

# **PRACTICE EXAM 16: FIREFIGHTER I & II SIMULATION (150 QUESTIONS)**

---

1. A firefighter dons SCBA and during the pre-entry check observes that the low-air alarm bell is sounding despite the cylinder gauge reading 4,500 psi. The most likely cause is?

- A. The low-air alarm is malfunctioning and requires the SCBA to be taken out of service for repair
- B. The cylinder is empty despite the gauge reading
- C. The firefighter is wearing the SCBA incorrectly
- D. The alarm sounds at all pressures as a safety feature

2. During a working fire, the engineer at the pump reports that discharge pressure is gradually dropping despite no change in the throttle or supply. The most likely cause is?

- A. The supply hydrant flow is decreasing or the supply line has developed a leak or kink reducing inflow
- B. The discharge gauge is malfunctioning
- C. The attack crews have shut down the nozzles
- D. The fire has been extinguished

3. A firefighter notices that an extension ladder's halyard rope is showing significant fraying and a visible cut about 18 inches from the top sheave. The most appropriate diagnostic conclusion is?

- A. The ladder is safe to use as long as the halyard holds
- B. The halyard fraying is normal wear
- C. The ladder should be taken out of service and the halyard inspected/replaced per NFPA 1932 before the ladder is returned to service
- D. The halyard can be repaired with electrical tape

4. A crew advances a 1¾-inch attack line up a residential stairway. As they reach the second floor, the nozzle operator reports an unusually weak stream with poor reach. The pump operator confirms 175 psi discharge pressure to that gauge. The most likely cause is?

- A. The hose is too long for the operation
- B. The pump operator is incorrect about the discharge pressure
- C. The attack crew is too far from the pump
- D. A kink, blockage, or wye/appliance restriction in the line is creating excessive friction loss between the pump and the nozzle

5. During a residential structure fire, the truck company is placing a 24-foot extension ladder for window rescue. The ladder is positioned with the butt only 2 feet from the building, with the tip extended to the second-story window. The most significant error is?

- A. The ladder is the wrong type for window rescue
- B. The ladder should be longer
- C. The placement angle is too steep (approximately 85+ degrees rather than the standard 75 degrees, with risk of tipping backward during climbing)
- D. The ladder needs more personnel for raising

6. A nozzle operator complains that a 1¾-inch combination nozzle is producing an inconsistent, sputtering stream pattern with intermittent water pulses. The most likely cause is?

- A. The pump is producing too much pressure
- B. The hose is too short
- C. Air is entering the line (typically from a leak between pump and nozzle, low water supply causing pump cavitation, or air bleed-back from the nozzle when partially shut)
- D. The nozzle was incorrectly selected

7. A pump operator reports that the pump's primer is engaged for drafting but no water is being drawn after 90 seconds of operation. The most likely cause is?

- A. An air leak in the suction hose, suction couplings, or pump suction side, preventing the priming system from creating the vacuum needed to draw water
- B. The pump is undersized for the operation
- C. The water source has insufficient water
- D. The pump RPM is too high

8. A firefighter operating in a smoke-filled hallway reports that visibility has dropped to less than 1 foot and they cannot orient to the wall they were following. The most appropriate diagnostic action is?

- A. Continue advancing in the same direction
- B. Stop, communicate the situation, follow the hose line back to a known reference point, and re-establish orientation with the wall
- C. Remove the SCBA mask to improve visibility
- D. Increase walking speed to find the exit faster

9. A pump operator observes that the master intake gauge (suction pressure) is reading negative pressure (vacuum) during operation from a hydrant. The most likely cause is?

- A. The hydrant is overproducing
- B. The pump is demanding more water than the hydrant can supply, with the pressure dropping toward zero or vacuum; continued operation risks pump cavitation and damage
- C. The supply hose is too large
- D. The pump is operating correctly

10. A firefighter conducting overhaul removes a hot smoke detector and discards it in a debris pile. The most significant procedural error is?

- A. The smoke detector should be removed using insulated gloves

- B. The smoke detector should be photographed first
- C. The smoke detector should be checked for batteries
- D. The smoke detector should be preserved in place (with location and condition documented) for the investigator, since detector status is potentially relevant evidence

11. A crew advances a hose line into a smoke-filled commercial occupancy. After 30 seconds of advance, the nozzle operator notices the smoke at the floor level beginning to thin and the temperature decreasing. The most likely cause is?

- A. The fire has been extinguished
- B. The crew has advanced past the fire
- C. The smoke conditions are getting worse
- D. The truck company has begun coordinated ventilation, drawing the smoke layer upward and producing a thermal-layer separation that improves the lower atmosphere

12. A firefighter using a thermal imaging camera (TIC) observes that the entire image appears uniformly bright with no thermal differentiation between objects. The most likely cause is?

- A. The TIC is detecting a clean atmosphere
- B. The TIC is operating at temperature saturation (the high-heat conditions exceed the TIC's contrast range, washing out individual temperature differences); careful repositioning or use of contrast modes may improve the image
- C. The TIC battery is exhausted
- D. The TIC is malfunctioning permanently

13. A firefighter conducting a primary search hears a faint pulsing sound that intensifies briefly then stops. The most likely interpretation is?

- A. A loose pipe in the structure
- B. A PASS device alarm (the pulsing/cycling pattern characteristic of PASS pre-alarm or alarm activation) indicating a possibly motionless or trapped firefighter in the area

- C. The structure's mechanical equipment cycling normally
- D. Background noise from outside

14. During pre-arrival, dispatch reports the address as 1842 Maple Ave. but the engine officer's MDT (mobile data terminal) is showing 1284 Maple Ave. The most appropriate diagnostic action is?

- A. Verify the correct address with dispatch and confirm before committing to a specific location (transposed numbers are a common dispatch communication error and the wrong-address response is a known operational risk)
- B. Choose the address that seems most likely
- C. Drive to both addresses
- D. Ignore the discrepancy and proceed

15. A crew member's PASS device begins activating during operations. The crew leader checks and finds the firefighter is conscious, in good condition, and continuing operations. The most likely cause is?

- A. The PASS device's pre-alarm activation due to motionless period during a task that required holding still (the device requires deliberate manual reset and continued motion to prevent full alarm)
- B. The firefighter is in cardiac arrest
- C. The PASS device is malfunctioning
- D. The firefighter is unconscious

16. A firefighter advancing a hose line observes that the line behind them keeps catching on door frames and turns. The most appropriate diagnostic action is?

- A. Continue advancing without modification
- B. Pull harder to free the line
- C. Stop, communicate to crew positioning the line, deploy additional hose to make turns with appropriate flake or have crew members reposition at corners to manage the line
- D. Cut the line at the obstruction

17. During a sprinkler-system-protected fire, the suppression crew observes that the system has activated but only one sprinkler head has discharged, with water still flowing. The fire appears controlled. The most likely diagnostic conclusion is?

- A. The sprinkler system has failed
- B. The single-head activation has controlled the fire (sprinklers are designed for head-by-head activation, with most fires controlled by 1-3 heads in a properly designed system)
- C. Multiple heads have failed to activate
- D. The system is leaking, not actually responding to fire

18. A pump operator observes that the discharge gauge is reading 175 psi but the master gauge (overall pump pressure) is reading only 120 psi. The most likely cause is?

- A. The two gauges are reading different points in the system; the discharge gauge reflects the pressure after the discharge valve, while the master gauge reflects the system before the valves (the discharge gauge typically reads higher when supplying with elevation, but the difference here suggests a gauge issue or a pressure reducer in the line)
- B. The pump is operating normally
- C. The master gauge is malfunctioning
- D. The discharge gauge is malfunctioning

19. A crew advancing on a basement fire reports that conditions are deteriorating rapidly with intense heat overhead. The most likely diagnostic interpretation is?

- A. The fire is producing significant heat in the basement that is rising through floor compromise (fire-damaged floor structure transmitting heat upward) or smoke layer accumulation; the conditions indicate potential floor collapse and require immediate crew assessment
- B. The fire is small and easily controlled
- C. The structure is unaffected by fire
- D. The smoke is coming from outside the building

20. A truck company prepares to conduct vertical ventilation on a residential roof. As they approach the ridge with a chain saw running, they notice that the roof has substantial give and creaks underfoot. The most appropriate diagnostic conclusion is?

- A. The roof is sound and operations should proceed
- B. The truck crew should add more weight to test the roof
- C. The chain saw is too heavy
- D. The roof is showing signs of structural compromise from the fire below; operations should not proceed at this location and the crew should retreat to safer roof areas or alternative ventilation positions

21. A firefighter operating a smooth-bore handline observes that the stream is hitting the target but producing only minimal effect on the fire. The most likely cause is?

- A. The tip is too large
- B. The nozzle pressure is too low (smooth-bore handlines should operate at 50 psi nozzle pressure; lower pressure produces a stream with inadequate velocity and reach, reducing fire-attack effectiveness)
- C. The fire is too far away
- D. The hose is too long

22. The first arriving engine reports water visible at the curb in front of a residential structure with smoke showing from the second floor. The most likely diagnostic interpretation is?

- A. The water is from a plumbing leak unrelated to the fire
- B. A sprinkler system has activated inside the structure or a residential service line has been damaged by the fire, with water flowing out; the active water flow may indicate that the building's sprinkler system is operating and providing some fire control
- C. The water is from a fire hydrant
- D. The water is normal stormwater

23. A firefighter conducting fire investigation post-extinguishment finds a smoke detector with battery contacts that appear corroded green-white. The most likely diagnostic interpretation is?

- A. The corrosion was caused by the fire
- B. The detector was installed incorrectly
- C. The corrosion indicates the batteries were leaking before or during the fire (chemical reaction of leaking battery acid on the contacts), suggesting that the detector may not have been functional at the time of the fire
- D. The corrosion is normal

24. A pump operator is supplying a sprinkler system through the FDC and observes that the residual pressure on the supply gauge is dropping despite no change in throttle. The most likely cause is?

- A. The pump is malfunctioning
- B. The FDC connection is leaking
- C. Additional sprinkler heads have activated, increasing the system flow demand; the dropping pressure indicates the system is moving more water and the pump must increase to maintain supply pressure
- D. The supply hydrant has been shut off

25. A crew operating in a multi-family residence finds smoke coming from a wall behind which is an electrical panel. The most appropriate immediate action is?

- A. Coordinate with utility for de-energization or confirm the panel is de-energized, then carefully open the wall to address fire extension; applying water to the energized panel risks electrical conductivity through the water stream
- B. Apply water directly to the wall
- C. Continue interior attack without modification
- D. Apply foam to the wall

26. A firefighter notes that during their last shift, their SCBA cylinder pressure was at 4,500 psi when started and showed only 3,200 psi after a 45-minute operation. The cylinder is rated for 30 minutes (consuming approximately 1,500 psi at the rated work rate). The most likely diagnostic interpretation is?

- A. The cylinder is leaking

B. The pressure gauge is malfunctioning

C. The firefighter consumed more air than rated

D. The actual heavy-work consumption rate was lower than the rated 40 L/min (likely because the operation was less strenuous than rated work conditions, with extensive periods of lower-effort activity); the consumption matches a moderate-work duration

27. A firefighter conducting investigation post-extinguishment finds a wall outlet showing extensive melting and charring, with two-pronged appliance cords plugged in. The most likely diagnostic interpretation is?

A. The fire was external to the outlet

B. The outlet experienced electrical arcing damage with apparent ignition of nearby combustibles; the appliance loads, possible overloading, or fault conditions in the wiring should be examined by the investigator

C. The outlet was normal before the fire

D. The outlet was damaged by water

28. A truck company opens the front door of a structure with heavy smoke conditions inside. Within 60 seconds, the smoke begins issuing from the door at high velocity in pulses with audible "huffing" sounds. The most likely interpretation is?

A. The ventilation is working normally

B. The conditions indicate possible backdraft potential — the fire has been oxygen-starved, the smoke is pulsing as the fire alternately consumes oxygen and pauses, and the conditions warrant immediate withdrawal until proper ventilation can be coordinated with attack

C. The smoke is from outside the structure

D. The fire has extinguished

29. A firefighter conducting overhaul in a structure notices that the smoke alarms on the ceiling all show the green power indicator and have not been removed. The most likely diagnostic interpretation is?

A. The smoke alarms are decorative

- B. The smoke alarms failed during the fire
- C. The smoke alarms were operating normally during the fire (power indicators show electrical service to the alarms); their operation should be documented for the investigation
- D. The smoke alarms are battery-powered

30. A firefighter pulls a ceiling tile in a commercial structure during overhaul. As the tile drops, a large piece of black/charcoal-like material falls from the space above. The most likely diagnostic interpretation is?

- A. The fallen material is char from fire extension into the void space; the void space contains active or recently-active fire that requires further investigation and suppression
- B. The material is dust from the ceiling
- C. The material is mold
- D. The material is normal building debris

31. During size-up at a residential fire, the officer observes smoke issuing from the eaves on three sides of a single-story structure. The most likely diagnostic interpretation is?

- A. The fire is contained to one room
- B. The fire is in the attic space and has spread across the entire attic, with smoke issuing through eave vents; the operational implication is significant attic involvement requiring vertical ventilation and aggressive overhaul of the attic space
- C. The smoke is from outside the structure
- D. The fire has been extinguished

32. A pump operator reports that the pump is "running away" — the engine RPM is climbing without throttle increase, accompanied by pump noise. The most likely cause is?

- A. The pump operator is making errors
- B. The pump engine is normal
- C. The pump is operating at correct pressure

D. The pump has lost load (the discharge lines have shut down faster than the pump's relief or throttle could respond), causing the engine to over-rev; immediate throttle reduction and relief-valve check are required

33. A firefighter conducting investigation finds that the structure's electrical panel is open with the main breaker in the OFF position. The most likely diagnostic interpretation is?

A. The breaker was shut off pre-fire as part of fire-safety preparation

B. The breaker was damaged by the fire and forced to the OFF position

C. The breaker auto-tripped during the fire

D. The breaker was manually opened, either by the utility company (electrical isolation after the fire began), by the property owner (pre-fire or during the fire), or possibly during overhaul by fire crews; the timing and circumstances should be documented

34. A truck company arrives with a partial-collapse pile remaining from a structure fire. They observe small wisps of smoke continuing to emit from the pile 4 hours after the main fire was extinguished. The most likely diagnostic interpretation is?

A. The collapse is normal

B. The smoke is steam

C. Deep-seated fire remains within the collapse pile (the smoke indicates continued combustion in inaccessible areas); systematic exposure and selective overhaul are required, possibly with extended fire watch

D. The smoke is from outside the collapse

35. A nozzle operator observes that the stream from a smooth-bore handline appears to be losing reach significantly over time during operations, with no change in pump pressure. The most likely cause is?

A. The nozzle operator is changing position

B. The pump operator is reducing pressure without communication

C. The fire conditions are improving

D. The smooth-bore tip may be partially obstructed (debris, hose lining failure, or foreign material has entered the tip and is reducing the effective tip diameter or disturbing the stream coherence)

36. A firefighter conducting investigation finds that the smoke alarms throughout a residence are all installed at floor level rather than ceiling level. The most likely diagnostic interpretation is?

A. Installation error: smoke alarms should be installed on or near the ceiling because smoke rises and accumulates at the highest points; floor-level installation would substantially delay alarm activation

B. The installation is correct

C. The installation is decorative

D. The installation is normal for this type of detector

37. A pump operator supplying a high-rise standpipe operation is told the attack crew on the 14th floor is getting only 80 psi at the nozzle. The pump is set at 200 psi discharge. The most likely cause is?

A. The system losses ( $5 \text{ psi/floor} \times 13 \text{ floors} = 65 \text{ psi}$  for elevation, plus standpipe friction loss, plus supply-line friction loss) are adding up to the difference; the pump operator should verify the supply line, standpipe pressure, and elevation calculation, and consider increasing pump discharge

B. The pump is undersized for the operation

C. The nozzle is wrong

D. The crew is incorrect

38. A firefighter conducting investigation finds that the fire alarm system control panel shows a "trouble" condition with multiple fault indicators dating from before the fire. The most likely diagnostic interpretation is?

A. The system was newly installed and being tested

B. The fire alarm system had pre-existing maintenance issues or malfunctions before the fire (the troubles existed before fire-related damage); the operational status of the alarm system during the fire may have been compromised

C. The trouble lights are normal

D. The system was disabled by the property owner

39. A truck company pulls ceiling tiles in a strip mall during exposure protection. Behind the ceiling, they observe that fire has spread to fill the entire attic space of the adjacent unit despite no flame showing in the unit below. The most likely diagnostic interpretation is?

- A. The exposure unit is safe
- B. The attic space is functioning as a continuous flow path for the fire; the fire has already spread laterally through the attic, and operations must address this attic involvement aggressively
- C. The fire has been extinguished
- D. The attic is unaffected

40. A firefighter operating in a residential structure observes that the smoke layer at the ceiling is showing wave-like patterns moving back and forth. The most likely diagnostic interpretation is?

- A. The smoke layer is showing turbulent flow consistent with active fire activity beyond the visible area, with thermal layering and movement patterns indicating ongoing combustion and fire development; conditions warrant careful tactical assessment
- B. The smoke is from outside the structure
- C. The smoke is stable
- D. The fire has self-extinguished

41. A pump operator notes that the discharge gauge needle is fluctuating rapidly with the pulse of the pump, even when the throttle is steady. The most likely cause is?

- A. The fluctuations indicate that the pump impeller is partially obstructed (debris, kinking on the suction side, low water supply pressure) or that air is present in the pump; the pulsing pattern reflects irregular water flow into the impeller
- B. The throttle is malfunctioning
- C. The pump is operating normally
- D. The discharge valve is closing

42. A firefighter conducting investigation finds that a residential smoke alarm has been physically removed from the ceiling mounting bracket and is lying on a nearby table. The most likely diagnostic interpretation is?

- A. The detector fell during the fire
- B. The detector was being replaced
- C. The detector is normal
- D. The detector was deliberately removed before the fire (typical reason: nuisance alarms from cooking), which would have eliminated the warning function; the timing of removal should be examined by the investigator

43. A firefighter operating an attack line in a residential bedroom observes that the fire continues to burn intensely despite a sustained application of water. The most likely cause is?

- A. The fire is too large for the attack line
- B. The water is being applied incorrectly — possibly applied to the smoke or upper gas layer rather than to the seat of the fire; effective cooling requires the water to reach the burning fuel itself
- C. The fire is unique
- D. The hose has no water flow

44. A pump operator drafting from a static water source observes that the pump is "lifting" water but the discharge is sputtering and inconsistent. The most likely cause is?

- A. The static water source is contaminated
- B. The pump is properly sized
- C. The discharge is correct
- D. The drafting lift is approaching or exceeding the practical maximum (typically 20-22 feet at sea level), with the pump struggling to maintain a continuous water column; the sputtering reflects intermittent loss of priming

45. A truck company observes that during ventilation operations on a residential roof, smoke from the ventilation opening is being drawn back into the opening rather than exiting. The most likely cause is?

- A. The wind direction is changing the natural draft or PPV is creating opposing pressure; the ventilation effectiveness depends on the pressure differential between the structure interior and the exhaust opening, and reversed flow indicates an issue with the ventilation setup
- B. The roof opening is too large
- C. The ventilation is complete
- D. The fire has extinguished

46. A firefighter conducting overhaul lifts a heavy piece of charred wood and notices that beneath it the floor shows minimal damage. The most likely diagnostic interpretation is?

- A. The fire damaged the wood from above
- B. The position of the wood (covering the floor area) protected the underlying floor from the fire's heat and direct flame contact; the area beneath the wood preserves a representation of pre-fire conditions
- C. The fire originated under the wood
- D. The wood is normal

47. A firefighter notes that during a pre-incident inspection of a commercial occupancy, the fire pump room has a sign indicating "Fire Pump in Service" but the room appears unmaintained with dust on all surfaces. The most likely diagnostic interpretation is?

- A. The pump is brand new
- B. The room is clean
- C. The fire pump may not have been properly maintained or operated recently (NFPA 25 requires regular inspection, testing, and maintenance); the apparent lack of maintenance access raises concerns about the system's operational readiness
- D. The pump is operating

48. A firefighter conducting investigation finds a partially-melted child's toy in the area of origin of a residential fire. The most likely diagnostic interpretation is?

- A. The toy caused the fire

B. The toy was deliberately placed

C. The toy is normal

D. The toy provides evidence of the fire's heat exposure and possible ignition source consideration; the location, condition, and any ignition indicators on the toy should be documented and preserved for the investigator's examination, particularly if the area of origin involves children

49. A truck company observes that during ventilation, the smoke from the opening is dark black and pressurized for the first 30 seconds, then transitions to lighter gray smoke. The most likely diagnostic interpretation is?

A. The transition reflects the fire's combustion improvement as ventilation is established (the initial dark, pressurized smoke reflects the under-ventilated fire conditions; lighter smoke as ventilation is established reflects better combustion); the ventilation is functioning effectively

B. The fire is getting larger

C. The smoke is from outside

D. The ventilation is failing

50. A firefighter conducting investigation finds that a propane tank near the structure has the pressure relief valve venting actively. The most appropriate immediate action is?

A. Coordinate immediate hazmat support, establish substantial isolation distance, apply protective water lines for cooling the tank if safe to do so, and let the tank vent until pressure equalizes; the venting tank is releasing flammable gas under controlled conditions, but exposure to additional heat or ignition could escalate the situation

B. Approach the tank and shut off the venting valve

C. Apply water directly to the venting valve

D. Apply foam to the tank

51. A pump operator observes that the priming pump is engaged but the pump is not making the characteristic suction sound. The most likely cause is?

- A. The priming pump motor or pump itself has a mechanical issue, the suction connections have a major air leak, or the priming system is not engaging properly; the pump needs to be checked for the cause before drafting can be established
- B. The drafting is normal
- C. The fire is small
- D. The water supply is good

52. A firefighter conducting investigation finds that a residential water heater shows extensive char on the upper portion but the burner area is clean. The most likely diagnostic interpretation is?

- A. The water heater is consistent with external fire damage from above (the upper char indicates heat from outside the heater, not from the heater itself); the heater is unlikely to have been the ignition source
- B. The water heater caused the fire
- C. The water heater is malfunctioning
- D. The water heater is irrelevant

53. A pump operator at a working fire reports that the supply hydrant is providing only 200 gpm at 20 psi residual pressure. The pump is being asked to supply two 250 gpm attack lines (500 gpm total demand). The most likely cause and resolution is?

- A. The hydrant flow is below the demand; the pump operator must communicate the supply limitation to command, the attack crews may need to reduce flow, and additional supply lines (mutual aid, additional hydrants, alternate supply) may need to be established
- B. The pump is malfunctioning
- C. The supply is fine
- D. The attack crews are wrong

54. A firefighter operating in a high-rise observes that the standpipe outlet on the 14th floor is providing only 40 psi at the outlet. The pre-attack target is 100 psi (for the typical attack line). The most likely cause is?

- A. The standpipe valve is closed

- B. The standpipe system is malfunctioning
- C. The supply pressure to the standpipe system is inadequate (the FDC pressure plus building fire pump output must overcome the elevation pressure loss to deliver 100 psi at the 14th floor); the pump operator should be informed to increase supply pressure
- D. The pressure is correct

55. A truck company operating ventilation observes that PPV is being applied but smoke continues to fill the structure rather than clearing. The most likely cause is?

- A. The PPV is working correctly
- B. The smoke is from outside the structure
- C. The exhaust opening is not coordinated with the PPV — either the exhaust opening is too small, in the wrong location, or not established; effective PPV requires an appropriate exhaust opening downstream of the fan and the inlet should be sealed to direct the airflow
- D. The fire is extinguished

56. A firefighter conducting fire investigation finds a candle on a windowsill with melted wax dripping onto curtain material. The melted area on the curtain shows significant heat damage but the rest of the curtain is intact. The most likely diagnostic interpretation is?

- A. The fire was unrelated to the candle
- B. The candle was in proximity to the curtain material with the candle's heat producing localized ignition of the curtain; this is a common ignition scenario where combustible materials are positioned too close to an open-flame heat source
- C. The candle was decorative
- D. The candle was placed there during overhaul

57. A truck company arrives at a working fire to find that the structure has heavy fire showing from two non-adjacent rooms. The most likely diagnostic interpretation is?

- A. The fire started in one room and spread to the other naturally
- B. The fire is being driven by wind

C. The pattern is consistent with possible multiple ignition points (either accidental from multiple causes or possibly incendiary); the pattern requires careful investigation to determine the cause(s)

D. The pattern is normal

58. A pump operator observes that the supply hydrant has a wet barrel indicating that water has been flowing from the hydrant before the fire department arrived. The most likely diagnostic interpretation is?

A. The hydrant is malfunctioning

B. The hydrant was tested recently

C. The hydrant was used before fire department arrival — possibly by an occupant, neighbor, or other person attempting initial suppression with a garden hose; the prior water use does not indicate a hydrant issue

D. The hydrant is leaking

59. A firefighter operating the nozzle on a 2½-inch attack line observes that the stream is delivering apparently full flow but the fire is not knocked down. The most likely cause is?

A. The water is reaching the fire but the fire's heat-release rate exceeds the suppression capability of the 250 gpm flow — the fire load and intensity may require greater flow (master stream, additional attack lines) for control

B. The hose is broken

C. The nozzle is wrong

D. The fire is small

60. A firefighter operating a thermal imaging camera (TIC) observes that an area of the wall shows significantly higher thermal signature than the surrounding wall. The most likely diagnostic interpretation is?

A. The wall is normal

B. The TIC is malfunctioning

C. The high-thermal-signature area indicates hidden fire in the wall void (the heat from the fire is transmitting through the wall material to the surface where the TIC detects it); the area should be opened for inspection and suppression

D. The wall is decorative

61. A truck company is conducting roof ventilation when they note that the sound of the saw cutting the roof has changed from a smooth cutting sound to an irregular labored sound. The most likely cause is?

A. The saw is normal

B. The blade is sharp

C. The roof is sound

D. The saw is engaging with roof material it was not designed to cut (possibly truss connectors, ridge boards, or other engineered components), or the blade is dulling; the operator should disengage, inspect the saw, and reassess the cutting location

62. A firefighter conducting investigation finds that the residence has a kitchen with extensive grease buildup on the range hood and surrounding cabinetry. The most likely diagnostic interpretation is?

A. The grease buildup increases the fuel load in the area, providing more available combustibles in case of a cooking-related ignition; the kitchen condition may be relevant to the fire's growth dynamics

B. The kitchen is normal

C. The kitchen is decorative

D. The kitchen is unrelated

63. A truck company on a roof during ventilation operations observes that the smoke from the opening they just cut is being followed by hot embers and small flames. The most likely diagnostic interpretation is?

A. The fire has been extinguished

B. The smoke is from outside the structure

C. The roof opening is releasing the combustion products as designed; the hot embers and small flame indicate that fire is in or near the immediate area below the opening, and crews on the roof should maintain safety distance and be prepared for active fire behavior

D. The roof is normal

64. A pump operator reports a "knocking" sound from the pump during operation. The most likely cause is?

A. The pump is operating normally

B. The pump is well-lubricated

C. The pump is undersized

D. The pump is cavitating (the pump is demanding more water than the supply can provide, with vapor bubbles forming in the pump and collapsing as the impeller compresses them); the operator should reduce throttle, address the supply issue, or shut down the pump to prevent damage

65. A firefighter conducting investigation finds that the smoke alarm in a residence shows no battery installed and no AC power indicator. The most likely diagnostic interpretation is?

A. The smoke alarm was non-functional during the fire (no power source available), eliminating the warning function for occupants; the absence of detection capability is consistent with delayed fire discovery and possibly contributed to the fire's growth before detection

B. The smoke alarm was decorative

C. The smoke alarm was new

D. The smoke alarm is normal

66. A truck company observes during overhaul that a corner of the residential bedroom shows extensive char in the floor with the burn pattern radiating outward from a specific point. The most likely diagnostic interpretation is?

A. The corner had no fire involvement

B. The pattern is unrelated to the cause

C. The pattern is consistent with an ignition source at that specific point, with the radiating char indicating the fire's growth from that location; the area should be carefully examined for evidence of the ignition source

D. The pattern is from cleaning

67. A pump operator observes that the fuel gauge on the apparatus is reading low and the engine is making a sputtering sound. The most likely cause is?

A. The pump is operating normally

B. The fuel is high

C. The pump is overheating

D. The apparatus fuel is becoming exhausted, with the engine fuel system unable to maintain consistent fuel supply; the apparatus needs immediate refueling to continue pump operations, with consideration of relief apparatus

68. A firefighter using a thermal imaging camera in a smoke-filled structure observes that one specific area of the floor is showing significantly higher thermal signature than the surrounding floor. The most likely diagnostic interpretation is?

A. The area indicates a heat source beneath the floor or floor compromise from fire below; the area should be approached with caution as it may indicate basement fire conditions and possible floor collapse

B. The area is normal

C. The TIC is incorrect

D. The floor is decorative

69. A firefighter operating in a structure observes that the smoke they are encountering is producing minor coughing and a slight burning sensation in the eyes even with SCBA in use. The most likely cause is?

A. The smoke is irritating but the SCBA is providing respiratory protection

B. The SCBA is malfunctioning

C. The smoke is normal

D. There may be a SCBA mask seal issue (with smoke bypassing the mask) or the smoke contains particularly irritating compounds that are penetrating the mask seal; the firefighter should check the mask seal, communicate to crew, and prepare to withdraw if conditions cannot be addressed

70. A pump operator at a working fire notices that the engine compartment is showing increased steam emission and the engine coolant temperature gauge is reading higher than normal. The most likely cause is?

A. The engine is operating normally

B. The engine is overheating (typical causes: low coolant, blocked radiator, malfunctioning thermostat, or extended idle operation in high temperatures); the operator should monitor the temperature, ensure adequate engine cooling, and consider shutdown if temperature continues rising

C. The engine is broken

D. The pump is operating

71. A firefighter operating a hose stream observes that the stream is breaking up into a wide pattern rather than maintaining a coherent stream. The nozzle is set to a straight-stream pattern. The most likely cause is?

A. The nozzle has been damaged or contains debris that is disrupting the stream pattern, or the hose has a hidden defect (hose lining failure) that is producing inconsistent flow; the nozzle should be inspected and possibly replaced

B. The nozzle is operating normally

C. The pump is malfunctioning

D. The crew is wrong

72. A truck company observes that during ventilation operations, the building's HVAC system continues operating despite the ongoing fire conditions. The most likely concern is?

A. The HVAC system is moving smoke throughout the building, spreading fire products to uninvolved areas and complicating the operational situation; the system should be isolated for the fire floor and supported in smoke-management mode if available, in coordination with the building engineer

B. The HVAC system is working correctly

- C. The HVAC system is decorative
- D. The HVAC system has been disabled

73. A firefighter conducting investigation finds that a residence has multiple appliances plugged into a single power strip, which is connected to a wall outlet via an extension cord. The most likely diagnostic interpretation is?

- A. The setup is normal
- B. The setup is unrelated to the fire
- C. The setup creates potential electrical overload (the daisy-chained connections with multiple high-wattage devices may exceed the capacity of the circuit, the power strip, or the extension cord, with possible arcing or overheating ignition); the area should be examined for evidence of electrical fault
- D. The setup is decorative

74. A truck company operating a roof ladder on a steep-pitched roof observes that the ladder's hooks are not engaging the ridge properly. The most likely cause is?

- A. The ladder is the correct type
- B. The hooks were not deployed or were not positioned correctly over the ridge, or the ridge configuration does not support standard hook engagement; the ladder may slide and the truck crew should reset the ladder with proper hook engagement before continuing operations
- C. The roof is normal
- D. The ladder is too short

75. A firefighter conducting overhaul finds that a wood-burning stove in a residence shows significant char in the wall and floor immediately surrounding the stove. The most likely diagnostic interpretation is?

- A. The pattern is consistent with combustibles in close proximity to the stove (improper clearance from the stove to the wall and floor, or improper installation); the heat from the stove can radiate and conduct to the wall and floor, with eventual ignition; the installation should be examined by the investigator for code compliance
- B. The pattern is normal

- C. The pattern is from cleaning
- D. The pattern is from water damage

76. A pump operator using a relay supply (engine-to-engine pumping) observes that the receiving engine's intake gauge is showing the appropriate residual pressure but the discharge gauge of the supply engine is reading 0 psi. The most likely cause is?

- A. The supply engine is malfunctioning
- B. The discharge gauge of the supply engine has a malfunction or has been turned off, or the gauge connection is incorrect; the operational status is verified by the receiving engine's intake gauge, but the supply engine's gauge issue should be addressed for proper monitoring
- C. The supply engine is unsupplied
- D. The supply is correct

77. A truck company observes that a roof ladder positioned for ventilation is showing slight bending at the rungs near the bed. The most likely cause is?

- A. The ladder is normal
- B. The ladder is being used correctly
- C. The bending is decorative
- D. The ladder is being overloaded (typical causes: multiple firefighters on the ladder simultaneously, with combined weight exceeding the ladder's rating, or equipment being hauled up the ladder); the ladder should be taken out of service for inspection per NFPA 1932

78. A firefighter operating a 1¾-inch attack line at the second-floor bedroom observes that the stream pattern is full but the fire is not knocked down despite proper application. The most likely cause is?

- A. The stream is too wide
- B. The pump is supplying too much water
- C. The fuel load in the room exceeds what the 150 gpm flow can suppress, possibly requiring transition to a 2½-inch attack line or assistance with a second 1¾-inch line; the flow vs. fire-size relationship may have been misjudged

D. The hose is broken

79. A pump operator drafting from a static water source observes that the suction strainer is partially clogged with debris from the water source. The most likely diagnostic interpretation is?

A. The strainer is operating normally

B. The strainer is decorative

C. The strainer is broken

D. The strainer is doing its job (preventing debris from entering the pump), but continued operation will progressively reduce the effective flow through the strainer; the strainer should be cleared during a brief shutdown or the operation should be supplemented with an alternate water source

80. A firefighter conducting investigation observes that the residence has multiple smoke detector locations marked with mounting holes but no detectors are installed. The most likely diagnostic interpretation is?

A. The detectors were never installed

B. The detectors were removed for cleaning

C. The detectors are decorative

D. The smoke detectors have been removed at some point before the fire; the absence of detectors eliminates the warning function and may have contributed to the fire's growth before discovery, particularly if the residence was occupied during the fire

81. A truck company operating in a residence observes that the bedroom door is closed and intact, with the fire confined to the hallway outside. The most likely diagnostic interpretation is?

A. The fire originated in the bedroom and spread to the hallway

B. The bedroom door is normal

C. The closed bedroom door has protected the bedroom from the hallway fire, with the door's resistance limiting fire spread into the bedroom; the bedroom occupants, if present, would have benefited from the closed-door protection (a key fire-safety practice)

D. The bedroom is unaffected

82. A firefighter operating a smooth-bore master stream tip observes that the stream is hitting the target structure but producing minimal effect on the fire. The most likely cause is?

- A. The stream momentum may be insufficient (the master stream tip's flow rate may be lower than the fire's heat-release rate, or the stream is being applied at an angle that reduces effectiveness, or the master stream is being applied from too far away allowing the stream to dissipate); the operational placement and flow may need adjustment
- B. The fire is normal
- C. The master stream is correct
- D. The pump is broken

83. A truck company operating in a residence finds a closed bedroom door behind which is an unconscious child. The most likely diagnostic interpretation is?

- A. The child was not affected by the fire
- B. The child was protected from the fire by the closed door but may have been overcome by carbon monoxide and other combustion products that penetrated the door over time, or by lack of oxygen as the fire consumed the room's atmosphere; rapid removal and EMS care are essential
- C. The child is asleep
- D. The child is normal

84. A pump operator at a working fire observes that the supply hydrant has a flag indicating it is "out of service" but the engine company hooked up to it anyway and water is flowing. The most likely diagnostic interpretation is?

- A. The hydrant is operating
- B. The flag is decorative
- C. The hydrant is brand new
- D. The flag indicates that the hydrant was reported out of service (possibly due to inadequate flow, mechanical damage, or maintenance), but it is currently providing water; the flow may be intermittent or lower than expected, and the supply should be supplemented with an alternative source

85. A firefighter conducting investigation finds that the residence has a halogen lamp on the floor of a closet with a pile of clothing draped over the lamp. The most likely diagnostic interpretation is?

- A. The lamp is decorative
- B. The closet is normal
- C. The lamp's heat (halogen lamps can reach 500-1000°F at the bulb surface) in close proximity to combustible clothing creates a potential ignition source; the area should be examined for ignition evidence
- D. The clothing is unrelated

86. A truck company operating in a residence observes that the hallway has a strong, persistent smell of natural gas with no visible fire. The most appropriate immediate action is?

- A. Withdraw all personnel from the structure, request gas utility for shutoff, coordinate atmospheric monitoring, and establish an isolation perimeter; the natural gas leak could ignite catastrophically and the immediate priority is personnel safety
- B. Apply water to the area
- C. Light a flashlight to find the leak
- D. Continue interior operations

87. A pump operator at a working fire observes that the apparatus's emergency lighting (warning lights) has dimmed significantly during pump operations. The most likely cause is?

- A. The lights are normal
- B. The pump is operating correctly
- C. The lights are decorative
- D. The pump and other electrical loads are exceeding the apparatus's electrical generation capacity, with the battery providing supplemental power and being drawn down; the operator should manage electrical loads, ensure the engine is producing adequate charging, or consider supplemental power

88. A firefighter conducting investigation finds that the residence has been recently renovated, with visible construction materials and tools throughout the structure. The most likely diagnostic interpretation is?

- A. The renovation is normal
- B. The renovation is decorative
- C. The renovation is unrelated
- D. The renovation creates several potential fire causes: heat sources (welding, cutting torches, electrical work), combustible construction materials in unusual configurations, and possibly disabled or modified fire-protection systems; the investigator should examine the renovation activities and timeline as part of the cause investigation

89. A truck company operating a hose line on the third floor of an apartment building observes that the standpipe outlet is providing only 50 psi nozzle pressure despite the supply being charged. The most likely cause is?

- A. The standpipe is correct
- B. The standpipe outlet has a pressure-reducing valve installed (common in modern standpipe systems to limit pressure for hand-line operation safety), or the outlet is partially closed; the operator should check the outlet valve and ensure full flow is available
- C. The standpipe is broken
- D. The supply is wrong

90. A firefighter conducting investigation finds that the residence has a kitchen fire pattern that originated at the stove top, with the burner pattern visible on the stove surface and surrounding cabinetry. The most likely diagnostic interpretation is?

- A. The fire is unrelated to cooking
- B. The pattern is consistent with cooking-related ignition (typical cooking fire pattern with burner-area origin and spread to surrounding cabinetry); the most common cause of residential cooking fires is unattended cooking
- C. The fire is from electrical malfunction
- D. The fire is from natural gas leak

91. A pump operator at a working fire reports that the operating pressure on the discharge gauge is decreasing slowly during operations with no change in throttle or supply. The most likely cause is?

- A. The pump is operating normally
- B. The pump is overheating
- C. The throttle is malfunctioning
- D. The supply pressure to the pump is decreasing (the hydrant or supply source flow is reducing as the pump demand exceeds the supply capability, or the supply line has developed a kink or obstruction), with the pump output following the supply

92. A truck company operating ventilation on a residential roof observes that the smoke from the opening is coming out without significant pressure, drifting upward gently. The most likely diagnostic interpretation is?

- A. The fire is large
- B. The ventilation is failing
- C. The smoke characteristics are consistent with a fire that is either small, partially extinguished, or in a fuel-limited stage with reduced heat-release rate; the conditions are improving compared to higher-pressure smoke release
- D. The fire is growing

93. A firefighter operating in a residence finds that a circuit breaker in the electrical panel has been replaced with a higher-amperage breaker than the panel's design specification. The most likely diagnostic interpretation is?

- A. The breaker is normal
- B. The breaker is correct
- C. The breaker is decorative
- D. The breaker has been modified incorrectly — the higher amperage allows more current through the circuit than the wiring was designed to handle, with potential for wiring overheating and ignition; the modification is a code violation and a potential contributing factor in any electrical fire

94. A pump operator reports that the apparatus is shaking abnormally during pump operation. The most likely cause is?

A. The pump may be operating at an extreme RPM range, the pump may have a damaged impeller, the apparatus may be parked on unstable ground, or the pump may be cavitating; the operator should monitor the pump status, check the operating parameters, and consider shutdown if the shaking continues

B. The pump is operating normally

C. The apparatus is correct

D. The pump is sized correctly

95. A firefighter conducting investigation finds that the residence has a clothes dryer with the lint filter completely clogged with lint. The most likely diagnostic interpretation is?

A. The dryer is normal

B. The lint filter is unrelated

C. The dryer is decorative

D. The clogged lint filter creates significant ignition risk (the lint accumulation reduces airflow, causes the dryer to overheat, and provides combustible material in proximity to the heat source); clothes dryer fires are a common residential fire cause

96. A truck company arriving at a working fire reports that the building's standpipe system shows a 4-inch FDC inlet with one cap missing. The most likely diagnostic interpretation is?

A. The FDC is unprotected (a missing cap allows debris, vandalism, or environmental damage to the FDC inlet); the operational impact may include difficulty connecting supply lines, possible blockage of the inlet, or evidence of past misuse of the FDC inlet

B. The FDC is operating normally

C. The cap is decorative

D. The FDC is brand new

97. A firefighter operating in a residence observes that the dishwasher in the kitchen is showing signs of fire damage with the dishwasher door open and dishes still inside. The most likely diagnostic interpretation is?

A. The dishwasher is normal

B. The dishwasher may have been operating at the time of the fire, with possible appliance malfunction as a contributing cause; alternatively, the dishwasher may have been damaged by external fire spread; the appliance examination by the investigator can determine the relationship

C. The dishwasher is unrelated

D. The dishwasher is decorative

98. A pump operator at a working fire observes that the engine RPM is high but the discharge pressure is not building proportionally. The most likely cause is?

A. The pump may be experiencing internal slippage, the pump may be cavitating, the pump may have a malfunctioning impeller, or the pump may be requiring more priming; the throttle-pressure relationship indicates an inefficiency in the pump's hydraulic operation that requires diagnosis

B. The pump is operating normally

C. The pump is undersized

D. The discharge pressure is correct

99. A truck company operating in a residential basement observes that the basement floor shows extensive water damage with standing water and items afloat. The most likely diagnostic interpretation is?

A. The basement is undamaged

B. The water damage may be from suppression operations, from a burst pipe related to the fire (heat-damaged plumbing), or from a pre-existing condition; the salvage operations should address the water removal, content protection, and documentation of the conditions

C. The water is from outside

D. The water is normal

100. A firefighter conducting investigation finds that the residence has a fire pattern that originated in the basement, with the fire spread following an apparent path from the basement to the first floor and then to the attic. The most likely diagnostic interpretation is?

A. The pattern is unrelated

B. The pattern is normal

C. The pattern indicates vertical fire spread through the structure (typical basement-fire pattern with fire rising through floor openings, mechanical chases, or stair openings to upper levels and into the attic); the basement origin and vertical-spread pattern are common in residential fire scenarios

D. The pattern is from cooling

101. A pump operator at a working fire reports that one of the discharge lines has lost pressure suddenly while the other discharge lines remain at normal pressure. The most likely cause is?

A. The line may have burst, the attack crew may have shut down the nozzle, the line may have a kink that has progressed to a full blockage, or a coupling may have separated; the pump operator should communicate to the attack crew and investigate the line for the specific cause

B. The pump is operating normally

C. The pump has lost power

D. All discharge lines have lost pressure

102. A firefighter conducting investigation finds that the residence has a fireplace with significant creosote buildup in the chimney visible from below. The most likely diagnostic interpretation is?

A. The creosote is a known fire risk (creosote is a flammable byproduct of incomplete combustion that accumulates in chimneys; creosote fires can produce high temperatures that damage the chimney and ignite adjacent structures); the chimney condition is potentially relevant to any chimney-fire investigation

B. The fireplace is normal

C. The fireplace is decorative

D. The fireplace is unrelated

103. A truck company operating in a residence observes that the kitchen has a deep fryer with grease still inside, with the fryer surface showing signs of fire damage. The most likely diagnostic interpretation is?

A. The fryer is normal

B. The fryer may have been operating with the grease overheating to its auto-ignition temperature, with the grease producing the fire; the most common cause of commercial and residential deep-fryer fires is overheating of the cooking oil

- C. The fryer is decorative
- D. The fryer is unrelated

104. A firefighter operating in a residence observes that a smoke detector on the ceiling shows the green power indicator and a recent yellow indication near the test button. The most likely diagnostic interpretation is?

- A. The smoke detector is malfunctioning
- B. The detector is decorative
- C. The detector is unrelated
- D. The smoke detector was operational during the fire (the green indicator shows power, and the yellow may indicate the detector was recently tested or activated); the operational status of the detector during the fire is potentially relevant to the fire-discovery timeline

105. A pump operator at a working fire reports that the discharge pressure gauge is reading correctly but the attack crew at the nozzle reports that the stream has weak reach and reduced effect. The most likely cause is?

- A. The pump is malfunctioning
- B. The attack crew is wrong
- C. The line between the pump and the nozzle has developed significant friction loss (typical causes: kink in the line, partial blockage from debris, or an unrecognized appliance restriction); the actual delivery pressure at the nozzle is lower than the discharge pressure indicates
- D. The fire is large

106. A firefighter conducting investigation finds that the residence has a propane gas line connection that shows signs of corrosion and a faint smell of propane in the area. The most likely diagnostic interpretation is?

- A. The corroded connection may be leaking propane, with the gas accumulating in the area and potentially providing a fuel source for the fire; the connection should be examined by the investigator and the gas line isolated for safety

- B. The propane line is normal
- C. The corrosion is from water
- D. The propane is unrelated

107. A truck company operating in a residence observes that the bedroom of origin has the lights still on (the bulb visible through the smoke). The most likely diagnostic interpretation is?

- A. The lights were on at the time of the fire
- B. The lights were turned on before the fire started, indicating the room was being used or occupied at the time of ignition; the lights remained on through the fire (the electrical circuit has been intact); the investigator can use this information for the fire timeline
- C. The lights are decorative
- D. The lights are unrelated

108. A firefighter operating a hose line in a residential basement observes that the water from the hose is flowing on the floor and pooling rather than reaching the fire. The most likely cause is?

- A. The hose is broken
- B. The stream is incorrect
- C. The basement layout (multiple rooms, walls, obstructions) is preventing the stream from reaching the fire location; the attack approach may need to be modified to address the layout, possibly with additional crews to address multiple basement areas or a different attack position
- D. The pump is broken

109. A pump operator at a working fire observes that the apparatus's external warning lights are operating normally but the spotlights for scene illumination are dimming. The most likely cause is?

- A. The lights are normal
- B. The pump is overheating
- C. The lights are decorative

D. The spotlights are drawing significant power, with the apparatus electrical system unable to supply both pump-running power and illumination at full intensity; the operator should balance the electrical loads or consider supplemental scene lighting

110. A firefighter conducting investigation finds that the residence has a kitchen with a microwave oven that is open with food inside, and the microwave showing fire damage. The most likely diagnostic interpretation is?

A. The microwave is normal

B. The microwave may have been operating at the time of the fire, with possible food ignition (overheating, foreign objects in the microwave, microwave malfunction); microwave-related fires can result from various causes including operator error, appliance malfunction, or improper materials in the microwave

C. The microwave is decorative

D. The microwave is unrelated

111. A truck company operating in a residence observes that the entry door has been forced by fire department arrival, but additional damage to the door frame is visible that does not appear to match the forcible entry. The most likely diagnostic interpretation is?

A. The door is normal

B. The damage is from the fire

C. The additional damage is consistent with possible forced entry before fire department arrival (suggesting pre-fire entry by an occupant, neighbor, or possibly an intruder); the timing and circumstances should be documented and reported to the investigator for examination

D. The damage is from cleaning

112. A pump operator at a working fire reports that the apparatus's high-pressure hydraulic system (for rescue tool operation) is showing reduced effectiveness during use. The most likely cause is?

A. The hydraulic system is operating normally

B. The hydraulic tools are correctly used

C. The crew is incorrect

D. The hydraulic fluid may be low, the hydraulic system may have a leak, or the hydraulic pump may be malfunctioning; the operator should check the fluid level, inspect for leaks, and verify the pump operation

113. A firefighter conducting investigation finds that the residence has a gas stove with all four burners showing varying degrees of fire damage. The most likely diagnostic interpretation is?

A. The stove is normal

B. The stove is decorative

C. Multiple burners may have been operating simultaneously at the time of the fire (consistent with unattended cooking or simultaneous food preparation), or the stove was a victim of fire spread from an adjacent area; the investigator can determine the cause based on burner condition, food remains, and fire pattern

D. The stove is unrelated

114. A truck company operating in a residence observes that one of the windows on the involved side has been broken outward (glass debris on the exterior). The most likely diagnostic interpretation is?

A. The window was broken before the fire

B. The window was broken from the inside, either by an occupant attempting to escape, by ventilation (heat-induced breakage with shards falling outward), or by ventilation operations of the fire department; the window failure direction is consistent with internal fire pressure

C. The window is decorative

D. The window is unrelated

115. A pump operator reports that the apparatus is showing a "low oil pressure" warning on the dashboard during pump operations. The most likely cause is?

A. The warning is decorative

B. The pump is operating normally

C. The engine's oil supply may be low, the engine may have an oil leak, or the engine's oil pump may be malfunctioning; the operator should shut down the engine for inspection (continued operation with low oil pressure can cause severe engine damage) and consider relief apparatus

D. The warning is incorrect

116. A firefighter conducting investigation finds that the residence has a gas furnace with the access panel open and the burner area showing fire damage. The most likely diagnostic interpretation is?

A. The furnace is normal

B. The furnace is decorative

C. The furnace may have been the ignition source (improper combustion, faulty gas valve, blockage in the flue, or pilot light failure with gas accumulation); the access panel being open may indicate recent service or attempted operator intervention before the fire

D. The furnace is unrelated

117. A truck company arriving at a working fire reports that the structure has multiple windows showing flames extending outside the structure. The most likely diagnostic interpretation is?

A. The fire is small

B. The structure has multiple involved rooms with fire venting through the windows; the operational implication is significant fire involvement, possible structural damage, and substantial fire-control challenge — defensive operations may be appropriate given the extent

C. The flames are normal

D. The windows are decorative

118. A firefighter conducting investigation finds that the residence has multiple electrical outlets with extension cords from one outlet being connected to power strips at multiple other outlets in a circular arrangement. The most likely diagnostic interpretation is?

A. The arrangement is normal

B. The "circular" arrangement is not electrically meaningful (electrical circuits cannot be daisy-chained in a circle), suggesting either an unusual configuration or a misinterpretation of the visible arrangement;

the actual electrical condition should be examined by the investigator for any potential overload or fault conditions

- C. The arrangement is decorative
- D. The arrangement is unrelated

119. A pump operator at a working fire observes that the engine is "lugging" — the engine sounds labored despite the throttle being applied. The most likely cause is?

- A. The engine is operating normally
- B. The throttle is correct
- C. The engine is properly cooled
- D. The engine load exceeds the engine's power capability at the current RPM, possibly because the pump is being asked to deliver more pressure or flow than the engine can support, or because the engine is operating at a low RPM that limits power output; the operator should adjust throttle, reduce pump load, or shift to a higher engine RPM

120. A firefighter conducting investigation finds that the residence has a hot water heater in the basement with a significant amount of debris on top of the heater. The most likely diagnostic interpretation is?

- A. The water heater is normal
- B. The water heater is decorative
- C. The debris is from the fire
- D. Combustibles placed on top of a water heater create potential for ignition (the heater's surface temperature can reach high enough to ignite combustibles in direct contact, particularly with the pilot light's continuous combustion at the bottom); this is a code violation and a potential fire-cause consideration

121. A truck company operating in a residence observes that the residential central air conditioner unit (outside, on the exterior wall) shows fire damage on the side facing the structure. The most likely diagnostic interpretation is?

- A. The air conditioner is consistent with fire damage from the structure's interior, with heat radiating outward through the wall to damage the exterior unit; the air conditioner unit is unlikely to be the ignition source
- B. The air conditioner is the ignition source
- C. The air conditioner is normal
- D. The air conditioner is unrelated

122. A pump operator at a working fire reports that an attempt to engage a second discharge has resulted in no water flow from that discharge despite the supply being adequate. The most likely cause is?

- A. The pump is malfunctioning
- B. The supply is wrong
- C. The discharge valve may not be opening (jammed, broken handle, valve failure), the discharge gate at the apparatus may be obstructed, or the discharge fitting may have a blockage; the operator should check the valve operation and the discharge line
- D. The crew is incorrect

123. A firefighter conducting investigation finds that the residence has a Christmas tree with the lights still plugged in and the tree showing extensive char from a fire that radiated outward from the tree. The most likely diagnostic interpretation is?

- A. The tree is normal
- B. The lights are unrelated
- C. The Christmas tree fire pattern (radiating outward from the tree itself) is consistent with the tree being the ignition source; common Christmas tree fire causes include faulty/overloaded lighting, candles too close to the tree, dry tree conditions, and electrical heat sources
- D. The tree is decorative

124. A truck company operating in a residence observes that the only smoke alarm in the residence is mounted in the attached garage rather than in the living areas. The most likely diagnostic interpretation is?

- A. The detector is normal
- B. The detector is decorative
- C. The detector is correctly positioned
- D. The smoke alarm placement is inadequate (smoke alarms are required in living areas and bedrooms per NFPA 72 and most local codes); the attached-garage placement provides little warning value for fires originating in the living areas, where occupants would be most at risk

125. A pump operator reports that the apparatus engine is running rough with intermittent stalling during pump operations. The most likely cause is?

- A. The engine is operating normally
- B. The pump is correct
- C. The fuel system may have an issue (water in fuel, clogged fuel filter, malfunctioning fuel injector, or low fuel level), the air filter may be clogged, or the engine may have an ignition system problem; the operator should diagnose the engine condition and consider relief apparatus for continued operations
- D. The throttle is incorrect

126. A firefighter conducting investigation finds that the residence has a fireplace with the damper closed and ash and partial fire remains visible in the firebox. The most likely diagnostic interpretation is?

- A. The fireplace is normal
- B. The fireplace is decorative
- C. The fireplace was used recently, with the closed damper possibly trapping carbon monoxide and other combustion products in the structure; if the fire was related to the fireplace, the damper position may have contributed to the fire's progression
- D. The fireplace is unrelated

127. A truck company arriving at a residential structure fire observes that the front door has a "doormat" of synthetic material extending into the entrance. The most likely operational concern is?

- A. The doormat is decorative

B. The doormat could be a tripping hazard for fire personnel entering and exiting through the front door, particularly under low-visibility smoke conditions; the doormat may need to be removed or repositioned for safe operations

C. The doormat is normal

D. The doormat is unrelated

128. A firefighter operating a thermal imaging camera in a smoke-filled hallway observes that one specific section of the wall shows a uniformly white-hot signature extending from floor to ceiling. The most likely diagnostic interpretation is?

A. The wall is normal

B. The wall section may have active fire on the opposite side (perhaps in a void space or adjacent room), with the high thermal signature indicating substantial heat transfer through the wall; the area should be approached with caution and possibly opened for inspection and suppression

C. The TIC is malfunctioning

D. The wall is decorative

129. A pump operator at a working fire observes that the relief valve on the pump panel is dumping water during pump operations, with water visible flowing from the relief discharge. The most likely cause is?

A. The relief valve is operating normally (the relief valve is functioning as designed to prevent pump overpressure, suggesting that either the pump pressure has been set too high or one of the discharge lines has been shut down quickly, causing the pump to react to the pressure spike)

B. The pump is malfunctioning

C. The relief valve is decorative

D. The relief valve is correctly set to release water during normal operations as a safety feature; the dumping indicates that the relief is being triggered, suggesting a pressure spike from discharge line shutdown or operator pressure setting

130. A firefighter conducting investigation finds that the residence has a recently installed solar electrical system with visible wiring leading to the residence. The most likely diagnostic interpretation is?

- A. The solar system is normal
- B. The solar system is decorative
- C. The solar system is unrelated
- D. The solar electrical system creates potential post-fire electrical hazard (the photovoltaic panels can produce voltage as long as light reaches them, with the DC electrical system possibly energized even after the AC service is disconnected); the operational implication is electrical safety during overhaul, and the system should be coordinated with the utility and solar installer for proper isolation

131. A truck company operating in a residence observes that the kitchen has a wall-mounted spice rack adjacent to the stove, with the spices in plastic bottles. The most likely diagnostic interpretation is?

- A. The plastic spice bottles in close proximity to the stove may have melted or contributed to the fire if exposed to heat; the kitchen layout is a potential consideration in cooking fire dynamics
- B. The spice rack is normal
- C. The spice rack is decorative
- D. The spice rack is unrelated

132. A pump operator at a working fire observes that the engine compartment is showing visible smoke and the engine temperature gauge is reading at the maximum range. The most likely cause is?

- A. The engine is operating normally
- B. The pump is correct
- C. The engine compartment is decorative
- D. The engine is severely overheating (the engine cooling system has failed or is unable to dissipate the heat at the current load); the engine should be shut down immediately to prevent severe damage, with relief apparatus deployed and the apparatus taken out of service for repair

133. A firefighter conducting investigation finds that the residence has a portable space heater with the heating element exposed and combustible material visible nearby. The most likely diagnostic interpretation is?

- A. The space heater is normal

B. The space heater with exposed heating element in proximity to combustibles is a common residential fire cause; the heater may have ignited the combustibles, or it may have malfunctioned and ignited; the investigator can determine the specific cause based on the equipment and surroundings

C. The space heater is decorative

D. The space heater is unrelated

134. A truck company operating in a residence observes that the residence has a kitchen with grease accumulation on the range hood and the kitchen ceiling. The most likely diagnostic interpretation is?

A. The grease is decorative

B. The grease is unrelated

C. The grease accumulation provides additional combustible material in the kitchen, which can ignite during a cooking fire and contribute to fire growth and spread to the surrounding areas

D. The grease is normal

135. A pump operator at a working fire reports that the foam-education system is engaged but the foam concentrate level is dropping rapidly. The most likely cause is?

A. The foam-education is normal

B. The foam concentrate is correct

C. The foam is decorative

D. The foam-education system is consuming foam concentrate at the rated proportioning rate (3% or 6% depending on the application); the operator should monitor the concentrate level and ensure adequate foam supply for sustained operations, with consideration of supplemental foam supply for extended operations

136. A firefighter conducting investigation finds that the residence has an electrical outlet with two-prong appliance cords plugged in (older two-wire system) but the outlet is a three-prong grounded outlet. The most likely diagnostic interpretation is?

A. The use of two-prong cords in a three-prong outlet does not provide the grounding function; while this combination is not inherently fire-causing, it does limit the safety protection for the connected appliances and may indicate older electrical equipment in use

- B. The outlets are normal
- C. The cords are decorative
- D. The cords are unrelated

137. A truck company operating in a residence observes that the dining room has a chandelier suspended from the ceiling with visible signs of fire damage on the chandelier and the surrounding ceiling area. The most likely diagnostic interpretation is?

- A. The chandelier is normal
- B. The chandelier is decorative
- C. The chandelier is unrelated
- D. The chandelier may have been the ignition source (electrical fault in the wiring or fixture, faulty bulb, or overload condition), or it may have been damaged by fire spread from another source; the chandelier's electrical condition and fire pattern around it should be examined by the investigator

138. A pump operator at a working fire reports that the apparatus's high-band radio is producing static and intermittent transmissions. The most likely cause is?

- A. The radio is operating normally
- B. The radio is decorative
- C. The radio may have a transmission issue (low battery, antenna problem, terrain obstruction between transmitting and receiving units, or interference from other radio sources); the operator should troubleshoot the radio while attempting alternative communication methods
- D. The crew is incorrect

139. A firefighter conducting investigation finds that the residence has a portable propane tank with the valve open and the tank empty. The most likely diagnostic interpretation is?

- A. The propane tank is normal
- B. The empty propane tank with the valve open is consistent with the tank having released its propane content into the area, providing a fuel source for the fire; the tank's role in the fire's development should be examined by the investigator

- C. The propane tank is decorative
- D. The propane tank is unrelated

140. A truck company arriving at a residential structure fire observes that the structure has window air conditioner units in the windows of the involved area. The most likely diagnostic interpretation is?

- A. The window air conditioners may have contributed to the fire (electrical fault in the AC unit or its wiring, or the AC unit may have provided a path for fire spread through the window opening); the AC units and their wiring should be examined by the investigator
- B. The air conditioners are normal
- C. The air conditioners are decorative
- D. The air conditioners are unrelated

141. A pump operator at a working fire observes that the pump's discharge gauge reads 200 psi but the engineer reports the gauge has been "stuck" at 200 psi throughout the operation despite various throttle changes. The most likely cause is?

- A. The pump is operating at exactly 200 psi
- B. The gauge is reading correctly
- C. The pump is broken
- D. The gauge has a mechanical malfunction (stuck needle, damaged gauge mechanism, or air bubble in the gauge line) causing it to fail to respond to actual pressure changes; the operator should verify the actual pump pressure using alternative gauges or pump-discharge testing and take the gauge out of service for repair

142. A firefighter conducting investigation finds that the residence has a gas grill on a wooden deck immediately adjacent to the structure's vinyl siding. The most likely diagnostic interpretation is?

- A. The grill is decorative
- B. The grill on a wooden deck adjacent to vinyl siding creates significant fire risk (heat from the grill can ignite the deck, the heat can melt and ignite the vinyl siding, and the proximity to the structure exposes

the structure to the fire); this is a common cause of residential fires that begin outside and spread to the structure

- C. The grill is normal
- D. The grill is unrelated

143. A truck company arriving at a working fire observes that the structure has heavy fire involvement on the ground floor with flames extending from the front entrance. The most likely diagnostic interpretation is?

- A. The fire is small
- B. The fire has progressed beyond the incipient stage and is fully developed in the ground-floor area, with the entrance flow path serving as a major heat and smoke exhaust; the operational situation requires significant resources for control and likely defensive consideration
- C. The fire is contained
- D. The flames are decorative

144. A pump operator at a working fire observes that the supply hydrant has a flag showing "out of service" and the water flow is reduced compared to normal. The most likely cause is?

- A. The hydrant is flagged out of service for a reason (typical reasons: low flow, mechanical issue, maintenance status), and the reduced flow is consistent with the flag; the supply must be supplemented with alternative water sources for sustained operations
- B. The flag is decorative
- C. The hydrant is normal
- D. The flag is incorrect

145. A firefighter conducting investigation finds that the residence has a fire pattern consistent with the fire originating in an electrical panel that shows extensive heat damage. The most likely diagnostic interpretation is?

- A. The electrical panel is normal

B. The electrical panel fire pattern is consistent with electrical-related ignition (fault in the panel, overload condition, or electrical arc); the investigator can determine the specific cause based on the panel condition, the electrical loads, and the fire pattern

C. The electrical panel is decorative

D. The electrical panel is unrelated

146. A truck company operating in a residence observes that the bathroom has water flowing from the ceiling, with no fire visible in the bathroom but apparent fire damage above. The most likely diagnostic interpretation is?

A. The bathroom is normal

B. The bathroom is decorative

C. Fire above the bathroom has damaged the plumbing, with the water now flowing through the bathroom; the bathroom is suffering water damage from the fire above, and the salvage operations should address the water flow

D. The bathroom is unrelated

147. A pump operator at a working fire reports that the apparatus has been operating continuously for 4 hours and the pump bearings are showing signs of heat (the bearing housing is hot to the touch through the access cover). The most likely cause is?

A. The bearings are operating normally

B. The bearings are correctly maintained

C. Extended pump operation has heated the bearings, possibly with inadequate lubrication or wear; the bearings may continue to function but should be monitored, with consideration of relief apparatus and post-incident bearing inspection

D. The bearings are decorative

148. A firefighter conducting investigation finds that the residence has been recently vacant (no signs of recent occupation, dust accumulation, utilities possibly disconnected). The most likely diagnostic interpretation is?

A. The residence's vacant status is relevant context for the investigation; vacant structures have different cause-and-origin considerations than occupied structures (possibly squatters, vandalism, deliberate ignition, electrical malfunction in unattended systems); the vacancy timeline and circumstances should be documented

B. The residence is normal

C. The residence is decorative

D. The residence is unrelated

149. A truck company operating in a residence observes that the residence has multiple aerosol cans (paint, hair spray, cleaning products) in various rooms, with some cans showing signs of fire damage and burst caps. The most likely diagnostic interpretation is?

A. The cans are normal

B. The cans are decorative

C. The aerosol cans heated during the fire produce internal pressure that can rupture the cans (typically with the burst caps being projected outward and possibly the can itself becoming a projectile); the aerosol cans are a known fire hazard and the rupture pattern is consistent with fire exposure

D. The cans are unrelated

150. A pump operator at a working fire is approaching the end of a 6-hour continuous operation. The pump operator reports difficulty maintaining attention, slow reaction time to gauge changes, and some confusion about commands. The most likely diagnostic interpretation and action is?

A. The pump operator is normal

B. The pump operator is showing signs of fatigue affecting cognitive performance and operational safety; the pump operator should be relieved by a fresh operator, with the fatigued operator transitioning to rehab for assessment, hydration, food, rest, and medical monitoring per NFPA 1584

C. The pump operator is fine

D. The pump operator is incorrect

## PRACTICE EXAM 16 – ANSWER KEY AND EXPLANATIONS

- 1. A** — The low-air alarm is malfunctioning and requires the SCBA to be taken out of service for repair. A 4,500 psi full cylinder reading should not produce a low-air alarm activation; the alarm is designed to activate at one-third pressure (1,500 psi). The malfunction compromises the safety function and requires immediate corrective maintenance.
- 2. A** — The supply hydrant flow is decreasing or the supply line has developed a leak or kink reducing inflow. Discharge pressure drop without throttle or operator change indicates a supply-side issue; the pump can only deliver what it receives. The operator should investigate the supply chain and address the cause.
- 3. C** — The ladder should be taken out of service and the halyard inspected/replaced per NFPA 1932 before the ladder is returned to service. Halyard fraying and visible cuts compromise the load-bearing capacity required for safe ladder extension. Continued use risks halyard failure during operations.
- 4. D** — A kink, blockage, or wye/appliance restriction in the line is creating excessive friction loss between the pump and the nozzle. The 175 psi discharge pressure should produce adequate stream characteristics; the weak stream indicates that pressure is being lost between the pump and the nozzle. The line should be checked for kinks or obstructions.
- 5. C** — The placement angle is too steep (approximately 85+ degrees rather than the standard 75 degrees, with risk of tipping backward during climbing). A 24-foot ladder requires approximately 6 feet of butt offset (1:4 ratio); 2 feet produces a near-vertical angle with significant fall-back risk under climber weight transfer.
- 6. C** — Air is entering the line (typically from a leak between pump and nozzle, low water supply causing pump cavitation, or air bleed-back from the nozzle when partially shut). Inconsistent pulsing stream is a classic indication of air contamination disrupting the water column.
- 7. A** — An air leak in the suction hose, suction couplings, or pump suction side, preventing the priming system from creating the vacuum needed to draw water. The priming system depends on a sealed vacuum chamber; any air leak prevents the system from drawing water from the source.
- 8. B** — Stop, communicate the situation, follow the hose line back to a known reference point, and re-establish orientation with the wall. The hose line is the firefighter's reference back to safety; continued advance in lost orientation increases the entrapment risk. Communication ensures crew awareness and support.
- 9. B** — The pump is demanding more water than the hydrant can supply, with the pressure dropping toward zero or vacuum; continued operation risks pump cavitation and damage. Negative intake pressure indicates the pump is "starving" — drawing harder than the supply can provide.
- 10. D** — The smoke detector should be preserved in place (with location and condition documented) for the investigator, since detector status is potentially relevant evidence. The pre-fire operational state of the

detector (powered, with batteries, in correct location) is significant investigative information that requires factual preservation.

**11. D** — The truck company has begun coordinated ventilation, drawing the smoke layer upward and producing a thermal-layer separation that improves the lower atmosphere. The improving conditions match the expected effect of vertical ventilation removing heat and smoke from the upper layer.

**12. B** — The TIC is operating at temperature saturation (the high-heat conditions exceed the TIC's contrast range, washing out individual temperature differences); careful repositioning or use of contrast modes may improve the image. The "white-out" image indicates extreme fire conditions beyond the camera's normal contrast range.

**13. B** — A PASS device alarm (the pulsing/cycling pattern characteristic of PASS pre-alarm or alarm activation) indicating a possibly motionless or trapped firefighter in the area. PASS-device sound patterns are specific and recognizable; the pulsing pattern is the device's signature alert.

**14. A** — Verify the correct address with dispatch and confirm before committing to a specific location (transposed numbers are a common dispatch communication error and the wrong-address response is a known operational risk). Address verification prevents wrong-location responses that can compromise the actual incident's outcome.

**15. A** — The PASS device's pre-alarm activation due to motionless period during a task that required holding still (the device requires deliberate manual reset and continued motion to prevent full alarm). The pre-alarm is the device's intermediate warning before full alarm; movement or manual reset prevents progression to full alarm.

**16. C** — Stop, communicate to crew positioning the line, deploy additional hose to make turns with appropriate flake or have crew members reposition at corners to manage the line. Hose management at turns requires deliberate flaking or pivot personnel to allow the line to advance smoothly.

**17. B** — The single-head activation has controlled the fire (sprinklers are designed for head-by-head activation, with most fires controlled by 1-3 heads in a properly designed system). NFPA fire-incident data shows the majority of sprinkler-controlled fires involve only 1-3 heads.

**18. A** — The two gauges are reading different points in the system; the discharge gauge reflects pressure after the discharge valve, while the master gauge reflects the system before the valves. The unusual reading (discharge > master) suggests a gauge issue or anomalous system condition that should be diagnosed.

**19. A** — The fire is producing significant heat in the basement that is rising through floor compromise (fire-damaged floor structure transmitting heat upward) or smoke layer accumulation; the conditions indicate potential floor collapse and require immediate crew assessment. Floor compromise above a basement fire is a known collapse hazard.

**20. D** — The roof is showing signs of structural compromise from the fire below; operations should not proceed at this location and the crew should retreat to safer roof areas or alternative ventilation positions. Roof give and creaks are warning signs of imminent structural failure.

- 21. B** — The nozzle pressure is too low (smooth-bore handlines should operate at 50 psi nozzle pressure; lower pressure produces a stream with inadequate velocity and reach, reducing fire-attack effectiveness). Pressure deficit produces a weak ineffective stream.
- 22. B** — A sprinkler system has activated inside the structure or a residential service line has been damaged by the fire, with water flowing out; the active water flow may indicate that the building's sprinkler system is operating and providing some fire control. Water at the curb during a fire is a tactical indicator worth recognizing.
- 23. C** — The corrosion indicates the batteries were leaking before or during the fire (chemical reaction of leaking battery acid on the contacts), suggesting that the detector may not have been functional at the time of the fire. Leaking batteries are a common cause of non-functional smoke alarms.
- 24. C** — Additional sprinkler heads have activated, increasing the system flow demand; the dropping pressure indicates the system is moving more water and the pump must increase to maintain supply pressure. The supply pump must respond to increasing demand from system activation.
- 25. A** — Coordinate with utility for de-energization or confirm the panel is de-energized, then carefully open the wall to address fire extension; applying water to the energized panel risks electrical conductivity through the water stream. Electrical isolation precedes water application around panels.
- 26. D** — The actual heavy-work consumption rate was lower than the rated 40 L/min (likely because the operation was less strenuous than rated work conditions, with extensive periods of lower-effort activity); the consumption matches a moderate-work duration. Lower consumption than rated indicates less strenuous actual work.
- 27. B** — The outlet experienced electrical arcing damage with apparent ignition of nearby combustibles; the appliance loads, possible overloading, or fault conditions in the wiring should be examined by the investigator. Outlet melting/charring with adjacent fire damage is consistent with electrical-fault ignition.
- 28. B** — The conditions indicate possible backdraft potential — the fire has been oxygen-starved, the smoke is pulsing as the fire alternately consumes oxygen and pauses, and the conditions warrant immediate withdrawal until proper ventilation can be coordinated with attack. Pulsing/huffing smoke is a backdraft warning sign.
- 29. C** — The smoke alarms were operating normally during the fire (power indicators show electrical service to the alarms); their operation should be documented for the investigation. Green power LED on smoke alarms indicates the unit was electrically functional at the time of observation.
- 30. A** — The fallen material is char from fire extension into the void space; the void space contains active or recently-active fire that requires further investigation and suppression. Black/charcoal material from above a suspended ceiling is char from fire extension into the void.
- 31. A** — The fire is in the attic space and has spread across the entire attic, with smoke issuing through eave vents; the operational implication is significant attic involvement requiring vertical ventilation and aggressive overhaul of the attic space. Smoke from multiple eaves is the signature of full attic involvement.

- 32. D** — The pump has lost load (the discharge lines have shut down faster than the pump's relief or throttle could respond), causing the engine to over-rev; immediate throttle reduction and relief-valve check are required. Engine "runaway" on load loss requires immediate corrective response.
- 33. D** — The breaker was manually opened, either by the utility company (electrical isolation after the fire began), by the property owner (pre-fire or during the fire), or possibly during overhaul by fire crews; the timing and circumstances should be documented. Manual breaker opening has multiple possible explanations that require timeline investigation.
- 34. C** — Deep-seated fire remains within the collapse pile (the smoke indicates continued combustion in inaccessible areas); systematic exposure and selective overhaul are required, possibly with extended fire watch. Continued smoke 4 hours post-extinguishment is a clear deep-seated indicator.
- 35. D** — The smooth-bore tip may be partially obstructed (debris, hose lining failure, or foreign material has entered the tip and is reducing the effective tip diameter or disturbing the stream coherence). Stream degradation without pressure change indicates orifice-side issues.
- 36. A** — Installation error: smoke alarms should be installed on or near the ceiling because smoke rises and accumulates at the highest points; floor-level installation would substantially delay alarm activation. The detection physics requires ceiling placement.
- 37. A** — The system losses (5 psi/floor × 13 floors = 65 psi for elevation, plus standpipe friction loss, plus supply-line friction loss) are adding up to the difference; the pump operator should verify the supply line, standpipe pressure, and elevation calculation, and consider increasing pump discharge. High-rise standpipe calculations must account for all losses.
- 38. B** — The fire alarm system had pre-existing maintenance issues or malfunctions before the fire (the troubles existed before fire-related damage); the operational status of the alarm system during the fire may have been compromised. Pre-existing trouble conditions are relevant investigative information.
- 39. B** — The attic space is functioning as a continuous flow path for the fire; the fire has already spread laterally through the attic, and operations must address this attic involvement aggressively. Lateral attic spread in strip mall configurations is the principal exposure threat.
- 40. A** — The smoke layer is showing turbulent flow consistent with active fire activity beyond the visible area, with thermal layering and movement patterns indicating ongoing combustion and fire development; conditions warrant careful tactical assessment. Wave-like smoke patterns reflect active fire dynamics.
- 41. A** — The fluctuations indicate that the pump impeller is partially obstructed (debris, kinking on the suction side, low water supply pressure) or that air is present in the pump; the pulsing pattern reflects irregular water flow into the impeller. Pressure fluctuation in synchronization with pump pulse points to impeller-side issues.
- 42. D** — The detector was deliberately removed before the fire (typical reason: nuisance alarms from cooking), which would have eliminated the warning function; the timing of removal should be examined by the investigator. Removed-and-set-aside detectors are a common pre-fire occupant action.

- 43. B** — The water is being applied incorrectly — possibly applied to the smoke or upper gas layer rather than to the seat of the fire; effective cooling requires the water to reach the burning fuel itself. Smoke-cooling alone does not stop heat release from burning fuel.
- 44. D** — The drafting lift is approaching or exceeding the practical maximum (typically 20-22 feet at sea level), with the pump struggling to maintain a continuous water column; the sputtering reflects intermittent loss of priming. Excessive lift compromises drafting capability.
- 45. A** — The wind direction is changing the natural draft or PPV is creating opposing pressure; the ventilation effectiveness depends on the pressure differential between the structure interior and the exhaust opening, and reversed flow indicates an issue with the ventilation setup. Wind interaction with ventilation is a tactical consideration.
- 46. B** — The position of the wood (covering the floor area) protected the underlying floor from the fire's heat and direct flame contact; the area beneath the wood preserves a representation of pre-fire conditions. Protected areas under fallen materials provide important comparative evidence.
- 47. C** — The fire pump may not have been properly maintained or operated recently (NFPA 25 requires regular inspection, testing, and maintenance); the apparent lack of maintenance access raises concerns about the system's operational readiness. Maintenance status is operationally relevant.
- 48. D** — The toy provides evidence of the fire's heat exposure and possible ignition source consideration; the location, condition, and any ignition indicators on the toy should be documented and preserved for the investigator's examination, particularly if the area of origin involves children. Children's items in fire areas are sensitive investigative considerations.
- 49. A** — The transition reflects the fire's combustion improvement as ventilation is established (the initial dark, pressurized smoke reflects the under-ventilated fire conditions; lighter smoke as ventilation is established reflects better combustion); the ventilation is functioning effectively. Smoke transition signals ventilation success.
- 50. D** — Coordinate immediate hazmat support, establish substantial isolation distance, apply protective water lines for cooling the tank if safe to do so, and let the tank vent until pressure equalizes; the venting tank is releasing flammable gas under controlled conditions, but exposure to additional heat or ignition could escalate the situation. Active venting is a controlled release that should not be interrupted.
- 51. B** — The priming pump motor or pump itself has a mechanical issue, the suction connections have a major air leak, or the priming system is not engaging properly; the pump needs to be checked for the cause before drafting can be established. Absence of suction sound indicates priming system failure.
- 52. A** — The water heater is consistent with external fire damage from above (the upper char indicates heat from outside the heater, not from the heater itself); the heater is unlikely to have been the ignition source. Damage pattern direction is the diagnostic key.
- 53. A** — The hydrant flow is below the demand; the pump operator must communicate the supply limitation to command, the attack crews may need to reduce flow, and additional supply lines (mutual aid,

additional hydrants, alternate supply) may need to be established. Supply-vs-demand mismatch requires tactical adjustment.

**54. C** — The supply pressure to the standpipe system is inadequate (the FDC pressure plus building fire pump output must overcome the elevation pressure loss to deliver 100 psi at the 14th floor); the pump operator should be informed to increase supply pressure. Insufficient nozzle pressure traces back to supply.

**55. C** — The exhaust opening is not coordinated with the PPV — either the exhaust opening is too small, in the wrong location, or not established; effective PPV requires an appropriate exhaust opening downstream of the fan and the inlet should be sealed to direct the airflow. PPV without coordinated exhaust is ineffective.

**56. B** — The candle was in proximity to the curtain material with the candle's heat producing localized ignition of the curtain; this is a common ignition scenario where combustible materials are positioned too close to an open-flame heat source. Proximity to ignition source is the cause pattern.

**57. C** — The pattern is consistent with possible multiple ignition points (either accidental from multiple causes or possibly incendiary); the pattern requires careful investigation to determine the cause(s). Multiple non-adjacent points of fire are a recognized incendiary indicator.

**58. C** — The hydrant was used before fire department arrival — possibly by an occupant, neighbor, or other person attempting initial suppression with a garden hose; the prior water use does not indicate a hydrant issue. Pre-arrival water use is a benign explanation for a wet barrel.

**59. A** — The water is reaching the fire but the fire's heat-release rate exceeds the suppression capability of the 250 gpm flow — the fire load and intensity may require greater flow (master stream, additional attack lines) for control. Flow-to-fire-size mismatch requires escalation.

**60. C** — The high-thermal-signature area indicates hidden fire in the wall void (the heat from the fire is transmitting through the wall material to the surface where the TIC detects it); the area should be opened for inspection and suppression. TIC heat differential through a wall indicates void-space fire.

**61. D** — The saw is engaging with roof material it was not designed to cut (possibly truss connectors, ridge boards, or other engineered components), or the blade is dulling; the operator should disengage, inspect the saw, and reassess the cutting location. Cutting sound changes signal saw or material issues.

**62. A** — The grease buildup increases the fuel load in the area, providing more available combustibles in case of a cooking-related ignition; the kitchen condition may be relevant to the fire's growth dynamics. Grease accumulation contributes to fire intensity in cooking-related events.

**63. C** — The roof opening is releasing the combustion products as designed; the hot embers and small flame indicate that fire is in or near the immediate area below the opening, and crews on the roof should maintain safety distance and be prepared for active fire behavior. Hot embers and flame from vent openings are expected indicators of active fire below.

- 64. D** — The pump is cavitating (the pump is demanding more water than the supply can provide, with vapor bubbles forming in the pump and collapsing as the impeller compresses them); the operator should reduce throttle, address the supply issue, or shut down the pump to prevent damage. Pump knocking is the classic cavitation sound signature.
- 65. A** — The smoke alarm was non-functional during the fire (no power source available), eliminating the warning function for occupants; the absence of detection capability is consistent with delayed fire discovery and possibly contributed to the fire's growth before detection. No power = no detection = no warning.
- 66. C** — The pattern is consistent with an ignition source at that specific point, with the radiating char indicating the fire's growth from that location; the area should be carefully examined for evidence of the ignition source. Radiating char patterns identify the point of origin.
- 67. D** — The apparatus fuel is becoming exhausted, with the engine fuel system unable to maintain consistent fuel supply; the apparatus needs immediate refueling to continue pump operations, with consideration of relief apparatus. Sputtering engine on low fuel reading is a clear diagnostic.
- 68. A** — The area indicates a heat source beneath the floor or floor compromise from fire below; the area should be approached with caution as it may indicate basement fire conditions and possible floor collapse. Floor TIC heat signatures warn of basement fire involvement.
- 69. D** — There may be a SCBA mask seal issue (with smoke bypassing the mask) or the smoke contains particularly irritating compounds that are penetrating the mask seal; the firefighter should check the mask seal, communicate to crew, and prepare to withdraw if conditions cannot be addressed. SCBA irritation symptoms indicate seal compromise.
- 70. B** — The engine is overheating (typical causes: low coolant, blocked radiator, malfunctioning thermostat, or extended idle operation in high temperatures); the operator should monitor the temperature, ensure adequate engine cooling, and consider shutdown if temperature continues rising. Steam from engine compartment with high coolant temperature is unambiguous overheating.
- 71. A** — The nozzle has been damaged or contains debris that is disrupting the stream pattern, or the hose has a hidden defect (hose lining failure) that is producing inconsistent flow; the nozzle should be inspected and possibly replaced. Stream pattern disruption traces to nozzle or hose defect.
- 72. A** — The HVAC system is moving smoke throughout the building, spreading fire products to uninvolved areas and complicating the operational situation; the system should be isolated for the fire floor and supported in smoke-management mode if available, in coordination with the building engineer. Active HVAC during fire spreads smoke.
- 73. C** — The setup creates potential electrical overload (the daisy-chained connections with multiple high-wattage devices may exceed the capacity of the circuit, the power strip, or the extension cord, with possible arcing or overheating ignition); the area should be examined for evidence of electrical fault. Daisy-chained electrical setups are common ignition sources.

**74. B** — The hooks were not deployed or were not positioned correctly over the ridge, or the ridge configuration does not support standard hook engagement; the ladder may slide and the truck crew should reset the ladder with proper hook engagement before continuing operations. Hook misengagement creates ladder sliding risk.

**75. A** — The pattern is consistent with combustibles in close proximity to the stove (improper clearance from the stove to the wall and floor, or improper installation); the heat from the stove can radiate and conduct to the wall and floor, with eventual ignition; the installation should be examined by the investigator for code compliance. Insufficient stove clearance is a recognized cause pattern.

**76. B** — The discharge gauge of the supply engine has a malfunction or has been turned off, or the gauge connection is incorrect; the operational status is verified by the receiving engine's intake gauge, but the supply engine's gauge issue should be addressed for proper monitoring. Cross-verification confirms gauge issue.

**77. D** — The ladder is being overloaded (typical causes: multiple firefighters on the ladder simultaneously, with combined weight exceeding the ladder's rating, or equipment being hauled up the ladder); the ladder should be taken out of service for inspection per NFPA 1932. Ladder bending is a recognized overload indicator.

**78. C** — The fuel load in the room exceeds what the 150 gpm flow can suppress, possibly requiring transition to a 2½-inch attack line or assistance with a second 1¾-inch line; the flow vs. fire-size relationship may have been misjudged. Flow-to-fire-load mismatch requires tactical adjustment.

**79. D** — The strainer is doing its job (preventing debris from entering the pump), but continued operation will progressively reduce the effective flow through the strainer; the strainer should be cleared during a brief shutdown or the operation should be supplemented with an alternate water source. Strainer obstruction reduces operational flow.

**80. D** — The smoke detectors have been removed at some point before the fire; the absence of detectors eliminates the warning function and may have contributed to the fire's growth before discovery, particularly if the residence was occupied during the fire. Mounting holes without detectors are evidence of removal.

**81. C** — The closed bedroom door has protected the bedroom from the hallway fire, with the door's resistance limiting fire spread into the bedroom; the bedroom occupants, if present, would have benefited from the closed-door protection (a key fire-safety practice). The "close before you doze" principle in action.

**82. A** — The stream momentum may be insufficient (the master stream tip's flow rate may be lower than the fire's heat-release rate, or the stream is being applied at an angle that reduces effectiveness, or the master stream is being applied from too far away allowing the stream to dissipate); the operational placement and flow may need adjustment. Master stream effectiveness depends on multiple variables.

**83. B** — The child was protected from the fire by the closed door but may have been overcome by carbon monoxide and other combustion products that penetrated the door over time, or by lack of oxygen as the

fire consumed the room's atmosphere; rapid removal and EMS care are essential. Doors slow but do not stop combustion-product penetration.

**84. D** — The flag indicates that the hydrant was reported out of service (possibly due to inadequate flow, mechanical damage, or maintenance), but it is currently providing water; the flow may be intermittent or lower than expected, and the supply should be supplemented with an alternative source. Out-of-service hydrants warrant supplemental supply.

**85. C** — The lamp's heat (halogen lamps can reach 500-1000°F at the bulb surface) in close proximity to combustible clothing creates a potential ignition source; the area should be examined for ignition evidence. Halogen-lamp ignition of fabric is a known fire cause.

**86. A** — Withdraw all personnel from the structure, request gas utility for shutoff, coordinate atmospheric monitoring, and establish an isolation perimeter; the natural gas leak could ignite catastrophically and the immediate priority is personnel safety. Active gas leak risk drives immediate withdrawal.

**87. D** — The pump and other electrical loads are exceeding the apparatus's electrical generation capacity, with the battery providing supplemental power and being drawn down; the operator should manage electrical loads, ensure the engine is producing adequate charging, or consider supplemental power. Apparatus electrical-load management is operational reality.

**88. D** — The renovation creates several potential fire causes: heat sources (welding, cutting torches, electrical work), combustible construction materials in unusual configurations, and possibly disabled or modified fire-protection systems; the investigator should examine the renovation activities and timeline as part of the cause investigation. Active construction is a recognized fire-cause context.

**89. B** — The standpipe outlet has a pressure-reducing valve installed (common in modern standpipe systems to limit pressure for hand-line operation safety), or the outlet is partially closed; the operator should check the outlet valve and ensure full flow is available. PRVs in modern standpipes are a frequent cause of low nozzle pressure.

**90. B** — The pattern is consistent with cooking-related ignition (typical cooking fire pattern with burner-area origin and spread to surrounding cabinetry); the most common cause of residential cooking fires is unattended cooking. Stove-burner origin pattern is the cooking-fire signature.

**91. D** — The supply pressure to the pump is decreasing (the hydrant or supply source flow is reducing as the pump demand exceeds the supply capability, or the supply line has developed a kink or obstruction), with the pump output following the supply. Discharge pressure follows supply.

**92. C** — The smoke characteristics are consistent with a fire that is either small, partially extinguished, or in a fuel-limited stage with reduced heat-release rate; the conditions are improving compared to higher-pressure smoke release. Low-pressure drifting smoke indicates reduced fire activity.

**93. D** — The breaker has been modified incorrectly — the higher amperage allows more current through the circuit than the wiring was designed to handle, with potential for wiring overheating and ignition; the

modification is a code violation and a potential contributing factor in any electrical fire. Oversized breakers defeat the overcurrent protection function.

**94. A** — The pump may be operating at an extreme RPM range, the pump may have a damaged impeller, the apparatus may be parked on unstable ground, or the pump may be cavitating; the operator should monitor the pump status, check the operating parameters, and consider shutdown if the shaking continues. Abnormal vibration is a multi-cause diagnostic.

**95. D** — The clogged lint filter creates significant ignition risk (the lint accumulation reduces airflow, causes the dryer to overheat, and provides combustible material in proximity to the heat source); clothes dryer fires are a common residential fire cause. Dryer-lint fires are a well-recognized residential fire-cause category.

**96. B** — The FDC is unprotected (a missing cap allows debris, vandalism, or environmental damage to the FDC inlet); the operational impact may include difficulty connecting supply lines, possible blockage of the inlet, or evidence of past misuse of the FDC inlet. Missing FDC caps create operational complications.

**97. B** — The dishwasher may have been operating at the time of the fire, with possible appliance malfunction as a contributing cause; alternatively, the dishwasher may have been damaged by external fire spread; the appliance examination by the investigator can determine the relationship. Appliance involvement requires investigative determination.

**98. A** — The pump may be experiencing internal slippage, the pump may be cavitating, the pump may have a malfunctioning impeller, or the pump may be requiring more priming; the throttle-pressure relationship indicates an inefficiency in the pump's hydraulic operation that requires diagnosis. RPM-without-pressure is a pump-side issue.

**99. B** — The water damage may be from suppression operations, from a burst pipe related to the fire (heat-damaged plumbing), or from a pre-existing condition; the salvage operations should address the water removal, content protection, and documentation of the conditions. Water in basements during fires has multiple sources.

**100. C** — The pattern indicates vertical fire spread through the structure (typical basement-fire pattern with fire rising through floor openings, mechanical chases, or stair openings to upper levels and into the attic); the basement origin and vertical-spread pattern are common in residential fire scenarios. Vertical spread paths are the basement-fire characteristic.

**101. A** — The line may have burst, the attack crew may have shut down the nozzle, the line may have a kink that has progressed to a full blockage, or a coupling may have separated; the pump operator should communicate to the attack crew and investigate the line for the specific cause. Sudden single-line pressure loss has multiple possible mechanisms.

**102. A** — The creosote is a known fire risk (creosote is a flammable byproduct of incomplete combustion that accumulates in chimneys; creosote fires can produce high temperatures that damage the chimney and

ignite adjacent structures); the chimney condition is potentially relevant to any chimney-fire investigation. Chimney creosote is a recognized fire cause.

**103. B** — The fryer may have been operating with the grease overheating to its auto-ignition temperature, with the grease producing the fire; the most common cause of commercial and residential deep-fryer fires is overheating of the cooking oil. Deep-fryer fires originate in overheated oil.

**104. D** — The smoke detector was operational during the fire (the green indicator shows power, and the yellow may indicate the detector was recently tested or activated); the operational status of the detector during the fire is potentially relevant to the fire-discovery timeline. Detector operational state is investigative evidence.

**105. C** — The line between the pump and the nozzle has developed significant friction loss (typical causes: kink in the line, partial blockage from debris, or an unrecognized appliance restriction); the actual delivery pressure at the nozzle is lower than the discharge pressure indicates. Hidden friction loss compromises nozzle pressure.

**106. A** — The corroded connection may be leaking propane, with the gas accumulating in the area and potentially providing a fuel source for the fire; the connection should be examined by the investigator and the gas line isolated for safety. Corroded gas connections leak.

**107. B** — The lights were turned on before the fire started, indicating the room was being used or occupied at the time of ignition; the lights remained on through the fire (the electrical circuit has been intact); the investigator can use this information for the fire timeline. Light status provides timeline information.

**108. C** — The basement layout (multiple rooms, walls, obstructions) is preventing the stream from reaching the fire location; the attack approach may need to be modified to address the layout, possibly with additional crews to address multiple basement areas or a different attack position. Layout complexity affects attack effectiveness.

**109. D** — The spotlights are drawing significant power, with the apparatus electrical system unable to supply both pump-running power and illumination at full intensity; the operator should balance the electrical loads or consider supplemental scene lighting. Electrical load balancing is operational reality.

**110. B** — The microwave may have been operating at the time of the fire, with possible food ignition (overheating, foreign objects in the microwave, microwave malfunction); microwave-related fires can result from various causes including operator error, appliance malfunction, or improper materials in the microwave. Microwave fires have multiple causal pathways.

**111. C** — The additional damage is consistent with possible forced entry before fire department arrival (suggesting pre-fire entry by an occupant, neighbor, or possibly an intruder); the timing and circumstances should be documented and reported to the investigator for examination. Pre-arrival forced entry is investigative information.

**112. D** — The hydraulic fluid may be low, the hydraulic system may have a leak, or the hydraulic pump may be malfunctioning; the operator should check the fluid level, inspect for leaks, and verify the pump operation. Hydraulic-system diagnostics follow standard troubleshooting.

**113. C** — Multiple burners may have been operating simultaneously at the time of the fire (consistent with unattended cooking or simultaneous food preparation), or the stove was a victim of fire spread from an adjacent area; the investigator can determine the cause based on burner condition, food remains, and fire pattern. Multi-burner involvement has multiple explanations.

**114. B** — The window was broken from the inside, either by an occupant attempting to escape, by ventilation (heat-induced breakage with shards falling outward), or by ventilation operations of the fire department; the window failure direction is consistent with internal fire pressure. Glass-debris direction indicates the break-out direction.

**115. C** — The engine's oil supply may be low, the engine may have an oil leak, or the engine's oil pump may be malfunctioning; the operator should shut down the engine for inspection (continued operation with low oil pressure can cause severe engine damage) and consider relief apparatus. Low oil pressure is an immediate shutdown trigger.

**116. C** — The furnace may have been the ignition source (improper combustion, faulty gas valve, blockage in the flue, or pilot light failure with gas accumulation); the access panel being open may indicate recent service or attempted operator intervention before the fire. Open service panel suggests pre-fire activity.

**117. B** — The structure has multiple involved rooms with fire venting through the windows; the operational implication is significant fire involvement, possible structural damage, and substantial fire-control challenge — defensive operations may be appropriate given the extent. Multi-window flame venting indicates advanced fire.

**118. B** — The "circular" arrangement is not electrically meaningful (electrical circuits cannot be daisy-chained in a circle), suggesting either an unusual configuration or a misinterpretation of the visible arrangement; the actual electrical condition should be examined by the investigator for any potential overload or fault conditions. Apparent circular electrical paths are not physically meaningful.

**119. D** — The engine load exceeds the engine's power capability at the current RPM, possibly because the pump is being asked to deliver more pressure or flow than the engine can support, or because the engine is operating at a low RPM that limits power output; the operator should adjust throttle, reduce pump load, or shift to a higher engine RPM. Engine lugging indicates load-power mismatch.

**120. D** — Combustibles placed on top of a water heater create potential for ignition (the heater's surface temperature can reach high enough to ignite combustibles in direct contact, particularly with the pilot light's continuous combustion at the bottom); this is a code violation and a potential fire-cause consideration. Combustibles on appliances violate safety clearances.

**121. A** — The air conditioner is consistent with fire damage from the structure's interior, with heat radiating outward through the wall to damage the exterior unit; the air conditioner unit is unlikely to be the ignition source. Damage direction identifies the heat source.

**122. C** — The discharge valve may not be opening (jammed, broken handle, valve failure), the discharge gate at the apparatus may be obstructed, or the discharge fitting may have a blockage; the operator should check the valve operation and the discharge line. No-flow with adequate supply points to discharge-side issue.

**123. C** — The Christmas tree fire pattern (radiating outward from the tree itself) is consistent with the tree being the ignition source; common Christmas tree fire causes include faulty/overloaded lighting, candles too close to the tree, dry tree conditions, and electrical heat sources. Christmas tree fires have characteristic patterns.

**124. D** — The smoke alarm placement is inadequate (smoke alarms are required in living areas and bedrooms per NFPA 72 and most local codes); the attached-garage placement provides little warning value for fires originating in the living areas, where occupants would be most at risk. Inappropriate placement defeats the detection purpose.

**125. C** — The fuel system may have an issue (water in fuel, clogged fuel filter, malfunctioning fuel injector, or low fuel level), the air filter may be clogged, or the engine may have an ignition system problem; the operator should diagnose the engine condition and consider relief apparatus for continued operations. Engine rough running has multiple potential causes.

**126. C** — The fireplace was used recently, with the closed damper possibly trapping carbon monoxide and other combustion products in the structure; if the fire was related to the fireplace, the damper position may have contributed to the fire's progression. Closed damper traps combustion products.

**127. B** — The doormat could be a tripping hazard for fire personnel entering and exiting through the front door, particularly under low-visibility smoke conditions; the doormat may need to be removed or repositioned for safe operations. Tripping hazards in egress paths warrant operational attention.

**128. B** — The wall section may have active fire on the opposite side (perhaps in a void space or adjacent room), with the high thermal signature indicating substantial heat transfer through the wall; the area should be approached with caution and possibly opened for inspection and suppression. Thermal signatures indicate heat sources behind surfaces.

**129. D** — The relief valve is correctly set to release water during normal operations as a safety feature; the dumping indicates that the relief is being triggered, suggesting a pressure spike from discharge line shutdown or operator pressure setting. Relief activation protects pump from overpressure.

**130. D** — The solar electrical system creates potential post-fire electrical hazard (the photovoltaic panels can produce voltage as long as light reaches them, with the DC electrical system possibly energized even after the AC service is disconnected); the operational implication is electrical safety during overhaul, and the system should be coordinated with the utility and solar installer for proper isolation. Solar systems present unique electrical hazards.

**131. A** — The plastic spice bottles in close proximity to the stove may have melted or contributed to the fire if exposed to heat; the kitchen layout is a potential consideration in cooking fire dynamics. Combustible/meltable materials near heat sources are fire concerns.

**132. D** — The engine is severely overheating (the engine cooling system has failed or is unable to dissipate the heat at the current load); the engine should be shut down immediately to prevent severe damage, with relief apparatus deployed and the apparatus taken out of service for repair. Severe overheating requires immediate shutdown.

**133. B** — The space heater with exposed heating element in proximity to combustibles is a common residential fire cause; the heater may have ignited the combustibles, or it may have malfunctioned and ignited; the investigator can determine the specific cause based on the equipment and surroundings. Portable heater fires are a recognized residential cause.

**134. C** — The grease accumulation provides additional combustible material in the kitchen, which can ignite during a cooking fire and contribute to fire growth and spread to the surrounding areas. Grease accumulation amplifies cooking-fire growth.

**135. D** — The foam-education system is consuming foam concentrate at the rated proportioning rate (3% or 6% depending on the application); the operator should monitor the concentrate level and ensure adequate foam supply for sustained operations, with consideration of supplemental foam supply for extended operations. Foam consumption is expected during foam operations.

**136. A** — The use of two-prong cords in a three-prong outlet does not provide the grounding function; while this combination is not inherently fire-causing, it does limit the safety protection for the connected appliances and may indicate older electrical equipment in use. Grounding-function loss reduces electrical safety.

**137. D** — The chandelier may have been the ignition source (electrical fault in the wiring or fixture, faulty bulb, or overload condition), or it may have been damaged by fire spread from another source; the chandelier's electrical condition and fire pattern around it should be examined by the investigator. Ceiling-fixture fire damage requires investigation.

**138. C** — The radio may have a transmission issue (low battery, antenna problem, terrain obstruction between transmitting and receiving units, or interference from other radio sources); the operator should troubleshoot the radio while attempting alternative communication methods. Radio static has multiple potential causes.

**139. B** — The empty propane tank with the valve open is consistent with the tank having released its propane content into the area, providing a fuel source for the fire; the tank's role in the fire's development should be examined by the investigator. Open-valve empty tanks released their contents.

**140. A** — The window air conditioners may have contributed to the fire (electrical fault in the AC unit or its wiring, or the AC unit may have provided a path for fire spread through the window opening); the AC units and their wiring should be examined by the investigator. Window AC units present multiple fire considerations.

**141. D** — The gauge has a mechanical malfunction (stuck needle, damaged gauge mechanism, or air bubble in the gauge line) causing it to fail to respond to actual pressure changes; the operator should verify the actual pump pressure using alternative gauges or pump-discharge testing and take the gauge out of service for repair. Stuck gauges produce false-constant readings.

**142. B** — The grill on a wooden deck adjacent to vinyl siding creates significant fire risk (heat from the grill can ignite the deck, the heat can melt and ignite the vinyl siding, and the proximity to the structure exposes the structure to the fire); this is a common cause of residential fires that begin outside and spread to the structure. Grill placement creates known fire risks.

**143. B** — The fire has progressed beyond the incipient stage and is fully developed in the ground-floor area, with the entrance flow path serving as a major heat and smoke exhaust; the operational situation requires significant resources for control and likely defensive consideration. Flame venting from entrances indicates fully developed conditions.

**144. A** — The hydrant is flagged out of service for a reason (typical reasons: low flow, mechanical issue, maintenance status), and the reduced flow is consistent with the flag; the supply must be supplemented with alternative water sources for sustained operations. Flagged hydrants warrant supplemental supply.

**145. B** — The electrical panel fire pattern is consistent with electrical-related ignition (fault in the panel, overload condition, or electrical arc); the investigator can determine the specific cause based on the panel condition, the electrical loads, and the fire pattern. Panel-origin fire patterns are electrically-caused.

**146. C** — Fire above the bathroom has damaged the plumbing, with the water now flowing through the bathroom; the bathroom is suffering water damage from the fire above, and the salvage operations should address the water flow. Heat-damaged plumbing causes secondary water flow.

**147. C** — Extended pump operation has heated the bearings, possibly with inadequate lubrication or wear; the bearings may continue to function but should be monitored, with consideration of relief apparatus and post-incident bearing inspection. Heated bearings warrant monitoring.

**148. A** — The residence's vacant status is relevant context for the investigation; vacant structures have different cause-and-origin considerations than occupied structures (possibly squatters, vandalism, deliberate ignition, electrical malfunction in unattended systems); the vacancy timeline and circumstances should be documented. Vacant structure status affects investigation approach.

**149. C** — The aerosol cans heated during the fire produce internal pressure that can rupture the cans (typically with the burst caps being projected outward and possibly the can itself becoming a projectile); the aerosol cans are a known fire hazard and the rupture pattern is consistent with fire exposure. Aerosol-can rupture is recognized fire behavior.

**150. B** — The pump operator is showing signs of fatigue affecting cognitive performance and operational safety; the pump operator should be relieved by a fresh operator, with the fatigued operator transitioning to rehab for assessment, hydration, food, rest, and medical monitoring per NFPA 1584. Fatigued operators are safety risks at the pump.