC does not require conduit. What should the designer do?

A. Ignore specification because it exceeds code requirements

B. Install conduit only in corridors and omit in rooms

C. Request AHJ to override the specification to reduce costs

D. Install conduit as specified because the specification is a contractual obligation

88. A fire alarm voltage drop for a 70.7V speaker circuit shows 60.2 VAC at farthest speaker. Manufacturer minimum is 55 VAC. Does the circuit pass?

A. Yes, 60.2 VAC exceeds the 55 VAC minimum with 5.2-volt margin

B. No, 70.7V must maintain at least 90% (63.6 VAC) at all locations

C. No, speakers require exactly 70.7 VAC for impedance matching

D. Yes, but only if amplifier can be increased to compensate for loss

89. A fire alarm shop drawing shows releasing system with 18-second pre-discharge timer. Engineer notes it may not provide adequate evacuation. What determines the delay?

A. NFPA 72 specifies fixed 30-second minimum for all clean agent spaces

B. Agent manufacturer specifies delay based on concentration rate

C. Room size, exit count, travel distance, and expected occupant count

D. Fire department determines delay based on response time

90. A fire alarm as-built shows 178 devices on SLC 1. Panel programming shows 186. Record of Completion shows 170. What must be corrected?

A. Only as-built needs updating since closest to panel count

B. All three must be reconciled against physical field count for same number

C. Only Record needs updating because most outdated

D. Panel must be reprogrammed to match as-built as design reference

91. A fire alarm corridor shows a 230-foot straight corridor with detectors at 30-foot spacing. First detector at 10 feet: 10, 40, 70, 100, 130, 160, 190, 220. Eight detectors. Last is 10 feet from the far end. Is this correct?

A. No, 9 detectors needed because gap near center creates coverage hole

B. No, first and last must be within 15 feet of each end, not at the positions shown

C. Yes, but additional detectors needed at every corridor intersection

D. Yes, 8 detectors with 30-foot spacing and end distances within 15 feet provide coverage

92. A fire alarm shop drawing shows SLC 1 (Class B, Floors 1-4) and SLC 2 (Class A, Floors 5-24). Reviewer questions different classifications. Valid rationale?

A. NFPA 72 requires Class A above Floor 4 in buildings taller than 5 stories

B. Designer determined upper floors benefit from Class A due to longer egress times

C. Class B prohibited above Floor 4 per NEC Article 760

D. Both loops must use identical classifications for consistent performance

93. A fire alarm shop drawing shows NAC with 10 horn/strobes at 0.305A, 8 speakers at 0.145A, and 6 strobes at 0.190A on 3.0-amp output. What is total load?

A. Approximately 5.35 amps total from all devices significantly exceeding the 3.0-amp rating

B. 3.05 amps from horn/strobes alone already exceeding the rating

C. 2.40 amps total providing margin within the rating

D. 6.70 amps based on doubling for inrush estimation

94. A fire alarm riser shows "PATHWAY SURVIVABILITY LEVEL 2" on voice circuits. What satisfies Level 2?

A. Standard FPLP in standard EMT without additional fire rating

B. Standard FPLR in a 1-hour fire-rated stairwell

C. Either 2-hour fire-rated cable (CI cable) or installation within 2-hour fire-rated construction

D. Any listed cable in rigid metal conduit with firestop at each floor

95. A fire alarm specification requires acceptance testing per NFPA 72 before CO. Spec requires 10 business days' notice to AHJ. GC demands testing in 4 days. How should contractor respond?

A. Conduct testing in 4 days and submit for AHJ retroactive approval

B. Maintain the 10-day notice requirement and reschedule with proper notification

C. Contact AHJ to request expedited waiver of notice period

D. Perform preliminary test in 4 days and schedule formal test later

96. A fire alarm floor plan shows conference room 50 × 40 feet, 10-foot ceiling. Two 60 cd wall strobes — one on each 50-foot wall. Per NFPA 72, single 60 cd covers up to 45 × 45 feet. Do the two strobes provide adequate coverage?

A. No, each strobe individually cannot cover the 50-foot dimension

B. No, four strobes required — one per wall

C. Yes, but only if both synchronized and at identical heights

D. Yes, two strobes on opposite walls provide overlapping coverage for the full room

97. A fire alarm technician reviews as-built showing 155 devices on SLC 1. Physical count: 164. Panel confirms 164. What is required?

A. As-built must be updated to reflect the 164 devices currently installed

B. No action — 9-device discrepancy is within tolerance

C. Panel must be reprogrammed to match the 155-device drawing

D. Only Record of Completion needs updating

98. A fire alarm battery calculation: standby = 0.58A × 24hr = 13.92 Ah, alarm = 5.4A × 0.083hr = 0.448 Ah, subtotal = 14.368 Ah, × 1.20 = 17.24 Ah. Drawing specifies 18 Ah batteries. Is this adequate?

A. No, 18 Ah is too close to 17.24 Ah — next standard size must be used

B. No, 20% factor should be applied to each component separately

C. Yes, 18 Ah exceeds the calculated minimum of 17.24 Ah with 0.76 Ah margin

D. Yes, but only if building has a generator reducing standby requirements

99. A fire alarm sequence for hospital shows smoke detector alarms trigger alarm-floor-only notification while pull stations trigger full building notification. Both trigger recall and station signal. Is this valid?

A. No, all alarm types must produce identical building-wide responses

B. Yes, defend-in-place hospitals may have differentiated responses per fire safety plan

C. No, smoke detectors must trigger broader notification than pull stations

D. Yes, but only if hospital has fewer than 200 beds

100. A fire alarm as-built captures panel's dedicated circuit: 20A breaker, 12 AWG, 195-foot run, labeled, lock-on, no GFCI/AFCI. What additional detail should be documented?

A. Voltage at panel terminals for baseline comparison

B. Electrician's name and license for warranty documentation

C. Breaker manufacturer and catalog number for replacement

D. Conduit type, size, and routing path from electrical panel to fire alarm panel

DOMAIN 3.4 — MANAGEMENT (Questions 101–115)

101. A fire alarm project supervisor discovers a subcontractor pulled cable with excessive tension on 18 runs totaling 2,600 feet. Internal insulation may be damaged. What must the supervisor require?

A. Megger testing on all 18 runs to verify insulation integrity before connecting devices

B. Visual inspection at each pull point is sufficient to identify damage

C. Cable can be connected — damage will be found during functional testing

D. Subcontractor must certify in writing that proper technique was used

102. A fire alarm contractor coordinates acceptance testing for a building with elevator recall, HVAC shutdown, pressurization, smoke control, and door release. Which trade contractors must participate?

A. Only fire alarm contractor because test covers fire alarm equipment exclusively

B. General contractor solely coordinates and attends on behalf of all trades

C. Elevator, HVAC, controls, and door hardware contractors must verify their equipment

D. Only AHJ and fire alarm contractor — other trades submit results separately

103. A fire alarm project manager receives a change request to convert from horn/strobe to voice evacuation at 82% completion. What is correct?

A. Install speakers on remaining areas and retain horn/strobes in completed areas

B. A formal change order documenting engineering revision, cost, and schedule impact must be processed

C. Refuse because conversion at 82% is technically impossible

D. Absorb cost to maintain client relationship and timeline

104. A fire alarm contractor discovers the electrical contractor installed an AFCI/GFCI breaker on the fire alarm dedicated circuit. What is correct?

A. Accept because it provides enhanced protection beyond minimum code

B. Replace breaker directly since fire alarm compliance is the contractor's scope

C. Contact building owner to authorize cost of replacement

D. Notify the general contractor to direct the electrical contractor to replace it

105. A fire alarm contractor receives 450 detectors — 425 with one date code, 25 with a different code. Same model listed for the panel. Should the contractor be concerned?

A. No, date code variations are normal and do not affect compatibility

B. Yes, all must have identical date codes for firmware consistency

C. Yes, the 25 different units must go on a separate SLC loop

D. No, but 25 should be placed in non-critical locations as precaution

106. A fire alarm technician asks whether tightening a loose wire nut resolving a ground fault requires a formal service report. What is correct?

A. Reports needed only when devices are replaced or programming changed

B. Minor repairs under 15 minutes documented with verbal confirmation

C. Every service activity must be documented in a written report regardless of scope

D. Reports required only when repair resolves an active alarm condition

107. A fire alarm project's field technicians produced messy but accurate markup drawings. Closeout approaching. What should contractor do?

A. Submit messy markups as-is because they represent actual conditions

B. Create clean professional as-built drawings incorporating all field markup information

C. Submit original shop drawings since installation followed the design

D. Have technicians recreate from memory for cleaner documentation

108. Per NFPA 72, what minimum documentation must contractor deliver to building owner at closeout?

A. Only panel manufacturer's manual and warranty documents

B. Only as-built drawings and contractor's completion certificate

C. Complete bid documents, shop drawings, and quality worksheets

D. As-built drawings, Record of Completion, sequence of operations, and operating instructions

109. A fire alarm contractor schedules acceptance testing for a hospital. Infection control requires 48-hour notice before aerosol testing in patient areas. GC wants testing tomorrow. How should contractor proceed?

A. Provide 48-hour notice and coordinate patient testing per infection control requirements

B. Proceed tomorrow because fire code overrides hospital protocols

C. Test only non-patient areas tomorrow and skip patient areas

D. Use non-aerosol methods in patient areas without notice

110. A fire alarm project supervisor schedules acceptance testing. AHJ requires 10 business days' notice. GC demands testing in 5 days. How should supervisor respond?

A. Conduct testing in 5 days and submit for AHJ retroactive approval

B. Request AHJ waive notice period due to critical timeline

C. Maintain 10-day notice requirement and reschedule with proper notification

D. Perform preliminary test in 5 days and schedule formal test later

111. A fire alarm project manager discovers the HVAC contractor has not completed smoke control damper installation. The fire alarm acceptance test is scheduled in 10 days. Smoke control interface testing is a critical component. How should the manager handle this?

A. Proceed with testing all non-smoke-control interfaces and schedule follow-up for smoke control

B. Coordinate with GC to ensure HVAC contractor completes damper installation before the test date

C. Delay the entire acceptance test until all building systems are complete

D. Test the fire alarm panel's smoke control outputs using simulated loads at the control modules

112. A fire alarm contractor is managing a project where the building owner requests real-time cloud-based monitoring on a smartphone app. The owner wants to eliminate the central station contract. What should the contractor advise?

A. Cloud monitoring replaces central station and satisfies NFPA 72 requirements

B. Cloud monitoring must use the same manufacturer as the fire alarm panel

C. Cloud monitoring is prohibited by NFPA 72 because it creates unauthorized access

D. Cloud monitoring may supplement but does not replace the required supervising station connection

113. A fire alarm project supervisor discovers that a junior technician has been programming device location descriptors using non-standard abbreviations. Panel descriptors read "3N-C-SD" instead of "FLOOR 3 NORTH CORRIDOR SMOKE." What concern does this create?

A. Non-standard abbreviations may confuse firefighters and maintenance personnel who rely on clear descriptors

B. Abbreviated descriptors save panel memory and are the preferred method

C. The descriptors are acceptable if the contractor maintains an abbreviation key

D. Panel descriptors have no operational significance since responders use floor plans

114. A fire alarm contractor discovers during installation that the building's structural engineer has specified that no penetrations may be made in the post-tensioned concrete floor slabs. The fire alarm riser design requires multiple floor penetrations for conduit. How should the contractor resolve this?

A. Penetrate the slabs using specialized post-tension scanning equipment and careful coring

B. Route all riser conduit through the stairwell enclosures avoiding slab penetrations entirely

C. Request the structural engineer to identify allowable penetration zones within each slab

D. Notify the general contractor of the conflict and request coordination between the structural engineer and fire alarm designer

115. A fire alarm contractor completes installation. The building owner asks the contractor to certify that the system meets or exceeds all applicable code requirements. The system was designed and installed to code minimum. Should the contractor provide this certification?

A. No, the contractor should never certify compliance — only the AHJ can certify

B. Yes, the Record of Completion certifies the system was installed and tested per NFPA 72

C. No, because the system meets only code minimum and does not exceed requirements

D. Yes, but only with disclaimer language limiting the contractor's liability exposure

LEVEL III — SIMULATION EXAM 3: ANSWER KEY AND EXPLANATIONS

1. A — CI cable maintains its 2-hour fire rating independently regardless of surrounding construction, so Level 2 is preserved at the crossing. However, both paths sharing the same 50-foot corridor ceiling space — even in separate cable trays — creates a single point of failure where one fire could damage both paths simultaneously, compromising Class A pathway diversity.

2. C — Each power source calculates its own battery requirements based on the loads it directly serves. The main panel batteries serve only the panel/SLC, voice amplifier, network communication, NAC, and voice alarm loads. The remote power supply on Floor 10 has its own dedicated batteries and its own separate calculation based on its specific loads.

3. B — Adding 6 devices to SLC 1 reaches the absolute maximum of 198 with zero addresses remaining for future additions, replacements, or modifications. Any subsequent change — even replacing a single device requiring a new address — would require a new SLC loop. This zero-growth condition creates a rigid operational constraint.

4. D — Each room must have completely independent releasing circuit outputs on separate panel terminals. If two rooms share a releasing output terminal, energizing that output would discharge agent in both rooms simultaneously. Independent outputs ensure that only the room with confirmed cross-zone detection receives the release command.

5. A — Aspirating detection with sampling pipes concealed in architectural elements at multiple heights addresses both stratification and aesthetics. The pipes can be hidden in columns, moldings, and balcony trim while sampling air from different elevations. The detection unit is remotely located in a mechanical space, leaving no visible equipment in the atrium.

6. C — A 0.48-volt margin above the 16 VDC minimum is dangerously thin. Connection resistance increases with aging, conductor resistance increases with temperature, and any future device additions increase current draw. All three factors erode the margin over time, likely pushing end-of-circuit voltage below the minimum operating voltage.

7. B — Surgical suites require the most restrictive notification approach because audible alarms during active procedures can startle surgeons, disrupt concentration, and directly endanger patients on the operating table. Visible-only notification with staff acknowledgment at the nursing station addresses the concern while maintaining code-required notification.

8. D — When acoustically rated floor-to-ceiling partitions create twelve enclosed spaces, each is isolated from the others. Sound and light from notification appliances in one space cannot reach

occupants in adjacent enclosed spaces. Each possible configuration must have independent notification when partitions are deployed.

9. A — Dual-path IP/cellular provides redundancy with continuous monitoring on both paths. Each independently meets the 200-second failure detection per NFPA 72 Section 26.6.3.2. If one path fails, the other maintains monitoring without interruption — a level of redundancy single-path options cannot provide.

10. C — Different elevator banks may recall to different alternate floors based on their operational function. When the machine room detector activates, all banks must recall to alternate floors, but each bank's alternate can be selected based on where its passengers are best served during the emergency.

11. B — Aspirating detection with sampling pipes threaded through existing architectural cavities — crown moldings, column interiors, and millwork gaps — provides effective detection without visible surface-mounted equipment. The detection unit is in a concealed mechanical space, satisfying both code detection requirements and landmark preservation restrictions.

12. D — The generator room with 115 dB ambient noise presents the most impractical intelligibility challenge. Even maximum speaker output with acoustic treatment cannot overcome noise levels that extreme to deliver intelligible speech at 0.50 STI. Alternative notification means must address this limitation.

13. A — When different conductor sizes share the same conduit, pre-calculated Annex C tables cannot be used because they assume uniform sizes. The actual cross-sectional area of each conductor from NEC Chapter 9 Table 5 must be calculated and the total compared to the conduit's internal area using the 40% fill allowance.

14. C — NFPA 72 Section 23.10 requires the fire command center to have a permanently installed fire alarm control panel or a dedicated fire alarm repeater panel. A commercial tablet — even permanently wall-mounted — is a consumer device subject to software crashes, updates, and potential removal. The FCC requires permanent, dedicated fire alarm equipment.

15. B — Fire alarm monitoring of pump running status provides building-wide supervisory awareness that the pump is operating. While the controller tracks this internally, the fire alarm panel ensures building management, the monitoring station, and emergency responders are all informed for maintenance decisions and emergency operations.

16. D — Cubicle partitions at 5.5 feet are below the typical wall-mounted strobe mounting height of 80-96 inches above the floor. Since strobes are mounted above the partition height, the partitions do not obstruct strobe light output. The visible coverage calculation treats the space as an open room.

17. A — A double-interlock pre-action system requires BOTH fire detection AND a drop in supervisory air pressure before the valve opens. Neither condition alone is sufficient. If only

detection activates, the panel generates an alarm and transmits to the station, but the valve remains closed until both conditions are satisfied.

18. C — The building's approved fire safety plan determines the specific notification scope for defend-in-place facilities. Some plans notify only the alarm floor while others include adjacent floors. The strategy is a design decision documented in the fire safety plan and approved by the AHJ.

19. B — The pre-discharge countdown must provide adequate evacuation time based on the room's specific characteristics: physical dimensions, number and location of exits, maximum travel distance, and expected occupant count. These factors determine whether 25 seconds is sufficient — not a fixed code value.

20. D — Simultaneous evacuation of all 30 floors into the stairwells creates dangerous congestion that slows evacuation and can cause crush injuries at stairwell entrances. Defend-in-place notifies only affected floors, allowing controlled evacuation while remaining floors shelter safely in fire-rated compartments.

21. A — NFPA 72 Section 23.8.1.3 requires that if a second automatic alarm from a different zone occurs during the PAS investigation period, PAS must immediately cancel and general alarm notification must activate. A second zone activation provides independent confirmation of a genuine alarm condition.

22. C — NFPA 72 Section 17.14.8 specifically requires manual fire alarm stations to be red. This is the only fire alarm device type with a mandatory code-specified color requirement. Smoke detectors, horn/strobes, and speakers may be any color acceptable to the project specifications.

23. B — NFPA 72 Section 18.4.4.1 requires audible notification at 15 dB above ambient. Theater: 95 + 15 = 110 dB. Orchestra pit: 108 + 15 = 123 dB. Both levels are impractical to achieve with standard appliances. The design must compensate with enhanced visible notification.

24. D — Remote amplifier panels at intermediate floors shorten speaker circuit distances, directly addressing the root cause of line losses. Centralized amplifiers with 850-foot runs experience significant cumulative resistance losses. Distributing amplifiers with 350-foot maximum runs maintains consistent audio levels across all floors.

25. B — When the kitchen suppression system activates, the fire alarm panel must execute the full approved sequence: building notification, supervising station signal, and HVAC shutdown. A suppression activation confirms a fire condition requiring coordinated building-wide response.

26. A — The raised floor space used for air distribution is a plenum requiring FPLP cable. The overhead cable tray space with dedicated ducted return — not used for air handling — is not a plenum and accepts FPL as the minimum. Each space's cable requirement depends on its air-handling function.

27. C — Zone-specific waterflow notification directs occupants to evacuate only the area served by the activated riser while other building areas continue normal operations. This targeted response reduces unnecessary disruption and allows responders to focus on the specific affected area.

28. D — NFPA 72 Section 17.6.3.1.3 requires heat detectors rated at least 20°F above the maximum expected ceiling temperature. The loading dock maximum is 95°F, so the minimum activation temperature is 115°F (95 + 20 = 115). Any detector rated at or above 115°F satisfies the code minimum.

29. B — When the MRL drive area detector activates, smoke near the motor and controller at the top of the hoistway may travel down the shaft to the primary recall floor. Recalling elevators to a potentially smoke-contaminated floor endangers passengers. NFPA 72 Section 21.3 requires recall to an alternate floor.

30. A — When mass notification overrides fire alarm audible notification, the fire alarm signal must continue transmitting to the supervising station for fire department dispatch. The override affects only in-building audio — not external alarm communication.

31. C — When a supervised releasing circuit develops an open fault, the panel detects the loss of continuity and generates a trouble signal. This alerts building management that the releasing circuit cannot deliver the release signal to the valve solenoid until the circuit is repaired.

32. B — All three environments — swimming pool (humidity/chlorine), dry sauna (extreme temperature swings), and commercial bakery (flour dust/heat) — create conditions causing smoke detector nuisance alarms. Heat detection responds only to abnormal temperature increases unaffected by environmental contaminants.

33. D — ADA-accessible sleeping rooms require both a wall-mounted strobe meeting NFPA 72 room coverage and a supplemental alerting device effective for waking sleeping hearing-impaired occupants. A bed shaker or pillow-level strobe directly alerts a sleeping person who cannot hear alarms or see a wall strobe.

34. A — In a 70.7V audio system, impedance-matching transformers convert the high-voltage signal to each speaker's low impedance. Without transformers, parallel speakers present very low impedance directly to the amplifier, causing excessive current, distortion, and potential amplifier damage.

35. C — Beam detector spacing must not exceed the manufacturer's listed maximum for the specific ceiling height. At 46 feet, the listing establishes the allowable lateral distance based on tested performance. NFPA 72 requires compliance with the manufacturer's listing.

36. B — During Phase 2 construction above operational Phase 1, cutting, drilling, and finishing generate dust that can cause nuisance alarms on Phase 1 devices near the construction boundary. Phase 1 zones affected by construction must be bypassed with the monitoring station notified of the impairment.

37. C — Distributing 8 devices to SLC 1, 8 to SLC 2, and 24 to SLC 3 keeps all three loops below their maximum capacities while providing the best balance of remaining capacity across the system. This approach avoids maxing out any loop and preserves future flexibility on all three.

38. A — NFPA 72 Section 26.3.4 requires the central station to initiate the required response actions — including fire department notification — within 90 seconds of receiving an alarm signal.

39. C — NEC Article 700.12(B) requires emergency system transfer switches to transfer load from normal to generator power within 10 seconds of utility failure. This rapid transfer minimizes battery-only operation for fire alarm panels.

40. B — In-rack detectors at intermediate heights identify fires where they originate — among stored materials on shelves and pallets — before smoke travels the full 52 feet to ceiling detectors. Early detection at storage level provides significantly faster alarm response.

41. D — Cross-zone logic, countdown, abort switch, and releasing circuit supervision have all been verified. The remaining test is verifying the pre-discharge warning appliances in the protected space produce adequate audible and visual output for occupant evacuation.

42. A — Both high-reading detectors (above 3.7%) and low-reading detectors (below 0.5%) are outside the manufacturer's listed acceptable range. The 25 high-reading detectors require cleaning. The 7 low-reading detectors must be investigated. All 32 out-of-range detectors require corrective action.

43. C — The pre-recorded message plays on all 30 floors confirming amplifiers and speakers function. The live microphone reaching only Floors 1-14 indicates the audio routing is programmed to broadcast to a subset of zones. The programming must be verified against the approved design.

44. B — Bank A's selective recall tested correctly. When Bank D activated, both C and D recalled despite only Bank D's relay activating. The elevator controllers for Banks C and D share a common recall input wired in parallel — when Bank D's relay closes, both controllers receive the signal.

45. D — NFPA 72 Section 10.6.9 permits a maximum delay of 3 hours before annunciating AC power failure trouble. The 3-hour-15-minute delay exceeds this maximum by 15 minutes. The panel's timing must be corrected to ensure trouble appears within the 3-hour window.

46. A — A smoke detector covered with a latex glove for nine weeks has been effectively disabled. The glove prevents smoke from entering the sensing chamber, leaving the corridor without detection coverage. This is a significant impairment requiring immediate correction.

47. C — A double-interlock pre-action system requires both fire detection AND a supervisory air pressure drop before the valve opens. Neither condition alone is sufficient. The valve correctly remained closed because only the detection interlock was satisfied.

48. A — Three functions were verified: the IP path transmitted successfully, the panel detected IP failure within 200 seconds (meeting NFPA 72 supervision timing), and the cellular backup

transmitted successfully when the primary was unavailable. Both paths and timing function correctly.

49. D — Eleven months of historical event data has been permanently lost due to the log overwriting entries. This impairs troubleshooting, incident investigation, and maintenance compliance documentation. The log must be downloaded and cleared to restore full capacity.

50. B — Seven adjacent detectors with significantly longer activation times (28-42 seconds versus 3-7 seconds) compared to identical detectors on the same floor strongly suggests contaminated sensing chambers. The detectors should be cleaned and retested.

51. A — A gradual voltage decline from 26.8 to 25.6 VDC over 15 minutes of standby — a 1.2-volt drop — is normal for batteries under standby load. The voltage remains well above the minimum threshold. The charger activating after AC restoration confirms a successful test.

52. C — Any unauthorized modification to a smoke detector — including homemade covers with holes — renders the detector non-compliant with its listing. The container alters the sensing chamber's aerodynamic characteristics. Only manufacturer-approved covers are acceptable.

53. D — NFPA 72 Table 14.4.3.2 requires releasing device circuits to be functionally tested annually as part of the comprehensive releasing system test. This includes cross-zone logic, countdown timers, abort switches, releasing circuit supervision, and pre-discharge notification.

54. B — Circuit voltage at the speaker reads 70.0 VAC — within the normal range for a 70.7V system. Reduced volume from one speaker while others are normal and voltage is adequate indicates the speaker's internal wattage tap is set to a lower power level.

55. A — NFPA 72 Section 18.5.5.5.7 requires all visible notification appliances within the same field of view to flash in synchronization. Two strobes visible from the same corridor location must be synchronized regardless of circuit assignment. The 0.5-second offset violates this requirement.

56. D — NFPA 72 Section 17.14.8 requires manual fire alarm stations to be red. Painting pull stations orange violates this requirement. Paint covering instruction labels renders devices unusable by occupants. The painted stations must be replaced.

57. C — The batteries ended at 18.8 VDC — below the manufacturer's 20.4 VDC minimum end-voltage. Panel components may malfunction at this voltage during an actual alarm event. The batteries cannot sustain the required load and must be replaced.

58. B — The duct detector activated, the panel processed the alarm, and the control module relay closed. The AHU did not shut down despite relay closure. The fault is downstream — in the wiring between the relay contacts and the AHU controller's shutdown input.

59. A — Four renovations adding 75 devices and modifying the sequence three times over eight years represent major changes. NFPA 72 Section 7.8 requires the Record of Completion to reflect the

current configuration. An eight-year-old document describing a substantially different system must be updated.

60. D — One hundred eighty nuisance waterflow alarms over six months with no fires indicates water pressure surges causing brief paddle movements. The corrective approach should address both the root cause (investigating surges) and the switch response (adjusting retard delay within the 90-second maximum).

61. C — The detector behind the new wall is in a concealed space separated from the occupied corridor. Smoke from a corridor fire may not reach the concealed detector in time. The detector must be relocated to the occupied side, and the concealed space should be evaluated.

62. B — NFPA 72 requires tamper switches to generate a supervisory signal within two revolutions of the valve wheel from fully open. The switch activated at exactly two revolutions, meeting the code requirement. The tamper switch passes the functional test.

63. A — NFPA 72 Section 18.5.5.5.3 requires visible notification appliances to flash between 1 and 2 flashes per second. At 0.8 flashes per second, the strobe is below the minimum required rate. The device must be investigated and repaired or replaced.

64. D — When a tamper switch activation generates an alarm instead of supervisory, the input is programmed as an alarm zone rather than supervisory. The panel programming must be corrected to classify the input as supervisory for valve position changes.

65. C — Sixty days without communication redundancy means the system operates with a single path. If the cellular also fails, the building has no monitoring. This is a significant impairment requiring prompt corrective action with documentation for the building owner and AHJ.

66. B — A shelf completely blocking both the horn opening and strobe lens eliminates both audible and visible notification output. The shelf must be removed and building management informed that notification appliances must remain unobstructed.

67. A — The batteries ended at 19.4 VDC — below the manufacturer's 20.4 VDC minimum end-voltage. Panel components may malfunction at this voltage. The batteries cannot sustain the required load and must be replaced.

68. D — A smoke detector at 28 inches above the floor is completely ineffective for fire detection. Smoke rises to the ceiling and accumulates there first. A desk-level detector will not sense smoke until the room is heavily filled. The detector must be reinstalled at the ceiling.

69. C — NFPA 72 Table 14.4.3.2 requires supervisory devices including tamper switches to be functionally tested annually as part of the comprehensive system functional test.

70. B — Burned-out LEDs at the fire command center graphic annunciator prevent firefighters from identifying active alarms in those zones. This impairs emergency response by eliminating visual alarm identification. All non-functioning LEDs must be repaired.

71. D — NFPA 72 Table 14.4.3.2 requires releasing device circuits to be functionally tested annually as part of the comprehensive releasing system test.

72. A — Storage of paint, chemicals, and boxes combined with only 19 inches of working clearance violates NEC Article 110.26. The minimum clearance is typically 30 inches wide and 36 inches deep. All storage must be removed and required space maintained.

73. C — NFPA 72 Table 14.4.3.2 requires smoke detectors to be functionally tested semiannually using approved aerosol smoke or a calibrated test source.

74. B — Floor 6 requiring more force (positive pressure) while Floor 18 opens normally (no pressure) indicates inconsistent pressurization. A duct, damper, or balancing issue prevents adequate air distribution to upper floors. Both observations should be documented for mechanical investigation.

75. D — A 108-minute discrepancy between the panel clock and actual time significantly affects event log accuracy. Timestamps nearly two hours off create confusion when correlating events with security footage, dispatch records, and other building logs. The clock must be corrected immediately.

76. A — The panel processed the alarm and 17 of 19 locks released correctly. The two non-releasing locks indicate a fault specific to those devices. The control module outputs, interface wiring, and power supply to those specific locks must be investigated.

77. C — NFPA 72 requires waterflow alarm signals at the panel within 90 seconds of sustained flow. The alarm appeared at 89 seconds, within the 90-second maximum. The waterflow switch passes the functional test.

78. B — A sensitivity reading of 0.3% falls below the manufacturer's minimum acceptable range of 0.5%. The detector is operating outside its listed parameters and may produce nuisance alarms or indicate a sensor fault. The detector must be investigated and corrected.

79. D — R = 1,000 × (3.14/1000) = 3.14 Ω. V_drop = 2.5 × 3.14 = 7.85V. End voltage = 24 − 7.85 = 16.15 VDC. While technically above the 16 VDC minimum, the 0.15-volt margin is dangerously thin. Connection aging or any system change could push voltage below minimum. Redesign is strongly recommended.

80. A — Standby = (0.85 + 1.15) × 4 = 8.0 Ah. Alarm = (4.5 + 9.0) × 0.25 = 3.375 Ah. Subtotal = 11.375 Ah. With 20% safety factor: 11.375 × 1.20 = 13.65 Ah, approximately 13.7 Ah. The generator reduces standby to 4 hours. Voice evacuation requires 15-minute alarm duration.

81. C — Even when duct detectors are configured for HVAC shutdown only without building notification, the detection signal should still transmit to the supervising station. This ensures building management and the monitoring service are aware of the event for investigation.

82. B — When different conductor sizes share the same conduit, pre-calculated Annex C tables cannot be used. The actual cross-sectional area of each conductor from NEC Chapter 9 Table 5 must be calculated and the total compared to the conduit's 40% fill limit.

83. D — A detector at the 90-degree corridor turn ensures detection at the direction change where coverage from detectors in either leg may be limited. Smoke traveling along one leg may not effectively reach detectors beyond the turn. The corner detector catches smoke at the intersection.

84. A — SLC 1 at 193 of 198 has only 5 remaining addresses. Adding 5 reaches maximum with zero flexibility and 11 more still need a new loop. Placing all 16 on a new SLC preserves SLC 1's remaining capacity and provides substantial expansion room.

85. C — Each remote NAC power supply panel has its own batteries sustaining the loads it serves during AC failure. A separate battery calculation using each panel's specific standby and alarm currents must be performed applying the same NFPA 72 duration and safety factor.

86. B — NFPA 72 Section 7.8.2 requires the Record of Completion to include system specifications, circuit information, device counts by type, power supply data, communication details, test results, and signatures from installer, designer, and AHJ.

87. D — Project specifications are contractual documents the contractor must follow. Even though NEC does not require conduit in non-plenum spaces, the specification is a binding obligation. Deviating without formal approval exposes the contractor to liability.

88. A — The speaker circuit delivers 60.2 VAC at the farthest speaker, exceeding the manufacturer's minimum of 55 VAC by 5.2 volts. The speakers operate within their listed parameters at this voltage, producing acceptable audio quality.

89. C — The pre-discharge time delay must provide adequate evacuation time based on the room's specific characteristics: physical size, exit count and locations, maximum travel distance, and expected occupant count. These factors determine adequacy.

90. B — Three different device counts across three documents indicate modifications were not consistently documented. All three must be verified against a physical field count and reconciled to reflect the same accurate, verified number.

91. D — Eight detectors at positions 10, 40, 70, 100, 130, 160, 190, 220 provide 30-foot inter-detector spacing. The first detector is 10 feet from one end (within 15 feet) and the last is 10 feet from the 230-foot far end (within 15 feet). Both end distances comply with NFPA 72.

92. B — Using Class A for upper floors (5-24) provides enhanced fault tolerance where it benefits most — longer egress distances, more difficult firefighter access, and greater vulnerability during extended evacuation. The designer's risk assessment determined lower floors can accept Class B.

93. A — Horn/strobes: 10 × 0.305 = 3.05A. Speakers: 8 × 0.145 = 1.16A. Strobes: 6 × 0.190 = 1.14A. Total = 5.35 amps, which significantly exceeds the 3.0-amp NAC output rating. The circuit must be redesigned across multiple outputs.

94. C — NFPA 72 Section 12.4.4 defines pathway survivability Level 2 as requiring either 2-hour fire-rated cable (CI cable) or installation within 2-hour fire-rated construction. Standard cable in standard conduit and FPLR in 1-hour enclosures do not satisfy Level 2.

95. B — The specification requires 10 business days' advance notice to the AHJ before acceptance testing. This is a regulatory and contractual obligation that cannot be waived by construction schedule pressure. The contractor must maintain the requirement and reschedule.

96. D — Two 60 cd wall-mounted strobes on opposite 50-foot walls divide the room into two coverage zones. Each strobe covers its portion from its wall position. With two strobes, each covers approximately half the room — well within the single-strobe 45 × 45 foot capability.

97. A — The as-built drawings show 155 devices but 164 are physically installed and confirmed by programming. NFPA 72 requires as-built drawings to reflect the current configuration. The drawings must be updated to show all 164 devices.

98. C — The calculated minimum is 17.24 Ah. The specified 18 Ah batteries exceed this minimum by 0.76 Ah, providing adequate capacity. Select the next available standard battery size at or above the calculated minimum for compliance.

99. B — Hospitals using defend-in-place may have differentiated fire alarm responses for different alarm types per the approved fire safety plan. Pull stations triggering building-wide notification while smoke detectors trigger floor-only notification is valid when documented and accepted by the AHJ.

100. D — As-built drawings for the dedicated branch circuit should capture the conduit type, size, and routing path from the electrical panel to the fire alarm panel. This information is essential for future maintenance, troubleshooting, and modifications.

101. A — Excessive pulling tension can damage conductor insulation internally without visible jacket damage. Megger testing all 18 runs verifies insulation integrity and catches latent damage before devices are connected. Visual inspection alone cannot detect internal failure.

102. C — Emergency control function interfaces require respective trade contractors to be present. The elevator contractor verifies recall, the HVAC contractor verifies shutdown and smoke control, the controls contractor verifies automation, and the door hardware contractor verifies holder release.

103. B — Converting from horn/strobe to voice evacuation is a fundamental design change requiring amplifiers, speaker circuits, intelligibility analysis, and panel reconfiguration. A formal change order must document the engineering revision, cost, and schedule extension before work proceeds.

104. D — The fire alarm contractor should not modify the electrical contractor's work directly. The general contractor coordinates all trades and should be notified so they can direct the electrical contractor to replace the non-compliant breaker with a standard breaker and lock-on device.

105. A — Different date codes within the same detector model indicate different production runs. As long as all 450 are the same model and listed as compatible with the panel, date code variations do not affect compatibility, communication, or detection performance.

106. C — Every service activity must be documented in a written service report regardless of scope. Even a wire nut tightening resolves a trouble condition that should be recorded for maintenance history, compliance, and building owner records.

107. B — Field markups contain actual as-installed information. The contractor must create clean, professional as-built drawings accurately incorporating all field data. Submitting messy markups, originals, or memory-based recreations fails to provide accurate, legible documentation.

108. D — NFPA 72 Section 7.7 requires the contractor to deliver as-built drawings, the completed Record of Completion, the approved sequence of operations, and operating and maintenance instructions. These four documents constitute the minimum closeout package.

109. A — Hospital infection control requirements for 48-hour notice must be respected. The contractor should provide the required notice and coordinate patient care testing with both the general contractor and hospital. Patient safety protocols cannot be overridden by construction schedules.

110. C — The AHJ's 10-business-day notice requirement is a regulatory obligation that cannot be waived by construction deadlines. Testing without proper notice may be invalidated, requiring a complete retest. The supervisor must maintain the requirement and reschedule.

111. B — The fire alarm acceptance test requires verification of all emergency control function interfaces including smoke control. The project manager should coordinate with the GC to ensure the HVAC contractor completes damper installation before the test so all interfaces can be tested together.

112. D — Cloud-based monitoring dashboards may provide supplemental notifications to building owners but do not satisfy NFPA 72 supervising station requirements. The code-required connection to a listed central, remote, or proprietary station must remain regardless of supplemental monitoring.

113. A — Non-standard abbreviations in panel location descriptors may confuse firefighters, maintenance technicians, and monitoring operators who rely on clear descriptors to identify locations. Standard naming ensures anyone interacting with the panel can immediately understand alarm locations.

114. D — Post-tensioned concrete slabs require specialized engineering assessment before any penetrations. The fire alarm contractor should notify the general contractor of the conflict and

request coordination between the structural engineer and fire alarm designer to identify either allowable penetration zones or alternative routing solutions.

115. B — The Record of Completion is the appropriate document certifying that the system was installed and tested in accordance with NFPA 72. It accurately represents the system's compliance status without making claims about performance beyond the code requirements.