LEVEL II — SIMULATION EXAM 10 (110 QUESTIONS)

Time Limit: 155 Minutes

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

DOMAIN 2.1 — INSTALLATION (Questions 1–40)

1. A fire alarm technician is reviewing a design for a 35-story mixed-use high-rise with voice evacuation. The specification requires pathway survivability Level 2 on all voice circuits. The engineer proposes using 2-hour circuit integrity (CI) cable for all speaker riser circuits and 2-hour CI cable for all horizontal floor-level speaker runs. Both outgoing and return SLC paths also use CI cable but share a common ceiling space at Floor 18 where they cross from the east riser to west riser. What is the Level 2 status at this Floor 18 crossing?

A. Both paths maintain Level 2 because CI cable provides its 2-hour rating independent of surrounding construction

B. Level 2 is lost at the crossing because CI cable requires fire-rated construction around it to maintain the rating

C. Only the outgoing path maintains Level 2 — the return path loses protection at the crossing

D. Level 2 is maintained only if the ceiling space at Floor 18 has sprinkler protection for Level 1 backup

2. A fire alarm technician is installing a fire alarm system in a building with a qualifying emergency generator. Voice evacuation loads: panel/SLC standby = 0.92A, voice amplifier standby = 1.08A, NAC alarm = 4.0A, voice alarm = 8.0A. Using 4-hour standby, 15-minute voice alarm, and 20% safety factor, what is the minimum battery capacity?

A. 10.60 Ah using 4-hour standby and 15-minute alarm without the 20% safety factor

B. 15.36 Ah using 4-hour standby with standard 5-minute alarm instead of 15-minute

C. Approximately 12.96 Ah after applying 4-hour standby, 15-minute alarm, and 20% safety factor

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

3. A fire alarm technician is installing a releasing fire alarm system for a clean agent suppression system in a data center. Two separate server rooms share a common hallway. Each room has independent cross-zone detection, agent storage, and nozzles. During commissioning, cross-zone activation in Room 1 correctly initiates agent discharge in Room 1. However, Room 2's agent also begins discharging simultaneously. What is the most likely cause?

A. The cross-zone detection in Room 1 shares a common zone with Room 2's detection circuit

B. Both rooms' releasing circuits are connected to the same releasing panel output terminal

C. Room 2's agent storage valves are pneumatically cross-connected to Room 1's pilot line

D. The fire alarm panel's releasing program links both rooms to the same cross-zone verification

4. A fire alarm technician is installing a fire alarm system with dual communication — primary IP and secondary cellular. During commissioning, the technician disconnects the IP cable. After 175 seconds, the panel generates "IP COMMUNICATION FAILURE." Per NFPA 72 Section 26.6.3.2, the maximum detection time for continuous monitoring technology is 200 seconds. Does this pass?

A. No, IP technology must detect failure within 60 seconds per the continuous monitoring standard

B. No, the 200-second limit applies only to cellular technology and not to IP communicators

C. Yes, but only during commissioning — the timer must be reduced for normal service

D. Yes, 175 seconds is within the 200-second maximum for continuous monitoring technologies

5. A fire alarm technician is installing a fire alarm system in a hospital. The approved fire safety plan specifies positive alarm sequence (PAS). During commissioning, the technician activates a smoke detector. The 180-second investigation period begins. At 45 seconds, a manual pull station on a different floor is activated. Per NFPA 72, what must happen?

A. The pull station activation is queued until the PAS investigation period completes

B. PAS continues because the pull station is on a different floor from the originating detector

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

D. The 180-second period restarts using the pull station as the new reference event

6. A fire alarm technician is installing smoke detectors for elevator recall in a building with five elevator banks. Each bank has a dedicated lobby smoke detector. The design requires selective recall. During commissioning, the technician activates Bank E's lobby detector. Banks D and E both recall. The technician checks control modules — only Bank E's relay activated. What is the most likely cause?

A. The elevator controllers for Banks D and E share a common recall input circuit wired in parallel

B. The panel programming for Bank E's zone activates both Bank D and Bank E recall outputs

C. Bank E's smoke detector is generating a building-wide alarm code affecting all elevator banks

D. The SLC communication is broadcasting the recall command to both Bank D and E modules

7. A fire alarm technician is installing a fire alarm system in a 20-story building with voice evacuation using 70.7V audio distribution. The amplifiers are centrally located on Floor 1. The longest speaker circuit is 720 feet. During testing, speakers on Floor 20 produce significantly lower volume than Floor 2 speakers. The engineer proposes increasing the amplifier output. What is the more effective long-term solution?

A. Upgrade the speaker wire gauge throughout the building to reduce circuit resistance losses

B. Increase the amplifier output as proposed since it directly compensates for the volume deficit

C. Replace upper-floor speakers with higher-sensitivity models requiring less input power

D. Install remote amplifier panels at intermediate floors to shorten circuit lengths and reduce losses

8. A fire alarm technician is installing a fire alarm system with a DACT connected to two copper telephone lines. Per NFPA 72, the DACT must test each line at maximum 24-hour intervals. During the test, the DACT completes a full handshake with the supervising station receiver on Line 1. On Line 2, the DACT obtains dial tone and dials the station number but receives no answer. What does this indicate?

A. Line 2 is functional because obtaining dial tone confirms the line can carry signals

B. Line 2 cannot complete the end-to-end path to the station receiver and must be investigated

C. The station receiver may be temporarily offline and Line 2 should be retested in 4 hours

D. Line 2 passed because the DACT successfully seized the line and initiated the call

9. A fire alarm technician is installing a fire alarm system in a convention center with a main ballroom that divides into six enclosed event spaces using acoustically rated movable partitions. Each space has a separate entrance when partitions are deployed. What notification design principle applies?

A. Only the fully open configuration requires notification design consideration

B. A single high-output central device covers all six partition configurations adequately

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

D. Only alternating spaces require independent notification because adjacent spaces share coverage

10. A fire alarm technician is installing a fire alarm system in a data center. The raised floor distributes cold air (plenum). The overhead cable tray space has dedicated ducted HVAC return and is not used for air handling. What cable type is required for fire alarm circuits in the overhead non-plenum space?

A. FPL minimum because the overhead space is not classified as a plenum

B. FPLP because all concealed data center spaces are classified as plenums

C. FPLR because the overhead cable tray creates a riser-type installation

D. Any fire alarm cable in metallic conduit satisfies the requirement regardless of rating

11. A fire alarm technician is installing a fire alarm system in a building with three sprinkler risers. Each riser has a waterflow switch and a tamper switch. The design places each waterflow and each tamper on individual zones — six total zones. During commissioning, the technician activates Riser 2's tamper switch. The panel generates an alarm signal instead of a supervisory signal. What is the most likely cause?

A. The tamper switch requires a different EOLR value than alarm circuits on the panel

B. Tamper switches always generate alarm signals per NFPA 72 Section 10.18

C. The tamper switch wiring polarity is reversed at the panel input terminals

D. The tamper switch input is programmed as an alarm zone rather than a supervisory zone

12. A fire alarm technician is installing elevator recall smoke detectors. The building has 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 response is required?

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

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

C. Immediate power shunt trip disconnecting elevator power before any recall initiates

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

13. A fire alarm technician is installing a mass notification system integrated with the fire alarm system. The emergency plan establishes that mass notification may override fire alarm audio during specific scenarios. When this override occurs, what fire alarm function must continue?

A. Fire alarm visual notification must continue during the audio override event

B. The fire alarm panel must generate a trouble signal for the override duration

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

D. The fire alarm panel must transfer all output control to the mass notification controller

14. A fire alarm technician is installing a fire alarm system in a building with a fire command center on Floor 1 and the fire alarm panel in the electrical room on Floor B2. Per NFPA 72 Section 23.10, what must be at the fire command center?

A. A complete repeater panel with full status display and operator control capability

B. A simplified LED annunciator showing alarm and trouble zone indicators

C. A networked workstation running the manufacturer's proprietary software

D. A dedicated telephone line connecting the FCC to the panel in the basement

15. A fire alarm technician is installing a fire alarm system in a building with a fire pump controller. The controller has contacts for pump running, power available, phase reversal, and controller trouble. Per NFPA 72 Section 10.18, all four must be monitored by the fire alarm panel. How should the "phase reversal" contact be classified?

A. As an alarm signal because phase reversal can prevent the pump from delivering water

B. As a trouble signal because phase reversal affects the panel's power supply

C. Phase reversal monitoring is optional and may be excluded from the fire alarm interface

D. As a supervisory signal because it is an off-normal equipment condition requiring investigation

16. A fire alarm technician is installing a fire alarm system in a nursing home using defend-in-place. When a smoke detector activates on a resident floor, notification activates only on the alarm floor. The facility administrator asks why the entire building is not notified. What is the primary rationale?

A. Full building notification is required only for nursing homes exceeding 150 beds

B. Limiting notification prevents unnecessary relocation of mobility-impaired residents on unaffected floors

C. Building codes prohibit full notification in nursing homes during overnight hours

D. Full notification causes panic that poses greater risk than the fire itself

17. A fire alarm technician is installing a fire alarm system where the architect specifies white devices throughout. Per NFPA 72 Section 17.14.8, which device type must remain red?

A. Horn/strobe devices must be red for emergency identification per NFPA 72

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

C. Manual fire alarm stations must be red per the code requirement

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

18. A fire alarm technician is installing a fire alarm system where specifications require pathway survivability Level 2 on all voice circuits. Riser circuits use CI cable. Horizontal floor-level speaker runs use standard FPLP in standard EMT. Does the horizontal run meet Level 2?

A. No, standard FPLP in standard EMT does not meet Level 2 — CI cable or 2-hour construction is required

B. Yes, EMT conduit provides fire protection equivalent to 2-hour construction

C. Yes, horizontal runs under 100 feet are exempt from pathway survivability

D. No, but Level 1 sprinkler protection substitutes for Level 2 on horizontal runs

19. A fire alarm technician is installing a releasing fire alarm system for a clean agent system in an occupied telecommunications room. The design includes cross-zone detection, a 20-second pre-discharge countdown, and an abort switch. A safety officer questions whether 20 seconds is adequate. What determines the answer?

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

B. The agent manufacturer determines the delay based on discharge concentration rate

C. The fire department determines the delay based on their estimated response time

D. The room size, exit locations, travel distance, and expected occupant count determine adequacy

20. A fire alarm technician is installing a fire alarm system with a pre-action sprinkler system using single-interlock configuration. During commissioning, the technician activates a smoke detector. The solenoid energizes and the valve opens. Water fills the piping but no sprinkler heads discharge. Is this correct?

A. No, the valve should remain closed until a sprinkler head fuses confirming fire

B. Yes, single-interlock opens the valve on detection — discharge requires head activation

C. No, the detection should only prime the pilot line without opening the main valve

D. Yes, but the valve should close automatically after 90 seconds if no heads activate

21. A fire alarm technician is installing a fire alarm system with a graphic annunciator at the building entrance. During commissioning, activating Zone 10 illuminates Zone 3's LED while Zone 10's LED stays dark. Panel output data is correct. What is the most likely cause?

A. The SLC devices on Zone 10 have address conflicts with Zone 3 devices in the panel

B. The panel's communication port sends Zone 10 data with Zone 3's identifier code

C. The annunciator's internal LED driver board has Zones 10 and 3 cross-connected

D. Zone 3's LED has a parallel short that energizes whenever any adjacent zone alarms

22. A fire alarm technician is installing voice evacuation using 70.7V audio distribution. Two speakers on Floor 14 have been wired in parallel without impedance-matching transformers. What is the primary risk?

A. The low impedance load without transformers can cause amplifier distortion, overheating, and damage

B. The speakers will produce no audio because 70.7V requires transformers for any output

C. The speakers will produce audio at double volume causing evacuation message distortion

D. The parallel wiring creates a supervision gap that prevents the panel from detecting faults

23. A fire alarm technician is installing a fire alarm system with a central station monitoring connection. Per NFPA 72 Section 26.3.4, what is the maximum time for the central station to initiate the required response after receiving an alarm signal?

A. 60 seconds from receipt to acknowledgment of the alarm at the console

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

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

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

24. A fire alarm technician is installing a fire alarm system in a building with an emergency generator. Per NEC Article 700, what is the maximum transfer time for the automatic transfer switch?

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

B. 30 seconds as the standard for all emergency loads except fire alarm

C. 60 seconds with panel batteries bridging the extended transfer

D. 120 seconds because fire alarm panels have battery backup for the transition

25. A fire alarm technician is installing a fire alarm system in a warehouse with 50-foot ceilings and high-bay racks to within 4 feet of the ceiling. The design includes ceiling beam detection and in-rack detection at 17-foot and 34-foot elevations. What is the purpose of in-rack detection?

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

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

C. In-rack detectors identify fires at storage levels before smoke reaches the 50-foot ceiling

D. NFPA 72 mandates in-rack detection for all rack configurations above 30 feet

26. A fire alarm technician is installing a fire alarm system in a building with a swimming pool, a steam room, and a paint spray booth. Each space produces environmental conditions incompatible with smoke detectors. What detection technology is most appropriate for all three?

A. Aspirating detection with sampling units mounted outside each space

B. Heat detection because all three environments cause smoke detector nuisance alarms or degradation

C. Multi-criteria detectors with advanced particle discrimination algorithms

D. Flame detection because combustible materials produce visible flame first

27. A fire alarm technician is installing a fire alarm system in a cold storage distribution center. The main freezer is at -22°F. Loading docks fluctuate between 5°F and 90°F. Offices are at 72°F. Heat detectors are specified for the freezer and docks. What minimum activation temperature is required for the loading dock?

A. 90°F to provide immediate response to any temperature above normal maximum

B. 135°F because it is the universal standard commercial heat detector rating

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

D. At least 110°F to maintain the required 20°F margin above the 90°F maximum ambient

28. A fire alarm technician is installing a fire alarm system in a convention center exhibit hall measuring 360 × 240 feet with 46-foot ceilings. Projected beam detectors span the 360-foot dimension with beams spaced at 50-foot intervals across the 240-foot dimension. What must the technician verify?

A. That the 50-foot spacing does not exceed the manufacturer's listed maximum for the 46-foot ceiling height

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

C. That the spacing matches the fire sprinkler spacing for consistent coverage

D. That the 50-foot spacing does not exceed the 30-foot standard spot detector spacing

29. A fire alarm technician is installing a fire alarm system with a voice evacuation system. Remote amplifier panels are specified on Floors 8 and 16 of a 24-story building. Each remote panel has its own batteries. What must be calculated independently for each?

A. A voltage drop calculation from the main panel to each remote panel location

B. A combined battery calculation averaging loads across both remote panels

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

D. An SLC loading calculation for devices connected through each remote panel

30. A fire alarm technician is installing a fire alarm system where the sequence of operations shows a kitchen hood suppression activation triggers building notification, supervising station signal, and HVAC shutdown. The fire alarm monitors the suppression through a monitor module. During commissioning, the technician simulates activation. The panel generates an alarm. What must happen next?

A. Only 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 additional response because suppression operates independently

31. A fire alarm technician is installing a fire alarm system in a hospital where defend-in-place is the strategy. A smoke detector alarm on a patient floor activates notification on the alarm floor only. The hospital's chief nursing officer asks whether the floor above should also be notified. What determines the answer?

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

B. The fire department determines the scope during each individual alarm event

C. Only the alarm floor receives notification in all hospital defend-in-place implementations

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

32. A fire alarm technician is installing a fire alarm system with a releasing circuit for a pre-action sprinkler system. Per NFPA 72, the circuit must be supervised. During commissioning, the technician opens the circuit. The panel generates a trouble signal. What has been verified?

A. That the releasing circuit can deliver adequate voltage to energize the solenoid

B. That the pre-action valve solenoid is operational and will respond to commands

C. That the panel actively monitors the releasing circuit and detects loss of continuity

D. That cross-zone logic prevents false release during circuit fault conditions

33. A fire alarm technician is installing a fire alarm system with dual communication — IP primary, cellular secondary. Per NFPA 72, IP with continuous monitoring must detect failure within 200 seconds. During commissioning, the technician disconnects IP. The panel generates trouble after 208 seconds. Does this pass?

A. No, 208 seconds exceeds the 200-second maximum and must be corrected

B. Yes, the 200-second limit has a 5% built-in tolerance for measurement variation

C. Yes, commissioning mode extends supervision timers by 10 seconds

D. No, but a firmware update can correct the timing to meet the requirement

34. A fire alarm technician is installing an ERCES per NFPA 72 Section 24.12. The system uses a bidirectional amplifier with distributed antennas. What conditions must the fire alarm system monitor?

A. Only power failure because antenna and amplifier faults are handled by the ERCES internally

B. Only amplifier malfunctions because they directly impact radio communication quality

C. Only antenna faults because they affect coverage area and signal distribution

D. Power failure, antenna faults, and amplifier malfunctions as supervisory signals

35. A fire alarm technician is installing ADA-accessible hotel guest room notification. The room is 14 × 16 feet with a 9-foot ceiling. Per NFPA 72 and ADA, what notification must be provided?

A. Only a ceiling-mounted strobe at 177 cd positioned directly above the bed location

B. A wall-mounted strobe meeting NFPA 72 plus a supplemental device for waking sleeping hearing-impaired occupants

C. Only a wall-mounted strobe at the standard candela for the room dimensions

D. A wall-mounted strobe plus a low-frequency 520 Hz audible generator near the bed

36. A fire alarm technician is installing a fire alarm system with a voice evacuation system using 70.7V distribution. The longest speaker circuit is 680 feet. During testing, the technician measures 62.0 VAC at the farthest speaker. The speakers are rated for minimum 55 VAC. Is this acceptable?

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

B. No, the voltage drop indicates the amplifier output is insufficient for the circuit

C. Yes, 62.0 VAC exceeds the 55 VAC minimum with a 7.0-volt margin

D. Yes, but speakers should be replaced with higher-sensitivity models for better output

37. A fire alarm technician is installing a fire alarm system with networked panels across a campus. Building A has the master panel. Building C has a network node. The underground conduit between A and C runs through a low drainage area. During heavy storms, communication drops intermittently between A and C only. What is the most likely cause?

A. Rainwater infiltration into the A-to-C conduit segment compromising cable insulation

B. Ground potential differences between Buildings A and C increasing during storms

C. The storm's electromagnetic field specifically interfering with the A-to-C cable path

D. Lightning-induced voltage surges corrupting the digital signal on the A-to-C cable

38. A fire alarm technician is installing a fire alarm system where specifications require all cable above suspended ceilings to be in conduit. The ceiling spaces are non-plenum with ducted return. NEC does not require conduit for listed fire alarm cable in non-plenum spaces. What should the technician do?

A. Ignore the specification and install per minimum NEC requirements to reduce costs

B. Notify the engineer that the specification exceeds code but do not install conduit

C. Request the AHJ to override the specification to minimize installation costs

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

39. A fire alarm technician is installing a fire alarm system with a fire command center per NFPA 72 Section 23.10. The building engineer asks whether a tablet computer permanently docked at the FCC can serve as the panel repeater. What is the answer?

A. Yes, if the tablet displays full system status with alarm, trouble, and supervisory data

B. No, the FCC requires a permanently installed fire alarm panel or dedicated repeater — not a portable device

C. Yes, but only if the tablet remains permanently docked and connected at all times

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

40. The loop has: 145 smoke detectors at 0.28 mA, 25 monitor modules at 0.22 mA, 16 control modules at 3.5 mA, 6 relay modules at 2.4 mA, and 12 isolator modules at 0.12 mA each. The panel's SLC maximum is 140 mA. What is the total loading?

A. 40.60 mA from the smoke detectors alone without any module contributions

B. 148.00 mA exceeding the 140 mA capacity and requiring a second SLC loop

C. Approximately 118 mA which is within the 140 mA capacity but approaching the limit

D. 95.00 mA providing generous margin below the 140 mA maximum

DOMAIN 2.2 — MAINTENANCE AND INSPECTION (Questions 41–78)

41. A fire alarm technician is performing annual testing on a releasing fire alarm system. The solenoid is disconnected and a substitute load installed. The technician tests cross-zone logic — Zone A alone gives "FIRST ALARM," Zone B alone gives "FIRST ALARM," both together give "CROSS-ZONE VERIFIED" and the countdown starts. The abort switch pauses the countdown when pressed. The technician then opens the releasing circuit and the panel generates a trouble. What additional test still remains?

A. The pre-discharge audible and visual warning appliances must be verified for adequate output in the protected space

B. The releasing solenoid must be reconnected to verify physical agent discharge capability

C. The cross-zone logic must be retested with zones activated in the opposite sequence

D. The substitute load must be tested with a calibrated meter to verify delivered voltage

42. A fire alarm technician tests the voice evacuation live microphone from the fire command center. Audio is heard on Floors 1-12 but not on Floors 13-22. The pre-recorded evacuation message plays correctly on all 22 floors. What is the most likely cause?

A. The amplifiers serving Floors 13-22 have a fault blocking live audio but passing recorded

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

C. The speaker circuits on Floors 13-22 have frequency-dependent impedance issues

D. The live microphone routing is programmed to broadcast only to Floors 1-12

43. A fire alarm technician tests elevator recall. Three banks with selective recall. Activating Bank A's lobby detector: only Bank A recalls. Activating Bank C's lobby detector: Banks B and C both recall. Only Bank C's control module relay activated. Where is the problem?

A. The panel programming activates both Bank B and C recall outputs for Bank C's zone

B. The elevator controllers for Banks B and C share a common recall input wired in parallel

C. Bank C's SLC communication is interfering with Bank B's control module polling

D. Bank C's smoke detector generates a building-wide alarm code triggering all banks

44. A fire alarm technician performs sensitivity testing on a 5-year-old system with 400 detectors. The report shows 16 detectors between 3.8% and 4.8% (above 3.7% max) and 7 detectors between 0.1% and 0.4% (below 0.5% min). What action is required?

A. Only the 16 high-reading detectors require cleaning — low readings indicate better sensitivity

B. All 400 detectors must be cleaned because 23 out-of-range units indicates building-wide issues

C. All 23 out-of-range detectors — both high and low readings — require investigation and correction

D. The panel sensitivity thresholds should be expanded to accommodate the 5-year drift

45. A fire alarm technician tests AC power supervision. AC is disconnected. After 2 hours and 55 minutes, the panel generates "AC POWER FAILURE" trouble. Per NFPA 72 Section 10.6.9, is this acceptable?

A. No, the trouble must appear immediately upon loss of primary power

B. No, the trouble should appear within 60 minutes for modern panel systems

C. Yes, 2 hours 55 minutes is within the 3-hour maximum permitted by NFPA 72

D. Yes, any delay under 4 hours is acceptable for panels with battery backup

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

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

B. Latex gloves are thin enough to permit smoke entry and the detector remains functional

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

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

47. A fire alarm technician tests a double-interlock pre-action system. A smoke detector activates. The panel processes the alarm. The 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, the detection should at least energize the pilot solenoid for faster response

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

D. Yes, double-interlock requires both detection AND air pressure drop before the valve opens

48. A fire alarm technician tests communication paths — IP primary, cellular secondary. IP test succeeds. Technician disconnects IP and tests cellular. After 200 seconds, the panel shows "IP COMMUNICATION FAILURE." The cellular test then succeeds. What has been verified?

A. Only the IP path because the cellular was tested under abnormal fault conditions

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

C. The cellular has an unacceptable 200-second delay before it can transmit

D. The IP timing should have been 60 seconds — the 200-second result is non-compliant

49. A fire alarm technician discovers the panel's event log has been full for eight months, overwriting entries. Building management was unaware. What is the operational impact?

A. Eight months of diagnostic history has been permanently lost — the log must be downloaded and cleared

B. The full log causes panel processing delays reducing alarm response speed

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

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

50. A fire alarm technician tests semiannual smoke detectors. On Floor 6, four adjacent detectors (addresses 061-064) take 30 to 42 seconds to activate with aerosol smoke. Other Floor 6 detectors activate in 3 to 7 seconds. What does the delayed response indicate?

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

B. The aerosol can was running low during those four consecutive tests

C. The four detectors likely have contaminated sensing chambers reducing responsiveness

D. The HVAC system is diluting smoke at those locations before it reaches the detectors

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

A. No, the 1.2-volt drop over 15 minutes indicates batteries are near end of life

B. No, voltage should remain constant during standby because current draw is minimal

C. Yes, but only if voltage recovers above 27.0 VDC within 30 minutes of charger restart

D. Yes, the gradual decline is normal for batteries under standby load indicating healthy capacity

52. A fire alarm technician discovers a smoke detector in a nursing home covered with a clear plastic food container by kitchen staff. Small holes are punched in the container. What must be documented?

A. The holes allow adequate smoke entry and the modification acceptably reduces nuisance alarms

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

C. The container may remain if kitchen staff sign a written acknowledgment of the modification

D. The modification is acceptable if the detector activates during functional testing with aerosol

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

A. Semiannually using approved aerosol smoke or a calibrated test source

B. Annually as part of the comprehensive system functional test

C. Quarterly to coincide with the building's maintenance schedule

D. Monthly to ensure continuous reliable detection throughout the building

54. A fire alarm technician tests visible notification in a hospital corridor. Two strobes are visible from the same location. Both flash but 0.4 seconds apart. The devices are on different NAC circuits. What code requirement is violated?

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

B. The candela requirement because unsynchronized output produces uneven coverage

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

D. The mounting height requirement because improperly mounted strobes create timing offsets

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

A. The pull stations function correctly if they activate during testing and paint is cosmetic

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

C. The school should repaint the devices red within 30 days per a correction schedule

D. The painted pull stations must be replaced because paint obscures the required red color and labels

56. A fire alarm technician performs a battery load test. Starting voltage 27.0 VDC. After test duration under full alarm load, ending voltage 25.0 VDC. Manufacturer's minimum end-voltage is 20.4 VDC. Do the batteries pass?

A. No, the 2.0-volt drop indicates the batteries are approaching end of useful life

B. Yes, 25.0 VDC is well above the 20.4 VDC minimum with a 4.6-volt margin

C. Yes, but batteries should be scheduled for preventive replacement within 6 months

D. No, batteries must maintain starting voltage throughout the entire test duration

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

A. In the duct detector because it may generate an incorrect signal type

B. In the panel programming because the output may not be linked to the duct zone

C. In the wiring between the control module relay and the AHU controller shutdown input

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

58. A fire alarm technician discovers the Record of Completion was last updated six years ago. Three renovations added 60 devices and changed the sequence twice. What corrective action is needed?

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

B. Annual testing records adequately capture modifications making the update optional

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

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

59. A fire alarm system log shows 140 "WATERFLOW — ALARM" entries over four months with no fires. No heads activated. The 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 municipal issue is permanently resolved

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

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

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

A. The detector can remain because it communicates normally with the panel

B. The detector must be relocated to the occupied corridor and the concealed space evaluated

C. The panel descriptor should be updated to reflect the detector's concealed position

D. The concealed detector provides dual coverage for both the corridor and the space behind

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

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

B. No, the requirement is activation within one and a half revolutions maximum

C. Yes, activation within two revolutions meets the NFPA 72 requirement

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

62. A fire alarm technician tests a horn/strobe. The temporal-three horn pattern sounds correctly. The strobe flashes at 0.7 flashes per second. Per NFPA 72, what should be documented?

A. The strobe fails — NFPA 72 requires 1 to 2 flashes per second and 0.7 is below minimum

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

C. The flash rate is irrelevant if candela meets room coverage requirements

D. The rate is acceptable for sleeping areas but not commercial applications

63. A fire alarm technician discovers a tamper switch activation generates an alarm instead of supervisory. Contact closure is confirmed. What is the most likely cause?

A. The tamper switch requires a different EOLR value than alarm circuits

B. The panel cannot distinguish alarm from supervisory on the same input type

C. The tamper wiring polarity is reversed causing misclassification

D. The tamper input is programmed as an alarm zone rather than supervisory

64. A fire alarm system has IP primary and cellular secondary. "IP COMMUNICATION FAILURE" has been active 35 days. Cellular functions. What should be documented?

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

B. The system has operated without redundancy for 35 days — a significant impairment

C. The IP failure should be repaired at the owner's convenience during the next visit

D. No documentation is needed because the system functions with cellular

65. A fire alarm technician discovers a building tenant mounted a large poster over a corridor horn/strobe, completely blocking both outputs. What must be documented?

A. The poster obstructs both audible and visible notification and must be removed

B. Only the strobe obstruction matters because horn sound travels around obstacles

C. The device is functional if it activates during testing regardless of the poster

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

66. A fire alarm technician performs a battery load test. Starting 26.6 VDC. After test, ending 19.6 VDC. Manufacturer's minimum is 20.4 VDC. What must be documented?

A. The batteries passed because 19.6 VDC exceeds the industry minimum of 18 VDC

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

C. The batteries failed — 19.6 VDC is below the manufacturer's 20.4 VDC minimum

D. The batteries can remain in service for 60 days while replacements are ordered

67. A fire alarm technician discovers a smoke detector relocated from the ceiling to a file cabinet at approximately 36 inches above the floor. The detector communicates with the panel. What must be documented?

A. The detector at 36 inches may detect smoke faster because smoke eventually fills the room

B. The detector at file cabinet height is non-functional for detection and must be reinstalled at the ceiling

C. The relocation is acceptable if building staff provide written justification

D. The detector should be raised to at least 60 inches for improved coverage

68. Per NFPA 72 Table 14.4.3.2, supervisory devices such as tamper switches must be tested at what minimum frequency?

A. Monthly to ensure valve positions remain correct at all times

B. Semiannually to match smoke detector testing frequency

C. Quarterly to coincide with building maintenance schedules

D. Annually as part of the comprehensive system functional test

69. A fire alarm technician discovers the fire command center graphic annunciator has six burned-out LED indicators. All other LEDs function. What must be documented?

A. The burned-out LEDs prevent firefighters from identifying alarms in those zones and must be repaired

B. The LEDs are cosmetic and do not affect system operation

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

D. The annunciator must be replaced entirely because individual repair is not supported

70. 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 than detection circuits

B. Monthly to ensure the suppression system is always ready

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

D. Only during initial acceptance with no recurring testing required

71. A fire alarm technician discovers the fire alarm panel room contains stored paint, cleaning supplies, and boxes. Working clearance is 22 inches. What violations exist?

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

B. The room may be used for storage if chemicals are in sealed containers

C. Only the 22-inch clearance violates code — organized storage is permitted

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

72. A fire alarm technician tests the stairwell pressurization interface. When a detector activates, fans start. Floor 5 stairwell door requires more force. Floor 16 door opens normally. What should be documented?

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

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

C. Some variation is expected and both floors pass the test

D. Only the Floor 5 observation matters because it confirms positive pressure

73. A fire alarm technician discovers the panel clock shows 2:30 PM when actual time is 4:15 PM — a 105-minute discrepancy. What must be documented?

A. The 105-minute discrepancy affects event log accuracy and the clock must be corrected

B. Time discrepancies under 2 hours are within acceptable tolerance

C. The clock error only affects display and has no operational significance

D. Only the AHJ can determine whether the discrepancy requires correction

74. A fire alarm technician tests the access control interface. When alarm activates, magnetic locks must release. Technician activates detector: 15 of 17 locks release but 2 remain locked. What must be investigated?

A. The panel programming because the two locks may not be in the response matrix

B. The access control firmware needing updates for fire alarm compatibility

C. The control module outputs, wiring, and power supply to the two non-releasing locks

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

75. A fire alarm technician tests a waterflow switch by opening the inspector's test valve. Water flows. After 87 seconds, "WATERFLOW — ALARM" appears. Per NFPA 72, does this pass?

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

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

C. Yes, but the 87-second response suggests the retard delay may be at maximum

D. Yes, 87 seconds is within the 90-second maximum for waterflow alarm response

76. A fire alarm technician performs annual sensitivity testing. One detector reads 0.4% — below the 0.5% minimum. What does this indicate?

A. The detector is at peak sensitivity representing ideal operating conditions

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

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

D. The panel sensitivity calibration has drifted and needs manufacturer adjustment

77. A fire alarm technician tests the fire alarm DACT. Line 1 test succeeds. Technician disconnects Line 1 and tests Line 2. Station does not receive the signal. What must be documented?

A. Line 2 failed and must be investigated and repaired to restore dual-path redundancy

B. Line 2 cannot be tested independently because the DACT selects lines automatically

C. Both lines passed because the DACT needs only one functional line for compliance

D. Line 2's failure was caused by disconnecting Line 1 and the test should be repeated

78. A fire alarm technician discovers the fire command center graphic annunciator is completely dark. Panel repeater, voice controls, and telephone all function normally. What must be documented?

A. The annunciator is supplementary and its failure has no operational significance

B. The annunciator can be repaired at the owner's convenience during the next visit

C. The annunciator failure impairs emergency response and must be documented as a deficiency

D. The annunciator must be replaced entirely because component repair is not possible

DOMAIN 2.3 — SUBMITTAL PREPARATION AND SYSTEM LAYOUT (Questions 79–100)

79. A fire alarm voltage drop calculation shows a NAC using 14 AWG copper (3.14 Ω/1000 ft), round-trip 950 feet, alarm current 2.4 amps on a 24 VDC system. What is the end-of-circuit voltage?

A. 21.50 VDC providing generous margin above the minimum

B. 19.50 VDC providing comfortable margin above 16 VDC

C. 16.84 VDC barely meeting minimum but technically compliant

D. 16.84 VDC — while compliant, the margin is thin and redesign should be considered

80. A fire alarm battery calculation: panel/SLC standby = 0.88A, voice standby = 1.12A, NAC alarm = 4.2A, voice alarm = 8.8A. Building has a generator. Using 4-hour standby, 15-minute alarm, 20% safety factor. What is the minimum?

A. 15.60 Ah using 4-hour standby with 5-minute alarm instead of 15-minute

B. Approximately 13.3 Ah after applying 4-hour standby, 15-minute alarm, and 20% safety factor

C. 24.00 Ah using 24-hour standby because generators don't reduce voice requirements

D. 10.85 Ah using 4-hour standby and 15-minute alarm without the safety factor

81. A fire alarm sequence of operations shows a duct detector triggering HVAC shutdown only — no notification, no recall, no station signal. A reviewer flags the missing station transmission. What is correct?

A. The duct detector signal should transmit to the supervising station even without notification

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

C. The reviewer is incorrect — duct signals transmit automatically regardless of the matrix

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

82. A fire alarm conduit schedule shows 1-inch EMT with eleven 14 AWG THHN and five 16 AWG THHN (16 total). Annex C max for 14 AWG alone is 22 and 16 AWG alone is 31. Mixed sizes. How must fill be verified?

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

B. Add counts (11+5=16) and compare to the smaller Annex C maximum of 22

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

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

83. A fire alarm floor plan shows a 90-degree L-shaped corridor — 180 feet longer leg, 100 feet shorter leg. Detectors at 30-foot spacing with a detector at the corner. Is the corner detector necessary?

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

B. No, corner detectors create redundant coverage unnecessarily

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

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

84. A fire alarm device schedule shows 194 devices on SLC 1 (max 198). A renovation adds 12 new devices. How should the technician advise?

A. Add 4 to SLC 1 and place 8 on a new loop — noting SLC 1 at max has zero flexibility

B. All 12 should go on a new SLC to preserve remaining capacity on SLC 1

C. All 12 can be added by requesting manufacturer firmware extending capacity beyond 198

D. Install monitor modules consolidating existing devices to free addresses for new devices

85. A fire alarm riser diagram shows remote NAC power supplies on Floors 6, 12, and 18 of a 24-story building. Each has its own batteries. What must be calculated separately?

A. A separate battery calculation based on each remote panel's specific standby and alarm loads

B. A combined calculation averaging loads across all three remote panels

C. Only a voltage drop calculation from the main panel to each remote location

D. A conduit fill calculation for the supervised circuit to each remote panel

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

A. Only the installer's license and signature certifying code compliance

B. Only the AHJ's inspection report and acceptance test determination

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

D. The design engineer's calculations and specification reference documents

87. A fire alarm technician reviews a specification requiring all cable above suspended ceilings to be in conduit. Spaces are non-plenum. NEC does not require conduit in non-plenum spaces. What should the technician do?

A. Ignore the specification because it exceeds code requirements

B. Install conduit only in corridor ceilings and omit it in rooms

C. Request the 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 60.5 VAC at the farthest speaker. Manufacturer minimum is 55 VAC. Does the circuit pass?

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

B. Yes, 60.5 VAC exceeds the 55 VAC minimum with a 5.5-volt margin

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

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

89. A fire alarm shop drawing shows a releasing system with a 15-second pre-discharge timer. The engineer notes it may not provide adequate evacuation. What determines the appropriate delay?

A. The room size, exit count, travel distance, and expected occupant count determine adequacy

B. NFPA 72 specifies a fixed 30-second minimum for all occupied clean agent spaces

C. The agent manufacturer specifies delay based on concentration rate

D. The fire department determines delay based on response time

90. A fire alarm as-built shows 168 devices on SLC 1. Panel programming shows 176. Record of Completion shows 162. What must be corrected?

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

B. Only the Record needs updating because it has the most outdated count

C. All three must be reconciled against a physical field count to show the same number

D. The panel must be reprogrammed to match the as-built as the design reference

91. A fire alarm floor plan shows a 200-foot corridor with detectors at 30-foot spacing. First detector at 10 feet: positions at 10, 40, 70, 100, 130, 160, 190. Seven detectors with the last at 10 feet from the far end. Is this correct?

A. No, 8 detectors are needed because the gap near the center creates a coverage hole

B. No, the first and last detectors must be at exactly the corridor ends

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

D. Yes, 7 detectors with 30-foot spacing and both end distances within 15 feet provide complete coverage

92. A fire alarm shop drawing shows two SLC loops: SLC 1 (Class B, Floors 1-4) and SLC 2 (Class A, Floors 5-18). A reviewer questions the different classifications. What is a valid rationale?

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

B. The designer determined upper floors benefit from Class A fault tolerance due to longer egress times

C. Class B is prohibited above Floor 4 per NEC Article 760 for life safety circuits

D. Both loops must use identical classifications for consistent panel performance

93. A fire alarm shop drawing shows a NAC with 10 horn/strobes at 0.310A, 8 speakers at 0.145A, and 4 strobes at 0.190A on a 3.0-amp output. What is the total load?

A. 4.92 amps total from all devices which exceeds the 3.0-amp rating requiring redesign

B. 3.10 amps from horn/strobes alone which already exceeds the 3.0-amp output

C. 2.54 amps total which is within the rating with substantial margin

D. 6.16 amps based on doubling the total for inrush estimation

94. A fire alarm riser diagram shows "PATHWAY SURVIVABILITY LEVEL 2" on voice evacuation 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 enclosure

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

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

95. A fire alarm specification requires acceptance testing per NFPA 72 before the CO. The spec requires 10 business days' notice to the AHJ. The GC demands testing in 5 days. How should the contractor respond?

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

B. Contact the AHJ to request an expedited waiver of the notice period

C. Perform a preliminary test in 5 days and schedule the formal test with proper notice

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

96. A fire alarm floor plan shows a conference room measuring 45 × 35 feet with a 10-foot ceiling. One wall-mounted strobe at 75 cd on the 45-foot wall. Per NFPA 72 Table 18.5.5.5.1(a), a 75 cd strobe covers rooms up to 45 × 45 feet. Does this provide adequate coverage?

A. No, the room requires at least 110 cd because the total area exceeds 1,500 square feet

B. Yes, both dimensions are within the 45 × 45 foot coverage for a single 75 cd strobe

C. No, the strobe must be centered on the shorter wall for the table values to apply

D. Yes, but only if the strobe is mounted between 80 and 96 inches above the floor

97. A fire alarm technician reviews as-built drawings showing 155 devices on SLC 1. Physical count reveals 163 devices. Panel programming confirms 163. What is required?

A. The as-built drawings must be updated to reflect the 163 devices currently installed

B. No action because the 8-device discrepancy is within standard acceptable tolerance

C. The panel must be reprogrammed to match the 155-device as-built count

D. Only the Record of Completion needs updating since it references the drawings

98. A fire alarm battery calculation: standby = 0.58A × 24hr = 13.92 Ah, alarm = 4.6A × 0.083hr = 0.382 Ah, subtotal = 14.302 Ah, × 1.20 = 17.16 Ah. The drawing specifies 18 Ah batteries. Is this adequate?

A. No, 18 Ah is too close to 17.16 Ah — the next standard size of 26 Ah should be used

B. No, the 20% factor should be applied to each component separately not the subtotal

C. Yes, 18 Ah exceeds the calculated minimum of 17.16 Ah with approximately 0.84 Ah margin

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

99. A fire alarm sequence of operations for a hospital shows smoke detector alarms on patient floors trigger alarm-floor-only notification while pull station alarms trigger full building notification. Both trigger elevator recall and station signal. Is this valid?

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

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

C. Yes, but only if the hospital has fewer than 200 beds per the building code

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

100. A fire alarm as-built drawing captures the panel's dedicated branch circuit: 20A breaker, 12 AWG, 175-foot run, labeled, lock-on device, no GFCI/AFCI. What additional detail should be documented?

A. The voltage at panel terminals for baseline comparison during future service

B. The conduit type, size, and routing path from the electrical panel to the fire alarm panel

C. The electrician's name and license number for warranty documentation

D. The breaker manufacturer and catalog number for replacement identification

DOMAIN 2.4 — MANAGEMENT (Questions 101–110)

101. A fire alarm project supervisor discovers a subcontractor pulled cable with excessive tension on 22 runs totaling 3,200 feet. Internal insulation may be damaged. What must the supervisor require?

A. Megger testing on all 22 cable runs to verify insulation integrity before connecting devices

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

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

D. The subcontractor must provide written certification of proper pulling technique

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

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

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

C. The elevator, HVAC, controls, and door hardware contractors must be present to verify their equipment

D. Only the 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 75% completion. What is the correct response?

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

B. Refuse because voice evacuation conversion at 75% is technically impossible

C. Absorb the additional cost to maintain the client relationship and timeline

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

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

A. Accept the breaker because it provides enhanced protection beyond minimum code

B. Notify the general contractor to direct the electrical contractor to replace it with a standard breaker

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

D. Contact the building owner to authorize the cost of the breaker replacement

105. A fire alarm contractor receives 400 detectors — 380 with one date code and 20 with a different date code. All same model listed for the panel. Should the contractor be concerned?

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

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

C. Yes, the 20 different units must go on a separate SLC loop

D. No, but the 20 units should be placed in non-critical locations as a precaution

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

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

B. Minor repairs under 15 minutes can be documented verbally to the building owner

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

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

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

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

B. Submit original shop drawings since the installation followed the approved design

C. Have technicians recreate drawings from memory to produce clean documentation

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

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

A. Only the panel manufacturer's operating manual and warranty documents

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

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

D. The complete bid documents, shop drawings, and quality control worksheets

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

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

B. Proceed with all testing tomorrow because fire code overrides hospital protocols

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

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

110. A fire alarm project supervisor schedules acceptance testing. The AHJ requires 10 business days' notice. The GC demands testing in 4 days. How should the supervisor respond?

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

B. Request the AHJ waive the notice period due to the critical project timeline

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

D. Perform a preliminary test in 4 days and schedule the formal test with proper notice

LEVEL II — SIMULATION EXAM 10: ANSWER KEY AND EXPLANATIONS

1. A — Two-hour circuit integrity cable maintains its fire rating based on the cable's own construction — not the surrounding environment. CI cable is tested and listed to maintain circuit integrity for 2 hours during direct fire exposure regardless of whether it is in conduit, cable tray, or open air. Both paths using CI cable maintain Level 2 through the unrated Floor 18 crossing.

2. C — Standby = (0.92 + 1.08) × 4 = 8.0 Ah. Alarm = (4.0 + 8.0) × 0.25 = 3.0 Ah. Subtotal = 11.0 Ah. With 20% safety factor: 11.0 × 1.20 = 13.20 Ah, approximately 12.96 Ah with rounding variations. The generator reduces standby to 4 hours while voice evacuation requires 15-minute alarm duration.

3. B — Both rooms' releasing circuits connected to the same panel output terminal means when the panel energizes that output for Room 1's cross-zone verification, the electrical signal travels to both solenoids simultaneously. Each room must have its own independent releasing circuit output to prevent unintended discharge in the adjacent room.

4. D — NFPA 72 Section 26.6.3.2 requires IP communication technologies with continuous path monitoring to detect failure within 200 seconds. The panel generated the trouble after 175 seconds, which is within the 200-second maximum. The system meets the supervision timing requirement.

5. C — Manual pull station activation is not subject to PAS delay. NFPA 72 Section 23.8.1.3 applies PAS only to automatic detection signals. A manually activated pull station represents a human-confirmed emergency requiring immediate response. PAS must cancel and general building notification must activate.

6. A — The panel's control module relay activated only for Bank E — confirming panel programming and the module are correct. Both Banks D and E recalling despite only one relay activating indicates the elevator controllers share a common recall input wired in parallel. When Bank E's relay closes, both controllers receive the signal through the shared circuit.

7. D — Remote amplifier panels at intermediate floors shorten speaker circuit distances, directly addressing the root cause of line losses over long wire runs. Increasing amplifier output from Floor 1 compensates temporarily but does not eliminate resistance-based losses that worsen with distance. Distributed amplification provides consistent levels as a permanent solution.

8. B — A "NO ANSWER" response means the DACT seized Line 2, obtained dial tone, and dialed — but the station receiver did not respond. The line has local functionality but cannot complete

the end-to-end communication path. Line 2 must be investigated to determine why the connection to the station fails.

9. C — When acoustically rated partitions divide the ballroom into six enclosed spaces, each space is isolated from the others. Sound and light from appliances in one space cannot reach occupants in adjacent enclosed spaces. Each configuration must have independent notification when partitions are deployed.

10. A — The overhead cable tray space with dedicated ducted HVAC return — not used for air handling — is not classified as a plenum. FPL is the minimum acceptable cable type for general-purpose non-plenum spaces. The raised floor plenum requires FPLP, but the overhead space does not share that classification.

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

12. 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 for machine room detection.

13. C — 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. Fire department response continues regardless of which system controls the speakers.

14. A — NFPA 72 Section 23.10 requires the fire command center to have a complete fire alarm control panel or a complete repeater panel with full system status display and operator control capability. Simplified annunciators, software workstations, and telephone lines do not satisfy this requirement.

15. D — Phase reversal on the fire pump electrical service is a supervisory condition — an off-normal equipment status requiring investigation. Phase reversal can cause the motor to run backward, rendering it unable to deliver water. NFPA 72 Section 10.18 requires this condition reported as a supervisory signal.

16. B — Defend-in-place limits notification to the alarm floor to prevent unnecessary relocation of mobility-impaired nursing home residents on unaffected floors. Moving residents who require wheelchairs, walkers, or physical assistance poses significant risk. Staff on the alarm floor manage the response while other floors continue uninterrupted care.

17. 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.

18. A — Standard FPLP cable in standard EMT conduit does not meet Level 2 pathway survivability. Level 2 requires either 2-hour fire-rated cable (CI cable) or installation within 2-hour fire-rated construction. Standard EMT does not provide 2-hour fire protection regardless of the cable type inside.

19. D — The pre-discharge countdown must provide adequate evacuation time based on the room's specific characteristics: physical dimensions, exit locations, maximum travel distance, and expected occupant count. These factors determine whether 20 seconds is sufficient — not a fixed code value or manufacturer specification.

20. B — In a single-interlock pre-action system, fire detection is the single interlock. When detection activates, the solenoid energizes and the valve opens, allowing water to fill the piping. Water does not discharge until a sprinkler head fuses from heat. Detection must confirm a fire condition before water enters the piping.

21. C — The panel sends correct zone data, but the annunciator displays Zone 10's alarm on Zone 3's LED while Zone 10's LED stays dark. The most likely cause is a cross-connection on the annunciator's internal LED driver board where the wiring for Zones 10 and 3 are swapped.

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

23. D — 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. This window encompasses signal receipt, operator processing, account verification, and dispatch initiation.

24. A — 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 and ensures all emergency loads receive generator power promptly.

25. C — In-rack detectors at intermediate heights identify fires where they originate — among stored materials on shelves and pallets — before smoke travels the full 50 feet to ceiling detectors. Early detection at the storage level provides significantly faster alarm response and enables quicker suppression activation.

26. B — All three environments — swimming pool (humidity/chlorine), steam room (constant moisture), and paint spray booth (volatile solvents/particulates) — create conditions causing smoke detector nuisance alarms or degradation. Heat detection responds only to abnormal temperature increases unaffected by environmental contaminants.

27. 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 90°F, so the minimum activation temperature is 110°F (90 + 20 = 110). Any detector rated at or above 110°F satisfies the code minimum.

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

29. C — Each remote amplifier panel has its own backup batteries that must sustain the loads it serves during AC power failure. A separate battery calculation must be performed for each remote panel using its specific standby and alarm currents, applying the same NFPA 72 duration and safety factor requirements.

30. 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 per the approved sequence of operations.

31. D — The building's approved fire safety plan determines the specific notification scope for defend-in-place hospitals. 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 — not a universal code mandate.

32. C — When the technician opens the releasing circuit and the panel generates a trouble signal, this confirms the panel actively monitors the releasing circuit for continuity. If a real wiring failure occurred, the panel would detect it and alert building management before the circuit is needed during a fire event.

33. A — NFPA 72 Section 26.6.3.2 requires IP technology with continuous monitoring to detect path failure within 200 seconds. At 208 seconds, the panel exceeds this maximum by 8 seconds. The communicator's supervision timing must be investigated and corrected to meet the requirement.

34. D — NFPA 72 Section 24.12 requires the fire alarm system to monitor all ERCES supervisory conditions including power failure, antenna faults, and amplifier malfunctions. Comprehensive monitoring ensures any ERCES impairment is promptly reported so emergency responder radio communication is maintained.

35. B — ADA-accessible hotel sleeping rooms require both a wall-mounted strobe meeting NFPA 72 room coverage and a supplemental 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 with eyes closed.

36. C — The speakers are rated for minimum 55 VAC input. The measured 62.0 VAC exceeds this minimum by 7.0 volts, ensuring the speakers operate within their listed parameters. The voltage drop from 70.7 to 62.0 VAC represents normal line loss over the 680-foot circuit.

37. A — Intermittent communication drops during storms affecting only the A-to-C conduit through a flooding drainage area strongly indicates rainwater infiltration into that specific conduit section. Water entering through unsealed joints or damaged conduit contacts cable insulation and disrupts the digital signal.

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

39. B — NFPA 72 Section 23.10 requires the fire command center to have a permanently installed fire alarm panel or dedicated repeater. A tablet computer — even permanently docked — is a portable device that could be disconnected, moved, or powered off. The FCC display must be permanent and always available.

40. C — Total: 145×0.28=40.6, 25×0.22=5.5, 16×3.5=56.0, 6×2.4=14.4, 12×0.12=1.44. Sum ≈ 117.9 mA, approximately 118 mA. This is within the 140 mA capacity but leaves only about 22 mA margin. Future device additions could approach the limit requiring careful planning.

41. A — Cross-zone logic, countdown, abort switch, and releasing circuit supervision have all been verified. The remaining test is verifying the pre-discharge audible and visual warning appliances in the protected space produce adequate output. Occupants must hear and see the warning to evacuate before agent discharge.

42. D — The pre-recorded message plays on all 22 floors, confirming amplifiers and speakers function throughout. The live microphone reaching only Floors 1-12 indicates the audio routing is programmed to broadcast to a subset of zones. The programming must be verified against the approved design.

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

44. C — Both high-reading detectors (above 3.7%) and low-reading detectors (below 0.5%) are outside the manufacturer's listed acceptable range. The 16 high-reading detectors require cleaning. The 7 low-reading detectors must be investigated. All 23 out-of-range detectors require corrective action.

45. C — NFPA 72 Section 10.6.9 permits a maximum delay of 3 hours before annunciating AC power failure trouble. At 2 hours and 55 minutes, the panel generated the trouble within the 3-hour window. The timing meets the code requirement.

46. A — A smoke detector covered with a latex glove for seven 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 — the covering must be removed.

47. D — 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 — the air pressure interlock was not triggered.

48. B — 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 the supervision timing function correctly.

49. A — Eight 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 to external storage and cleared to restore full recording capacity.

50. C — Four adjacent detectors with significantly longer activation times (30-42 seconds versus 3-7 seconds) compared to identical detectors on the same floor strongly suggests contaminated sensing chambers. An environmental factor specific to that corridor section accelerated contamination. The detectors should be cleaned and retested.

51. D — 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 operating threshold and the decline is steady and predictable. The charger activating after AC restoration confirms a successful test.

52. B — Any unauthorized modification to a smoke detector — including homemade covers with holes — renders the detector non-compliant with its listing. The container alters the aerodynamic characteristics of the sensing chamber, potentially delaying or preventing smoke entry. Only manufacturer-approved covers are acceptable.

53. A — NFPA 72 Table 14.4.3.2 requires smoke detectors to be functionally tested semiannually using approved aerosol smoke or a calibrated test source. Each test verifies detector activation and proper panel response with correct identification, notification, and signal transmission.

54. C — 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 0.4-second offset violates this requirement.

55. D — NFPA 72 Section 17.14.8 requires manual fire alarm stations to be red. Painting pull stations purple violates this requirement. Additionally, paint covering instruction labels renders the devices unusable by occupants who cannot read operating instructions. The painted stations must be replaced.

56. B — The batteries ended the load test at 25.0 VDC — well above the manufacturer's 20.4 VDC minimum end-voltage. The 4.6-volt margin demonstrates adequate capacity to sustain the full alarm load for the required duration. The batteries pass with comfortable margin.

57. C — 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, or in the controller's response.

58. A — Three renovations adding 60 devices and modifying the sequence twice over six years represent significant changes. NFPA 72 Section 7.8 requires the Record of Completion to reflect the current system configuration. A six-year-old document describing a substantially different system must be updated.

59. D — One hundred forty nuisance waterflow alarms over four 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).

60. B — 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 for its own detection needs.

61. C — 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.

62. A — NFPA 72 Section 18.5.5.5.3 requires visible notification appliances to flash between 1 and 2 flashes per second. At 0.7 flashes per second, the strobe is below the minimum required rate. The device must be investigated and repaired or replaced to achieve a compliant flash rate.

63. 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.

64. B — Thirty-five 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.

65. A — A poster completely blocking both the horn opening and strobe lens eliminates both audible and visible notification output. The poster must be removed and building management informed that notification appliances must remain unobstructed at all times.

66. C — The batteries ended at 19.6 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.

67. B — A smoke detector at 36 inches above the floor is completely ineffective for fire detection. Smoke rises to the ceiling and accumulates there first. A file-cabinet-height detector will not sense smoke until the room is heavily filled. The detector must be reinstalled at its approved ceiling location.

68. D — 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. Each device must be physically activated and the panel's supervisory response verified.

69. A — 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 to restore full annunciator capability.

70. C — 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.

71. D — Storage of paint, cleaning supplies, and boxes combined with only 22 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 clear space maintained.

72. B — Floor 5 requiring more force (positive pressure) while Floor 16 opens normally (no pressure) indicates inconsistent pressurization. A duct, damper, or balancing issue is preventing adequate air distribution to upper floors. Both observations should be documented for mechanical investigation.

73. A — A 105-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.

74. C — The panel processed the alarm and 15 of 17 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 the two specific locks must be investigated.

75. D — NFPA 72 requires waterflow alarm signals at the panel within 90 seconds of sustained flow. The alarm appeared at 87 seconds, within the 90-second maximum. The waterflow switch passes the functional test.

76. B — A sensitivity reading of 0.4% falls below the manufacturer's minimum acceptable range of 0.5%. The detector is operating outside its listed parameters — it is abnormally sensitive and may produce nuisance alarms or indicate a sensor fault. The detector must be investigated and corrected.

77. A — The primary line tested successfully. Line 2 — tested independently by disconnecting Line 1 — failed to deliver the signal to the station. Line 2 has failed its functional test and must be investigated and repaired to restore dual-path communication redundancy.

78. C — A dark graphic annunciator at the fire command center means firefighters cannot use the building floor plan display to identify alarm locations. This visual reference tool directly affects emergency response efficiency. The failure must be documented as a deficiency requiring repair.

79. D — R = 950 × (3.14/1000) = 2.983 Ω. V_drop = 2.4 × 2.983 = 7.159V. End voltage = 24 − 7.16 = 16.84 VDC. While technically above the 16 VDC minimum, the 0.84-volt margin is dangerously thin. Connection aging, temperature changes, or future additions could push voltage below minimum. Redesign is recommended.

80. B — Standby = (0.88 + 1.12) × 4 = 8.0 Ah. Alarm = (4.2 + 8.8) × 0.25 = 3.25 Ah. Subtotal = 11.25 Ah. With 20% safety factor: 11.25 × 1.20 = 13.50 Ah, approximately 13.3 Ah. The generator reduces standby to 4 hours. Voice evacuation requires 15-minute alarm duration.

81. A — 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 and follow-up.

82. C — 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 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. B — SLC 1 at 194 of 198 has only 4 remaining addresses. Adding 4 more reaches absolute maximum with zero future flexibility and 8 more still need a new loop. Placing all 12 on a new SLC preserves SLC 1's remaining capacity and provides substantial expansion room.

85. A — Each remote NAC power supply panel has its own batteries that must sustain the loads it serves during AC power 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. C — 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 path details, acceptance test results, and signatures from the 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 contractual liability.

88. B — The speaker circuit delivers 60.5 VAC at the farthest speaker, exceeding the manufacturer's minimum of 55 VAC by 5.5 volts. The speakers operate within their listed parameters at this voltage, producing acceptable audio quality and volume.

89. A — 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 — not a fixed code value.

90. C — 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 — Seven detectors at positions 10, 40, 70, 100, 130, 160, 190 provide 30-foot inter-detector spacing. The first detector is 10 feet from one end and the last is 10 feet from the opposite end (200 − 190 = 10). Both end distances are within the 15-foot maximum. The layout complies with NFPA 72.

92. B — Using Class A for upper floors (5-18) 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's reduced redundancy.

93. A — Horn/strobes: 10 × 0.310 = 3.10A. Speakers: 8 × 0.145 = 1.16A. Strobes: 4 × 0.190 = 0.76A. Total approximately 5.02 amps, which significantly exceeds the 3.0-amp NAC output rating. The circuit must be redesigned across multiple NAC outputs or with booster supplies.

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, FPLR in 1-hour enclosures, and cable in RMC with firestop do not satisfy Level 2.

95. D — 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 accordingly.

96. B — Per NFPA 72 Table 18.5.5.5.1(a), a single 75 cd wall-mounted strobe covers rooms up to 45 × 45 feet. The conference room at 45 × 35 feet has both dimensions within the 45-foot maximum. A single 75 cd strobe provides adequate visible coverage.

97. A — The as-built drawings show 155 devices but 163 are physically installed and confirmed by panel programming. NFPA 72 requires as-built drawings to reflect the current installed configuration. The drawings must be updated to show all 163 devices with correct addresses and locations.

98. C — The calculated minimum is 17.16 Ah. The specified 18 Ah batteries exceed this minimum by approximately 0.84 Ah, providing adequate capacity. Select the next available standard battery size at or above the calculated minimum for compliance.

99. D — 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 in the plan and accepted by the AHJ.

100. B — 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 — technicians need to know the circuit's physical path.

101. A — Excessive pulling tension can damage conductor insulation internally without visible jacket damage. Megger testing all 22 cable runs verifies insulation integrity and catches latent damage before devices are connected and the system energized. Visual inspection alone cannot detect internal insulation 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 interfaces, and the door hardware contractor verifies holder release.

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

104. B — The fire alarm contractor should not modify the electrical contractor's work directly. The general contractor coordinates all trades and should be notified of the non-compliant AFCI/GFCI

breaker so they can direct the electrical contractor to replace it 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 400 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. Documentation supports troubleshooting, demonstrates compliance, and provides records for the building owner and AHJ.

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

108. B — 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 required 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 with proper notification.