PRACTICE EXAM 17: FIREFIGHTER I & II SIMULATION (150 QUESTIONS)

1. A firefighter who has become trapped or disoriented inside a structure and is transmitting a Mayday should follow which acronym to deliver organized information to the incident commander?

A. CAN — Conditions, Actions, Needs reported in that order on the radio channel

B. SLICERS — Size up, Locate, Identify, Cool, Extinguish, Rescue, Salvage in order

C. RECEO — Rescue, Exposure, Confinement, Extinguishment, Overhaul in that order

D. LUNAR — Location, Unit, Name, Assignment/Air, Resources needed in that order

2. When the first arriving officer transmits "We have a worker" during the initial size-up, this indicates:

A. A medical patient is being assessed inside the structure for transport to a facility

B. A working fire requiring full company assignment is confirmed at the dispatch address

C. A search and rescue operation has been initiated by the first arriving company crew

D. A defensive operation has been declared because of structural collapse concerns

3. The "fuel-controlled" phase of compartment fire development is characterized by:

A. Insufficient oxygen to support continued combustion at the current intensity of burning

B. Heat release governed by the available ventilation openings into the fire room

C. Combustion limited by the amount and arrangement of fuel rather than by oxygen

D. Total compartment involvement with all combustibles burning simultaneously at peak HRR

4. The "C-post" of a four-door passenger vehicle is located:

A. At the rear of the passenger compartment supporting the rear of the roof and rear glass

B. Between the front and rear doors providing roof support and seatbelt mounting points

C. At the front of the vehicle supporting the windshield and the front of the roof line

D. Within the engine compartment supporting the hood and front cowl assembly area

5. A "Bresnan distributor" is most commonly used to attack fires in:

A. The attic or roof space above a finished ceiling in residential construction projects

B. The fully developed bedroom of a single-family residence during interior attack operations

C. Open commercial spaces where ceiling heights exceed standard residential dimensions

D. Confined spaces such as basements, cellars, and ship holds inaccessible to firefighters

6. "Class D" fire extinguishing agents are used on fires involving:

A. Cooking oils and fats in commercial kitchen equipment such as deep fryers in restaurants

B. Combustible metals such as magnesium, titanium, sodium, and potassium chips

C. Energized electrical equipment in switchgear, transformers, and motor controls

D. Flammable and combustible liquids such as gasoline, diesel fuel, and chemical solvents

7. The "A tool" or "K tool" used in forcible entry is designed to:

A. Pull the lock cylinder from a door so the latch mechanism can be operated with a key tool

B. Cut steel padlocks and chains during entry on commercial occupancies and fenced areas

C. Spread an inward-opening door from its frame using a built-in hydraulic mechanism

D. Strike the halligan tool during the gap-set-force sequence for inward-opening doors

8. The recommended position for an interior nozzle operator working at the doorway of a fire room is:

A. Standing upright behind the nozzle with the line stretched in a straight path to the fire

B. Kneeling with the dominant leg forward and the nozzle held at chest height for control

C. Crouched low with one knee on the floor and the nozzle bail held in the firefighter's grip

D. Sitting on the floor with both legs forward and the nozzle held by both hands together

9. The "EDITH" home fire safety program teaches families to:

A. Estimate Distance Inside The Home before purchasing smoke alarms for installation

B. Practice an Exit Drill In The Home including a meeting place outside the structure

C. Evaluate Detector Installation Throughout the Home for proper coverage of bedrooms

D. Educate Dwellers In The Hazards of common household fire risks in the kitchen area

10. The "Stokes basket" used in technical rescue serves to:

A. Provide a portable platform for the firefighter to stand on during overhead work

B. Replace the gurney during medical responses to long-distance backwoods rescues

C. Collect debris during overhaul operations for transport away from the structure

D. Package a patient for transport over rough terrain, down ropes, or through narrow spaces

11. The "smoke explosion" phenomenon differs from a backdraft in that a smoke explosion:

A. Occurs when accumulated smoke gases in an uninvolved area find an ignition source

B. Requires sudden introduction of oxygen to a fuel-rich, oxygen-limited compartment to trigger

C. Occurs only during the initial stages of fire when fuel and oxygen are both abundant

D. Produces a fireball that propagates outward at supersonic speeds from the source

12. A "trash line" or "bumper line" carried on the apparatus is typically:

A. A 5-inch supply line for connection to a hydrant or another pumper at the scene

B. A 2.5-inch attack line for heavy-flow operations on commercial structure fires

C. A 1-inch or 1.5-inch booster line used for small grass, dumpster, and outside fires

D. A foam line preconnected for use on Class B flammable liquid fires at the scene

13. The "operational period" in incident command system planning typically lasts:

A. Until the incident is concluded and all units have been released from the scene

B. 12 hours, after which new tactical objectives and assignments are established

C. 4 hours, requiring frequent updates to the incident action plan throughout the day

D. 24 hours, allowing crews adequate rest between active firefighting operations

14. The "Pre-Connect" attack hose load on an engine apparatus typically:

A. Is connected to the apparatus suction inlet for drafting from static water sources

B. Is connected to the booster tank fill line for refilling the tank from hydrants

C. Connects to the standpipe outlet through threaded couplings carried on board

D. Is connected to a discharge gate on the pump panel and ready for immediate deployment

15. The "PASS" device worn by firefighters typically sounds an alarm after:

A. Approximately 30 seconds of no motion, with a pre-alarm warning at about 15 to 20 seconds

B. The cylinder pressure drops below 33 percent of the rated service pressure of the SCBA

C. Three minutes of no radio transmission from the firefighter to the incident commander

D. The firefighter has been outside line-of-sight of the company officer for over 10 minutes

16. A "wet barrel" hydrant is best suited for installation in:

A. Northern climates where the ground freezes deeply during winter months for portions of the year

B. Industrial occupancies where high-volume flows are required for fire protection coverage

C. Climates that do not experience prolonged freezing temperatures during the winter months

D. Underground vaults where the hydrant body is protected from freezing temperatures externally

17. The "Halligan tool" was invented by:

A. Hugh Stoddard, a Boston firefighter who developed it for forcible entry on warehouse doors

B. Hugh Halligan, an FDNY first deputy chief who designed it as an improved forcible entry tool

C. Henry Halligan, an Irish firefighter who patented the tool during the late 19th century

D. The Hayward Tool Company of Massachusetts in the early 20th century for fire service use

18. A "deadman" anchor in rope rescue operations consists of:

A. A buried object such as a log or rock used as an anchor point when no natural anchor exists

B. A firefighter who is no longer breathing and is being prepared for transport from the scene

C. A failed mechanical advantage system that has lost the ability to support a load safely

D. A specialized rope-rescue device used for self-belay during single-line rappelling operations

19. The "drop test" of a fire ladder is performed by:

A. Allowing the ladder to fall from a 10-foot height onto a hard surface for impact testing

B. Climbing the fully extended ladder while monitoring for any flexing or movement under load

C. Releasing the halyard and allowing the fly section to drop, verifying that the dogs catch each rung

D. Dropping a calibrated weight from the tip of the ladder to measure deflection under load

20. The "platform" of a fire pump apparatus refers to:

A. The flat surface above the pump where the operator stands during pumping operations

B. The chassis frame on which the pump and water tank are mounted on the apparatus

C. The pre-piped manifold inside the pump connecting suction to discharge gates

D. The structural framework on which the pump, tank, and supporting components are mounted

21. The "first due" engine company at a structure fire is typically responsible for:

A. Establishing rapid intervention crew positions at all entrances to the structure

B. Establishing water supply, advancing the initial attack line, and conducting fire attack

C. Performing primary search and rescue operations as the immediate priority on arrival

D. Operating the aerial device for vertical ventilation and upper-floor rescue work

22. A "fire ground commander" (FGC) at a complex incident:

A. Is the incident commander managing the overall fire ground operation and tactical decisions

B. Is the operations section chief assigned to manage tactical units only at the incident

C. Is the senior officer of the first arriving company before formal command is established

D. Is a position eliminated in modern ICS in favor of the incident commander designation

23. The "size-up" of a fire incident is:

A. Only the initial radio report given by the first arriving officer on arrival at the scene

B. The final report submitted to dispatch at the conclusion of the incident operations

C. The detailed evaluation conducted by the fire investigator after extinguishment is complete

D. A continuous process throughout the incident, updated as conditions change during operations

24. The "command staff" in the Incident Command System includes:

A. The operations, planning, logistics, and finance section chiefs working together

B. The safety officer, public information officer, and liaison officer reporting to the IC

C. The incident commander, safety officer, and all branch directors at the incident

D. The strike team leaders, task force leaders, and division supervisors operating tactically

25. The "Span of Control" principle in ICS recommends that each supervisor manage:

A. Between 10 and 15 subordinates for maximum operational efficiency during incidents

B. Only one subordinate at a time to maintain clear and direct communication channels

C. Between 3 and 7 subordinates, with 5 being optimal under emergency conditions

D. As many subordinates as the supervisor can effectively manage with no upper limit set

26. The "Unified Command" structure in ICS is used when:

A. A single agency has clear jurisdiction over the entire incident and supporting agencies are absent

B. The senior officer present must take command from a less experienced incumbent commander

C. The incident involves only the fire department with no need for any external coordination

D. Multiple agencies share authority over the incident, requiring coordinated decision-making

27. The "Accountability Officer" at a working incident is responsible for:

A. Tracking the location, function, and welfare of all personnel operating at the incident

B. Reviewing fire department response times and performance metrics after the incident

C. Documenting all financial expenditures incurred during the incident for reimbursement

D. Investigating the cause and origin of the fire after the suppression phase is complete

28. The "Rehab Sector" established at a working fire provides:

A. A staging area for incoming apparatus and personnel waiting for assignment by command

B. Medical evaluation, hydration, nutrition, and rest for firefighters during prolonged operations

C. A decontamination corridor for personnel exiting the hot zone during hazmat operations

D. A media briefing area where the public information officer addresses press inquiries

29. The "Two-In/Two-Out" rule under OSHA 1910.134 does NOT apply when:

A. The incident commander has not yet formally declared interior structural attack operations

B. The first arriving officer determines the structure to be unsafe for any interior attack

C. The fire department has fewer than four firefighters on duty at any given station

D. There is a known life hazard inside and immediate rescue could save the victim's life

30. The "Personnel Accountability Report" (PAR) is initiated by:

A. The dispatcher at 10-minute intervals throughout the duration of a working fire

B. Each individual firefighter when their cylinder reaches 33 percent of its rated pressure

C. The incident commander at benchmark events or regular intervals during the incident

D. The safety officer immediately following any reported injury at the incident scene

31. The "Mayday" call from a trapped firefighter should be transmitted:

A. Only when the firefighter has exhausted all self-rescue options including emergency egress

B. After the firefighter has activated the PASS device and waited for rescue for 5 minutes

C. As soon as the firefighter recognizes the situation requires immediate rescue assistance

D. Only on the command channel to avoid interrupting tactical communications

32. A "Maltese cross" symbol used by the fire service represents:

A. The four cardinal directions of the compass used during navigation at incidents

B. The four major fire department divisions: operations, training, prevention, administration

C. The four primary fire ground tactical priorities of life safety, exposure, confinement, extinguishment

D. Bravery and service, with the symbol dating back to the Knights Hospitaller of the Crusades era

33. The "Smoke Reading" technique focuses on four primary attributes of smoke. These attributes are:

A. Color, temperature, chemical composition, and particle size produced by combustion

B. Volume, velocity, density, and color produced by the fire compartment

C. Direction, duration, dispersion, and dilution patterns observed from the exterior

D. Speed, size, shape, and sound produced by smoke leaving the structure under pressure

34. A "decay" stage compartment fire is characterized by:

A. Increasing heat release as additional fuel surfaces become involved in combustion

B. Stable, fully developed combustion involving all available fuel surfaces in the room

C. Decreasing heat release as fuel is consumed and combustion slows or becomes ventilation-limited

D. Initial ignition and limited combustion before involvement of additional fuel packages

35. The "ignition" stage of a fire is the:

A. Initial phase in which the heat source contacts the fuel and combustion begins to occur

B. Stage at which fire involves all fuel surfaces in the compartment during full development

C. Stage of fire decay following consumption of available fuel within the compartment

D. Transition phase between growth and full involvement of the compartment by the fire

36. The "fully developed" stage of a compartment fire is characterized by:

A. Combustion limited to the initial fuel package that was ignited by the heat source

B. Decreasing heat release as fuel is consumed and combustion slows down in the room

C. The initial ignition of fuel and the beginning of flaming combustion in a small area

D. All available fuel within the compartment burning at the maximum possible heat release rate

37. A "smoke detector" using "photoelectric" sensing technology is most responsive to:

A. Fast-flaming fires that produce small smoke particles in high concentration quickly

B. Heat sources that exceed the activation temperature without producing visible smoke

C. Slow smoldering fires that produce large smoke particles before flaming combustion occurs

D. Carbon monoxide produced by incomplete combustion in tightly sealed sleeping areas

38. The "ionization" smoke detector is most responsive to:

A. Fast-flaming fires that produce small smoke particles in high concentration quickly

B. Slow smoldering fires that produce large smoke particles before flaming combustion occurs

C. Heat sources that exceed the activation temperature without producing visible smoke

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39. A "fixed-temperature" heat detector activates at:

A. Any rate of temperature rise exceeding the manufacturer's preset threshold

B. A predetermined fixed temperature, typically 135 to 165 degrees Fahrenheit, regardless of rate

C. The same temperature as the activation point of standard residential sprinkler heads

D. A temperature that varies based on the ambient temperature of the protected space

40. A "rate-of-rise" heat detector activates when:

A. The temperature increases faster than a preset rate, typically 12 to 15 degrees Fahrenheit per minute

B. The temperature exceeds a fixed predetermined threshold regardless of how rapidly it rose

C. The smoke concentration in the protected space exceeds a preset particulate density limit

D. The carbon monoxide concentration exceeds the OSHA permissible exposure limit value

41. The "annunciator panel" in a fire alarm system displays:

A. Only the building's main address for responding fire department units to confirm

B. Only the name of the building's owner and the responsible party for the system

C. Only the names of the technicians authorized to service the fire alarm system

D. The location of the alarm initiating device that has activated the system

42. A "presignal" fire alarm system is designed to:

A. Sound the general alarm immediately throughout the building upon any activation

B. Notify trained staff first to investigate before the general alarm is initiated for evacuation

C. Activate the building's sprinkler system before any audible alarm sounds anywhere

D. Send signals only to the central station without sounding any internal alarm devices

43. The "code 99" or "general alarm" in some fire department dispatch systems indicates:

A. A full structural fire assignment with multiple companies dispatched to the address

B. A medical emergency requiring only a single engine company response to the patient

C. A motor vehicle accident with potential entrapment requiring extrication operations

D. A grass or brush fire requiring only a single brush apparatus and crew to respond

44. The "knockout panel" in a roof or wall is a:

A. Reinforced section designed to resist forcible entry by intruders or vandals

B. Decorative panel installed for architectural aesthetics with no structural function

C. Lightweight section designed to be easily removed by firefighters for ventilation access

D. Structural component that must be removed completely to allow apparatus passage

45. The "Fire Department Connection" (FDC) on a sprinkler or standpipe system is most commonly located:

A. On the roof of the protected building, accessible only by ladder from the apparatus

B. Inside the building near the fire alarm panel where access is controlled by staff

C. At the rear of the building near the loading dock for protected access from delivery vehicles

D. On the exterior front or side of the building, within reach of the responding pumper

46. The "Siamese" appliance used in fire ground hose operations:

A. Reduces a 2.5-inch line to a 1.75-inch attack line at the entry to the structure

B. Combines two supply lines into a single supply for the receiving pumper at scene

C. Divides a single supply line into two attack lines downstream of the appliance

D. Increases the operating pressure on a single line by passing it through a relay pump

47. A "gated wye" appliance used on a hose line:

A. Reduces the diameter of a single line from 2.5 inches down to 1.75 inches with valves

B. Combines two supply lines into a single supply with gate valves at each connection

C. Divides one larger line into two smaller lines with a gate valve at each outlet

D. Increases the pressure on a single line by passing it through a pump-equipped device

48. The "high-rise pack" carried by firefighters to upper floors in a high-rise structure typically contains:

A. Hose (50 to 150 feet), a nozzle, adapters, fittings, and tools to connect to standpipe outlets

B. A preconnected 200-foot attack line with a fog nozzle ready for immediate deployment

C. A salvage cover and basic overhaul tools for use after the fire has been controlled

D. A spare SCBA cylinder and harness for use as a relief during extended interior attack

49. The "spotting" of an aerial apparatus at a structure fire requires:

A. Positioning directly in front of the structure with no consideration of collapse zones

B. Positioning to optimize aerial reach, avoid the collapse zone, and maintain clear sight lines

C. Positioning at least 200 feet from any potential collapse zone of the involved building

D. Positioning only after the engine company has established water supply at the hydrant

50. The "aerial ladder" extension and positioning during operations is most efficiently controlled from:

A. The cab of the apparatus by the driver/operator using the steering wheel-mounted controls

B. A remote control unit held by the company officer at the tip of the deployed aerial

C. The pedestal or turntable controls at the rear of the apparatus, designed for the operator

D. The tip of the aerial by the firefighter operating it for fine positioning during rescue

51. The "Aerial Ladder Truck" differs from a "Quint" apparatus in that the quint includes:

A. A water tank, fire pump, hose, ground ladders, and an aerial device all integrated

B. Only an aerial device with no water tank, hose, or pump components on board

C. A water tank and hose but no aerial device for upper-floor operations or roof access

D. Only ground ladders without an aerial device, but with a water tank for attack lines

52. The "Tower Ladder" or "Aerial Platform" differs from a straight aerial ladder in that it:

A. Has a longer reach than any straight aerial ladder at the same cost and weight

B. Operates at higher water flows than a straight aerial without a platform attached

C. Is mounted on a longer chassis than straight aerials for additional stability

D. Has a basket or platform at the tip that provides a working platform for firefighters

53. The "outriggers" or "stabilizers" of an aerial apparatus must be deployed:

A. Only after the aerial has been raised to its working position and is being operated

B. Before the aerial device is raised, to provide stability and prevent the apparatus from tipping

C. Only when the apparatus is operating on uneven ground that may shift during operations

D. Only when the aerial is being used for rescue operations with personnel on board

54. The "swing radius" of an aerial apparatus is:

A. The clear area required around the apparatus for the aerial to rotate without obstruction

B. The maximum reach of the aerial measured from the centerline of the apparatus

C. The horizontal distance from the apparatus to the structure being attacked

D. The arc that the aerial sweeps during a defensive fire attack on the building

55. The "scrub area" of an aerial device is:

A. The area near the tip that must be kept clear of debris during operations on the apparatus

B. The area of the apparatus where the aerial controls are mounted for the operator at the rear

C. The area that requires routine cleaning to maintain proper function of the hydraulic systems

D. The area of the building that the aerial can reach with its working positions from where it is set up

56. A "mid-mount" aerial apparatus differs from a "rear-mount" in that:

A. The aerial is mounted with greater overall length, providing 30 percent more reach typically

B. The water tank is mounted in the rear, with the aerial mounted directly behind the cab

C. The aerial device is mounted between the cab and the rear, while rear-mount has it in the back

D. The apparatus is lighter than rear-mount designs by approximately 20 percent of total weight

57. The "load chart" for an aerial apparatus shows:

A. The maximum tip load at various extensions and angles for safe operating conditions

B. The total weight of the apparatus including all equipment, water, and personnel on board

C. The pumping capacity at various engine RPMs across the full operating range of the pump

D. The water tank capacity at various levels of fullness during operations of any kind

58. The "below grade" position of an aerial ladder operates below:

A. Zero degrees of elevation, with the aerial positioned in a horizontal level configuration

B. The horizontal position, with the tip of the aerial below the level of the apparatus platform

C. The maximum reach of the aerial when fully extended at a low angle of operation

D. The structural envelope of the building when the apparatus is positioned at a corner

59. The "rated capacity" of a fire pump under NFPA 1901 must be delivered at:

A. 100 percent of rated capacity at 100 psi net pump pressure for at least one full hour

B. 70 percent of rated capacity at 200 psi net pump pressure for 30 minutes continuously

C. 50 percent of rated capacity at 250 psi net pump pressure for 60 minutes continuously

D. 100 percent of rated capacity at 150 psi net pump pressure for a sustained period at draft

60. The "Priming" of a centrifugal fire pump is necessary because the pump:

A. Cannot start its impeller until air has been added to the suction side of the pump

B. Requires a pressurized water source at the suction inlet to begin normal operations

C. Cannot create the vacuum needed to lift water from a static source through air alone

D. Cannot operate at the discharge pressure required by the attack lines being supplied

61. A "tandem" pumping operation during a relay involves:

A. Two pumpers connected in parallel to supply water to the same attack lines

B. Two pumpers connected in series, with the first supplying the second in the relay

C. Two pumpers operating from different hydrants to supply a single attack engine

D. Two pumpers exchanging water through a shared portable tank at the scene

62. The "Net Pump Discharge Pressure" (NPDP) of a fire pump is calculated as:

A. PDP plus intake pressure to determine total system pressure under load

B. PDP divided by the number of attack lines flowing simultaneously from the pump

C. The pressure at the lowest discharge gate that is actively flowing during operations

D. PDP minus intake pressure when supplied from a pressurized source

63. The "Hazen-Williams" formula used in fire service hydraulics is most commonly applied to:

A. Calculate friction loss in fire hose at various flow rates and hose diameters during use

B. Determine the required application rate for AFFF foam on a hydrocarbon fuel spill

C. Calculate the maximum theoretical lift from a static water source during drafting operations

D. Determine the required fire flow for a structure based on its size and occupancy

64. The "discharge coefficient" used in hydrant flow test calculations accounts for:

A. The pressure rating of the hydrant body under maximum operating conditions

B. The shape of the outlet and the velocity profile of water leaving the hydrant

C. The temperature of the water as it flows through the hydrant outlet during testing

D. The age of the hydrant and the corrosion present inside the supply pipe at testing

65. The "Pitot tube" used during hydrant flow tests measures:

A. The static pressure of the hydrant before the test begins by the inspector

B. The residual pressure remaining at the hydrant during the flow test event

C. The velocity pressure of water flowing from the hydrant outlet during the test

D. The temperature of the water for chlorine and water quality verification

66. The "Reverse Lay" of a supply line begins:

A. At the fire scene and proceeds back to the water source as the apparatus drives away

B. At the hydrant and proceeds to the fire as the apparatus drives toward the structure

C. With the apparatus stopping halfway between the hydrant and the fire to lay both directions

D. With two engines laying simultaneously toward each other from opposite directions

67. A "Forward Lay" of supply hose:

A. Begins at the fire and proceeds back to the hydrant as the apparatus drives away from scene

B. Begins at the hydrant and proceeds to the fire as the apparatus drives toward the structure

C. Uses two engines laying toward each other from opposite ends of the supply lay

D. Drops supply hose along the curb at the closest position to the structure being attacked

68. A "Split Lay" hose evolution uses:

A. A single pumper laying both supply and attack lines simultaneously during the response

B. Two pumpers operating from opposite sides of the same fire scene during the attack

C. Two pumpers laying supply hose from opposite ends, meeting in the middle of the lay

D. One pumper drafting from a static source while another pumps from a hydrant

69. The "load test" of an SCBA cylinder verifies:

A. The cylinder valve operates smoothly at the rated pressure during the routine test

B. The cylinder weighs within the manufacturer's specifications at the time of testing

C. The cylinder gauge reads accurately within +/- 5 percent across its operating range

D. The cylinder can withstand 5/3 of its rated service pressure without permanent damage

70. The "hydrostatic test" of an SCBA cylinder is performed:

A. Every 2 years for steel cylinders and every 5 years for composite cylinders, both in service

B. Only when the cylinder is suspected to be damaged or has been subjected to abnormal use

C. Every 5 years for steel cylinders and every 3 to 5 years for composite cylinders, depending on construction

D. Once during initial manufacture, with no further hydrostatic testing required during service life

71. The "RAT (Rescue Air Tank) strap" or "RIT bag" is used by rapid intervention teams to:

A. Carry a spare SCBA bottle and regulator to deliver air to a downed firefighter quickly

B. Carry forcible entry tools used during the rescue of a trapped or downed firefighter

C. Provide thermal protection for the RIT crew during their interior rescue operations

D. Carry the radio equipment needed for communication with command during rescue

72. The "Buddy Breathing" technique for SCBA users in an emergency:

A. Requires removing the facepiece and passing it back and forth between the two firefighters

B. Connects two SCBAs through the high-pressure hose at the cylinder valve assembly

C. Requires a specialized adapter not standard on most SCBA units used in the fire service

D. Uses the Universal Emergency Breathing Safety System (UEBSS) low-pressure connection

73. The "Skip Breathing" technique used during emergency air conservation:

A. Requires the firefighter to skip every third breath to extend the cylinder duration

B. Involves a normal inhalation, a brief breath hold, and a slow exhalation cycle

C. Involves removing the facepiece briefly to allow ambient air to be inhaled during breaks

D. Requires hyperventilation prior to entering the IDLH atmosphere to load oxygen stores

74. A "Personal Escape System" (PES) under NFPA 1983:

A. Includes a rope, anchor, and descent device for emergency egress from upper floors

B. Provides backup compressed air for use during emergency egress from an IDLH atmosphere

C. Includes only an escape rope without any associated descent control device for use

D. Is required to be worn on every interior structural fire attack regardless of building height

75. The "Bailout" technique using a personal escape system involves:

A. Using a rope ladder hooked over the windowsill to climb down during emergency egress

B. Jumping from a window onto the roof of an apparatus positioned below for safe rescue

C. Using a pole to slide down from an upper floor through a designated drop chute

D. Anchoring to a fixed point inside the structure and descending out a window to escape

76. The "anchor" point for a bailout from an upper floor should be:

A. The closest available furniture, such as a bed or dresser, near the window opening

B. A structural element such as a stud, beam, or radiator that can support the firefighter's weight

C. The window frame itself, as it provides the most direct anchor for the rope and descent

D. The doorknob of the room or hallway door, which provides adequate strength for descent

77. The "descent device" used in a personal escape system:

A. Allows free-fall descent at the maximum rate of speed possible with the rope length used

B. Provides only minimal friction, allowing the firefighter to control speed manually with both hands

C. Provides controlled friction to allow the firefighter to descend at a safe rate during egress

D. Requires both hands of the firefighter to operate properly during the entire descent

78. The "Mayday" radio transmission protocol typically requires the firefighter to:

A. Transmit only after the PASS device has been activated and the firefighter is unable to move

B. Transmit only on the command channel to avoid disrupting tactical operations on scene

C. Transmit only after attempting all self-rescue options including emergency egress techniques

D. Transmit immediately upon recognizing the need for assistance and provide LUNAR information

79. The "RIC" (Rapid Intervention Crew) at a working structure fire is staged:

A. At a location near the entry point, equipped with tools and ready to deploy immediately

B. At the rear of the structure to provide rescue access from the opposite side of attack

C. Inside the structure with the attack crew to provide immediate close-proximity assistance

D. At the staging area with other reserve crews until specifically requested to deploy

80. The "RIT Pack" (or "RIC pack") carried by the rapid intervention team contains:

A. A pre-stocked first aid kit for treating injured firefighters during rescue operations

B. A complete set of forcible entry tools for breaching walls during rescue operations

C. A dedicated SCBA — cylinder, regulator, and mask — for the downed firefighter

D. A specialized radio set for communicating with the trapped firefighter directly during rescue

81. The "Drag Rescue Device" (DRD) built into modern turnout coats is:

A. A wireless transponder that broadcasts the firefighter's location to command continuously

B. A retractable hose connection between the turnout coat and the SCBA regulator assembly

C. A specialized tool stored in the pocket for use during rescue of downed firefighters

D. A built-in webbing handle accessible after opening a flap at the upper back of the coat

82. The "anchor strap" or "girth hitch" used for rescue applications creates:

A. A permanent anchor that cannot be untied after loading without cutting the webbing

B. A friction grip on a rope that holds when loaded but slides freely when not weighted

C. A loop around an object (such as a beam) that grips itself tightly when loaded with weight

D. A two-point anchor for distributing rescue loads across multiple structural elements

83. A "Z-rig" mechanical advantage system used in rope rescue provides:

A. A 3-to-1 mechanical advantage for lifting or hauling loads through pulleys and progress capture

B. A 5-to-1 mechanical advantage for heavy loads requiring multiple rescuers operating together

C. A 1-to-1 ratio with the simplest setup possible for low-load lifting operations only

D. A 2-to-1 mechanical advantage when used with standard rescue pulleys and carabiners

84. The "Mechanical Advantage" provided by a pulley system in rope rescue is calculated by:

A. The total weight of the load divided by the number of rescuers operating the haul team

B. The number of pulleys used in the system multiplied by 2 for the total mechanical advantage

C. The number of rope strands supporting the load in the system at the moving pulley

D. The diameter of the rope multiplied by the friction coefficient of the pulley wheels

85. A "haul team" in a rope rescue operation typically requires:

A. A minimum of 10 rescuers regardless of the mechanical advantage of the system used

B. Only one rescuer operating the system from start to finish during the rescue

C. Operating only at the top of the system where the moving pulley returns under load

D. A clear, level path with enough rescuers to safely pull the loaded rope through the system

86. "Negative pressure ventilation" is best described as:

A. Mechanical ventilation that pressurizes the structure to push smoke out an exhaust opening

B. Mechanical ventilation that uses smoke ejector fans to draw smoke out through an opening

C. Natural ventilation that relies on temperature differentials between interior and exterior

D. Hydraulic ventilation that uses a fog stream to entrain smoke out a window opening

87. The "Positive Pressure Ventilation" (PPV) sequence requires:

A. Starting the fan at the entry point before identifying the exhaust opening location

B. Pressurizing the entire structure first, then opening exhaust points one at a time

C. Identifying the exhaust opening, positioning the fan at the entry, then starting the flow

D. Starting all available fans simultaneously at every entry point on the structure

88. A "vertical ventilation" opening on a peaked roof should be located:

A. Directly above the seat of the fire to allow heat and gases to escape upward and out

B. At the highest point of the roof regardless of the location of the fire below it

C. At least 10 feet away from the fire to avoid weakening the roof above the seat

D. At the eaves where the rafters meet the wall plate for the easiest cutting access

89. The minimum recommended size for a vertical ventilation hole on a residential roof is:

A. 2 feet by 2 feet for the most rapid heat release with the smallest crew effort

B. 4 feet by 4 feet to provide adequate area for heat and smoke to escape the structure

C. 6 feet by 6 feet to ensure that flames and gases are fully released from the attic

D. 8 feet by 8 feet to allow rescuers to enter through the opening if necessary

90. The "trench cut" on a roof is performed:

A. Directly over the seat of the fire to release heated gases from the attic space

B. Across the roof ahead of the fire to stop horizontal spread through the cockloft or attic

C. Along the ridge of the roof to provide ventilation for the entire structure simultaneously

D. At the edge of the roof to allow firefighters to drop debris over the side safely

91. The "Mattydale" hose lay is loaded:

A. As a preconnected crosslay above the pump panel, perpendicular to the apparatus

B. Lengthwise in the hose bed with the couplings exposed for rapid deployment to the fire

C. In a horseshoe pattern around the perimeter of the hose bed for visibility of couplings

D. In a triple-layer pattern designed for one-firefighter deployment to the fire scene

92. The "horseshoe" hose load is loaded:

A. With the hose stacked flat in horizontal layers from the bottom of the bed up

B. In an accordion fold with the hose standing on edge throughout the bed area

C. In a triple-layer pattern designed for one-firefighter deployment from the bed

D. Along the perimeter of the bed in a U-shape with couplings exposed on the outer edge

93. The "accordion" hose load is characterized by:

A. The hose laid flat in horizontal layers stacked from the bottom of the bed upward

B. The hose loaded on edge in standing folds resembling the bellows of an accordion

C. The hose loaded around the perimeter of the bed in a U-shape with couplings exposed

D. The hose preconnected to a discharge gate for immediate deployment at the scene

94. The "Minuteman" hose load is designed to:

A. Deploy from the firefighter's shoulder as they walk toward the fire, paying out behind them

B. Connect directly to the standpipe outlet in a high-rise structure without intermediate steps

C. Remain stationary on the apparatus until the second-arriving engine begins the attack

D. Be deployed by two firefighters working together at the rear of the apparatus

95. The "Triple Layer" or "Triple Lay" hose load is:

A. Three separate hose lines preconnected to three different discharge gates at the pump

B. A 200-foot line loaded in three separate hose beds for use as supply and attack lines

C. Three lengths of supply hose stacked vertically in the bed and pulled simultaneously

D. A preconnect folded in three equal layers, designed for one-firefighter deployment

96. The "Donut Roll" of fire hose is best suited for:

A. Use as a preconnected attack line in the apparatus hose bed for rapid deployment

B. Storage in the apparatus for use as supply hose when the bed is fully loaded

C. Carrying and deployment to upper floors or remote areas where the bed cannot reach

D. Use as a salvage cover during overhaul when the hose is no longer needed for attack

97. The "duration" of an SCBA cylinder rating represents:

A. Manufacturer's rated air supply time at a standard work rate, not actual fireground duration

B. The maximum time the user can wear the SCBA without removing the facepiece for any reason

C. The total time from initial donning of the SCBA to its removal from the user at the scene

D. The exact working time for any user under any conditions encountered on the fire ground

98. The low-pressure alarm on an SCBA activates at:

A. 50 percent of the rated cylinder pressure to warn the user of significant air depletion

B. 33 percent of the rated cylinder pressure, indicating immediate egress is required

C. 25 percent of the rated cylinder pressure as the last warning before air is fully depleted

D. 10 percent of the rated cylinder pressure when only emergency reserve air remains

99. The "daily inspection" of an SCBA must include verification of:

A. Only the cylinder pressure to confirm the SCBA is ready for the next emergency response

B. Only the harness and straps to confirm they are not torn or showing visible wear damage

C. Only the regulator and facepiece to confirm proper seal and airflow during demand

D. The cylinder pressure, harness, regulator, facepiece, low-pressure alarm, and PASS device

100. The "Date of Manufacture" stamped on an SCBA cylinder establishes:

A. The exact date when the cylinder must be removed from service permanently

B. The date when the cylinder was last hydrostatically tested by a certified facility

C. The starting date for service life and hydrostatic testing interval calculations

D. The date when the cylinder will require replacement valves and gauges from the manufacturer

101. Using the formula $FL = CQ^2L$ (with C=2 for 2.5-inch hose, Q in hundreds of gpm, L in hundreds of feet), the friction loss in 250 feet of 2.5-inch hose flowing 500 gpm is:

A. 25 psi total loss in the 250-foot section at the indicated flow rate

B. 50 psi total loss in the 250-foot section at the indicated flow rate

C. 75 psi total loss in the 250-foot section at the indicated flow rate

D. 125 psi total loss in the 250-foot section at the indicated flow rate

102. The friction loss coefficient (C) for 1.75-inch attack hose using $FL = CQ^2L$ is:

A. 15.5, reflecting the higher friction loss in smaller diameter attack hose at normal flows

B. 8.0, reflecting moderate friction loss similar to 2-inch hose at typical attack flows

C. 2.0, reflecting low friction loss similar to 2.5-inch hose at standard attack flows

D. 0.8, reflecting the very low friction loss of LDH at high-volume flow conditions

103. Five-inch LDH (Large Diameter Hose) is most commonly used as:

A. A primary attack line on commercial structure fires requiring 250+ gpm at the nozzle

B. A supply line from a hydrant or pumper to the attack engine for high-volume flows

C. A standpipe pack line for high-rise operations connected to the standpipe outlet

D. A booster line for small grass and brush fires where 60+ gpm flow is sufficient

104. The elevation pressure gained or lost in a hose lay is calculated as:

A. 0.434 psi per foot of elevation change, regardless of hose size or flow rate carried

B. 0.434 psi per inch of elevation change, multiplied by the diameter of the hose used

C. 5 psi per floor of a typical residential structure with 8-foot ceilings

D. 0.5 psi per foot of elevation change, with pressure lost on uphill flows and gained on downhill

105. The "appliance loss" of pressure through devices such as a gated wye or Siamese is:

A. Always 0 psi because appliances are designed to add no resistance to the flow

B. Approximately 5 psi at flow rates under 350 gpm, increasing with higher flows

C. Approximately 25 psi for any flow rate, set by the design of standard fire service appliances

D. Calculated using the same formula as hose friction loss with a coefficient of 1.0

106. The standard nozzle pressure for a smoothbore handline tip is:

A. 50 psi at the tip, established as the standard for handline operations using smoothbore

B. 80 psi at the tip, matching the pressure required for combination fog handline operations

C. 100 psi at the tip, used for automatic and constant pressure fog handline operations

D. 175 psi at the tip, equivalent to the pressure rating of standard supply hose at the gate

107. The standard nozzle pressure for a combination (fog) handline nozzle is:

A. 50 psi at the tip, the same pressure used for smoothbore handlines at the same flow

B. 80 psi at the tip, used for older single-gallonage fog nozzles in current service

C. 100 psi at the tip, the standard pressure for most modern combination handline nozzles

D. 175 psi at the tip, matching the pressure rating of the supply hose at the gate connection

108. An "automatic" (constant pressure) nozzle operates by:

A. Adjusting the gallonage manually by the nozzle operator using a setting ring on the nozzle

B. Maintaining a constant nozzle pressure (typically 100 psi) by automatically varying the orifice size

C. Maintaining a constant gallonage regardless of pressure variations supplied to the nozzle

D. Switching automatically between straight stream and fog patterns based on the supplied pressure

109. The nozzle reaction (NR) for a smoothbore tip is calculated as:

A. $NR = 1.57 \times d^2 \times NP$, where d is the tip diameter in inches and NP is nozzle pressure in psi

B. $NR = 0.0505 \times Q \times \sqrt{NP}$, where Q is the flow rate in gpm and NP is nozzle pressure in psi

C. $NR = 1.5 \times NP$, regardless of the tip diameter used on the nozzle for the operation

D. $NR = Q^2 \times NP$, where Q is the flow rate in hundreds of gpm and NP is nozzle pressure in psi

110. The nozzle reaction (NR) for a fog/combination nozzle is calculated as:

A. $NR = 1.57 \times d^2 \times NP$, the same formula used for smoothbore tips on handlines

B. $NR = NP \times 1.5$, regardless of the gallonage flow used at the nozzle tip

C. $NR = 0.0505 \times Q \times \sqrt{NP}$, where Q is the flow in gpm and NP is the nozzle pressure in psi

D. $NR = Q^2 \times 0.5$, where Q is flow in gpm and the result is independent of nozzle pressure

111. The activation temperature for a standard residential sprinkler head is approximately:

A. 135 to 165 degrees Fahrenheit, with most heads activating at 155 degrees Fahrenheit

B. 200 to 250 degrees Fahrenheit, designed to delay activation until significant fire growth occurs

C. 300 to 400 degrees Fahrenheit, the temperature at which most building materials ignite

D. 500 to 600 degrees Fahrenheit, the same temperature as flashover conditions in a room

112. A "wet pipe" sprinkler system is characterized by:

A. Pressurized air in the piping that releases water only when a sprinkler head opens

B. Empty piping that fills with water from a remote source only when a head activates

C. Water in the piping that is preheated to prevent freezing in cold environments

D. Pressurized water in all piping at all times, with immediate discharge when a head activates

113. A "dry pipe" sprinkler system is characterized by:

A. Pressurized water in all piping at all times, similar to a wet pipe system in operation

B. Empty piping that contains neither water nor air until a detection system is activated

C. Pressurized air in the piping that holds water back at the dry pipe valve until a head opens

D. Pressurized inert gas in the piping designed to extinguish electrical fires without water

114. A "pre-action" sprinkler system requires:

A. Both a separate detection device to trip the valve AND a sprinkler head to open before water flows

B. Only the activation of a single sprinkler head to release water immediately into the protected area

C. Manual activation by a building occupant before water will flow through any sprinkler heads

D. Activation of the building's main fire alarm pull station before any water can be discharged

115. A "deluge" sprinkler system has:

A. Closed sprinkler heads that activate individually as the fire spreads through the area

B. Open sprinkler heads that all discharge simultaneously when the deluge valve is tripped

C. A combination of open and closed heads designed to balance protection and water damage

D. Specialized residential sprinkler heads designed for high-hazard occupancy use in dwellings

116. The "inspection, testing, and maintenance" of wet pipe sprinkler systems is governed by:

A. NFPA 13, which specifies the installation requirements for new sprinkler systems exclusively

B. NFPA 14, which specifies the installation requirements for standpipe systems in buildings

C. NFPA 20, which specifies the installation requirements for stationary fire pump systems

D. NFPA 25, which specifies the inspection, testing, and maintenance of water-based fire protection

117. A "Quick Response" (QR) sprinkler head differs from a "Standard Response" (SR) head by:

A. Operating at a lower temperature than standard heads in all residential applications

B. Discharging more water per minute than standard heads at the same operating pressure

C. Having a more thermally sensitive activation element, so it operates faster at the same temperature

D. Covering a larger floor area than standard heads, requiring fewer heads per protected space

118. A "Class I" standpipe system is intended for use by:

A. Fire department personnel only, with 2.5-inch outlets at each floor for connection to attack lines

B. Building occupants only, with preconnected 1.5-inch hose stored in cabinets at each floor

C. Both occupants and fire department personnel, with both 1.5 and 2.5-inch outlets provided

D. Only the building's automatic sprinkler system without manual hose connections at any floor

119. A "Class II" standpipe system is intended for use by:

A. Fire department personnel only, with 2.5-inch outlets at each floor for connection to attack lines

B. Building occupants only, with preconnected 1.5-inch hose stored in cabinets at each floor

C. Both occupants and fire department personnel, with both 1.5 and 2.5-inch outlets provided

D. Only the building's automatic sprinkler system without manual hose connections at any floor

120. A "Class III" standpipe system is intended for use by:

A. Fire department personnel only, with 2.5-inch outlets at each floor for connection to attack lines

B. Building occupants only, with preconnected 1.5-inch hose stored in cabinets at each floor

C. Both occupants and fire department personnel, with both 1.5 and 2.5-inch outlets provided

D. Only the building's automatic sprinkler system without manual hose connections at any floor

121. "Type I" (fire-resistive) building construction is characterized by:

A. Structural elements of noncombustible materials with the highest fire-resistance ratings

B. Structural elements of noncombustible materials with no fire-resistance rating required

C. Exterior walls of noncombustible materials with combustible interior framing of wood

D. Structural framing of large-dimension solid wood members in heavy timber design

122. "Type II" (noncombustible) building construction is characterized by:

A. Structural elements of noncombustible materials with the highest fire-resistance ratings required

B. Structural framing of large-dimension solid wood members with no fire-resistance rating

C. Structural elements of noncombustible materials with reduced or no fire-resistance ratings

D. Structural framing of dimensional lumber on a continuous foundation of poured concrete

123. "Type III" (ordinary) building construction is characterized by:

A. Structural framing entirely of noncombustible materials with the highest fire-resistance ratings

B. Exterior walls of noncombustible materials (masonry) with combustible interior framing of wood

C. Structural framing of large-dimension solid wood members with no concealed spaces

D. Complete combustible framing with no fire-resistance rating on exterior or interior elements

124. "Type IV" (heavy timber) construction is characterized by:

A. Exterior walls of masonry with light combustible interior framing of dimensional lumber

B. Structural elements of noncombustible materials with the highest fire-resistance ratings

C. Dimensional lumber framing typical of single-family residential construction methods

D. Large cross-section solid wood structural members with no concealed spaces for fire spread

125. "Type V" (wood frame) construction is characterized by:

A. Exterior walls of masonry with light combustible interior framing of dimensional lumber

B. Structural elements of noncombustible materials with the highest fire-resistance ratings

C. Large cross-section solid wood structural members in a heavy timber design

D. All structural elements of combustible materials including framing, sheathing, and finishes

126. Lightweight wood trusses (LWT) used in modern residential construction:

A. Resist fire damage well due to the small cross-section of each truss member

B. Can fail rapidly under fire conditions, often within 5 to 10 minutes of fire exposure

C. Have a fire resistance rating of 1 hour without any additional protective coverings

D. Are inherently stronger than dimensional lumber framing in the same building positions

127. "Balloon frame" wood construction is characterized by:

A. Continuous wall studs that extend from the foundation to the roof rafters in one piece

B. Each floor framed separately, with floor joists resting on the wall top plate of the floor below

C. Heavy timber construction with large dimensional wood members and no concealed voids

D. Exterior walls of masonry with light wood framing for the interior partitions only

128. "Platform frame" wood construction is characterized by:

A. Continuous wall studs that extend from the foundation to the roof rafters in one piece

B. Each floor framed separately, with floor joists resting on the wall top plate of the floor below

C. Heavy timber construction with large dimensional wood members and no concealed voids

D. Exterior walls of masonry with light wood framing for the interior partitions only

129. "Tilt-up" concrete construction is most commonly used in:

A. Single-family residential construction with one or two stories above grade level

B. High-rise office buildings with structural steel frames and curtain wall enclosures

C. Multi-family apartment buildings with wood frame interior partitions and concrete exterior walls

D. Commercial warehouses and big-box retail with concrete wall panels supporting a light truss roof

130. Unprotected structural steel in a building exposed to fire:

A. Maintains its full structural capacity until temperatures exceed 2000 degrees Fahrenheit

B. Burns and loses mass at temperatures above 1500 degrees Fahrenheit during fire conditions

C. Loses about 50 percent of its load-carrying capacity at temperatures around 1100 degrees Fahrenheit

D. Is unaffected by fire temperatures because steel does not burn at any temperature reached in a fire

131. The "Thermal Protective Performance" (TPP) rating of a turnout coat assembly:

A. Measures the combined insulation of all three layers against convective and radiant heat

B. Measures only the moisture barrier's resistance to water passage during firefighting operations

C. Measures only the outer shell's resistance to flame impingement during direct fire contact

D. Measures the assembly's breathability and moisture vapor transmission for user comfort

132. The "moisture barrier" layer of a turnout coat is designed to:

A. Provide additional thermal insulation in combination with the outer shell during operations

B. Provide structural strength to hold the gear together during stress on the fireground

C. Prevent liquid water, blood, and bodily fluids from passing through to the thermal liner and skin

D. Provide ventilation for the firefighter by allowing perspiration to escape through the gear

133. The "thermal liner" layer of a turnout coat provides:

A. The majority of the insulating capability of the ensemble against heat transfer to the body

B. The outer protection against flame impingement during direct contact with the fire

C. The barrier against bloodborne pathogens during medical responses by the firefighter

D. The reflective surface that reduces absorption of radiant heat from the fire environment

134. The "outer shell" of a turnout coat is typically made from:

A. Aluminized fabric to reflect radiant heat back toward the source during exposure

B. Cotton duck cloth treated with flame retardant chemicals during the manufacturing process

C. Nylon or polyester for lightweight comfort during long-duration interior firefighting operations

D. Aramid fibers such as Nomex, Kevlar, or PBI selected for flame and abrasion resistance

135. The "protective hood" worn under the SCBA facepiece and helmet is typically made of:

A. Heavy leather to resist flame impingement during interior structural firefighting operations

B. Knit aramid fibers such as Nomex or PBI providing flame resistance and a close ear fit

C. Lightweight polyester for the comfort needed during extended duration operations on scene

D. Aluminized foil to reflect radiant heat away from the ears and neck of the firefighter

136. The "fire helmet" worn by structural firefighters:

A. Is designed primarily to provide chin and face protection during interior operations

B. Is required by NFPA to weigh less than 8 ounces fully assembled with the chin strap

C. Provides impact protection, thermal insulation, and identification of rank or company position

D. Must be made entirely of metal for maximum impact and heat resistance during operations

137. "Structural firefighting boots" must meet NFPA 1971 standards for:

A. Puncture resistance, impact protection, thermal insulation, and a steel/composite toe cap

B. Insulation against electrical hazards up to 50,000 volts during contact with downed power lines

C. Flotation in water for firefighters during water rescue operations from the apparatus

D. Slip resistance only, with no specific puncture or impact protection requirements specified

138. "Structural firefighting gloves" must meet NFPA 1971 standards for:

A. Cold-weather insulation down to negative 40 degrees Fahrenheit for winter operations only

B. Water resistance only, allowing the hands to remain dry during operations on the fire ground

C. Electrical insulation up to 50,000 volts during contact with downed power lines at the scene

D. Heat resistance, cut resistance, abrasion resistance, and dexterity sufficient for tool handling

139. The "interface" between the turnout coat sleeve and the glove cuff should:

A. Allow a gap of at least 2 inches for ventilation and to prevent heat buildup at the wrist

B. Overlap completely to prevent embers and combustion products from reaching the skin

C. Use only Velcro closures rather than wristlets to avoid interfering with hand movement

D. Be sealed permanently during manufacturing so that the gloves and coat cannot be separated

140. The "wristlet" inside the cuff of a turnout coat is designed to:

A. Provide additional structural reinforcement to the sleeve cuff during heavy mechanical use

B. Be removable so that the firefighter can wash the wristlet separately from the coat shell

C. Provide a close-fitting seal at the wrist that prevents embers and water from entering the sleeve

D. Provide a reflective surface for nighttime visibility of the firefighter's hands during operations

141. The "DOT Emergency Response Guidebook" (ERG) is organized to allow responders to:

A. Identify only the chemical composition of the material involved in the incident situation

B. Calculate the exact size of the isolation zone based on detailed weather data input

C. Determine the specific medical treatment required for any patient exposed to a chemical

D. Identify the material from placards, container shape, or shipping papers and look up initial actions

142. "DOT placards" on transportation vehicles use a four-digit "UN/NA number" that:

A. Identifies the specific chemical or material being transported in the labeled container

B. Identifies the hazard class of the material such as flammable, corrosive, or radioactive

C. Identifies the manufacturer of the chemical or material in the labeled container

D. Identifies the destination address of the chemical or material being transported in the load

143. The "hot zone" at a hazmat incident is:

A. The area where decontamination operations are conducted by trained hazmat technicians

B. The area where contamination exists or could spread, requiring full PPE to enter or operate

C. The area used for command, staging, and rehab where uncontaminated personnel operate

D. The area where the responsible party representatives meet with the incident commander

144. The "Levels of Protection" classification system (Levels A, B, C, and D) is defined by:

A. The NFPA exclusively for use during fire department hazmat operations at incidents

B. The Department of Transportation for use during the transport of hazardous materials only

C. The EPA and OSHA to specify the protective ensemble appropriate to the hazards encountered

D. The CDC exclusively for use during infectious disease outbreaks affecting public health

145. "Level A" protective equipment is required when:

A. The hazard requires only respiratory protection while the skin can remain unprotected

B. The hazard requires only skin protection and no respiratory protection from the atmosphere

C. The hazard is unknown but the atmosphere has been confirmed to be free of vapor or skin hazards

D. The highest level of skin AND respiratory protection is needed, including a vapor-tight suit and SCBA

146. "Level B" protective equipment provides:

A. The highest level of respiratory protection (SCBA) with a lower level of skin protection than Level A

B. The highest level of skin protection with a lower level of respiratory protection than Level A

C. Only basic work uniform with no respiratory protection beyond a standard dust mask

D. The same protection as Level A, with the only difference being the color of the suit material

147. "Level D" protective equipment consists of:

A. A vapor-tight encapsulating suit with SCBA worn inside the suit for full encapsulation

B. A chemical-resistant suit with SCBA worn outside for highest respiratory protection available

C. A standard work uniform without specialized respiratory or chemical-resistant protection

D. A chemical-resistant suit with an air-purifying respirator instead of SCBA for protection

148. "Gross decontamination" at a hazmat incident is:

A. The final precision cleaning of all PPE before release of the equipment back to service

B. The initial rapid removal of the bulk of contamination from people and PPE at the scene

C. The decontamination of the responsible party's facility after the incident concludes

D. The chemical analysis of contaminated materials performed off scene by the hazmat lab

149. The acronym "CBRNE" used in weapons of mass destruction terminology stands for:

A. Combustion, Backdraft, Radiation, Nuclear, and Electrical hazards at any incident scene

B. Class B fuels, Backdraft, Rollover, Neutralization, and Explosive hazards at the fire ground

C. Chemical, Biological, Reduction, Neutralization, and Evacuation procedures during response

D. Chemical, Biological, Radiological, Nuclear, and Explosive agents or weapons of mass destruction

150. "Shipping papers" required to accompany hazardous materials in transport identify:

A. Only the destination address and the time of expected delivery to the receiving party

B. Only the manufacturer's address and the date of production at the original facility

C. The proper shipping name, hazard class, UN/NA number, quantity, and emergency contact

D. Only the value of the shipment for insurance and customs declaration purposes

ANSWER KEY WITH EXPLANATIONS – PRACTICE EXAM 17

1. D — LUNAR (Location, Unit, Name, Assignment/Air, Resources needed). The Mayday acronym standardizes information delivery so the IC immediately knows where the firefighter is, who they are, what they were doing, air status, and what resources are needed. Standardized format eliminates confusion under stress and accelerates RIC deployment.

2. B — "Worker" is fire service shorthand for a working fire, signaling to dispatch and incoming units that a full company assignment is committed at the address. The transmission triggers additional resources to roll and tells command staff that the response has shifted from investigation to active suppression.

3. C — Fuel-controlled fires burn freely with adequate oxygen available, so the rate of combustion is determined by how much fuel is exposed and how it is arranged. The opposite, ventilation-controlled, occurs when oxygen becomes the limiting factor and combustion slows or smolders.

4. A — The C-post is the rearmost roof support pillar at the back of the passenger compartment, behind the rear doors on a four-door vehicle. It is a critical structural element during side-removal extrication and a common reference point for cuts during rescue operations.

5. D — The Bresnan distributor is a piped-stream device thrown or lowered into spaces firefighters cannot safely enter, such as basements, cellars, ship holds, or attics. It spins under water pressure to distribute the stream in a 360-degree pattern across the confined space.

6. B — Class D fires involve combustible metals such as magnesium, titanium, sodium, lithium, and potassium that burn at extremely high temperatures. They require dry powder agents specifically formulated to smother the metal because water reacts violently with most burning metals.

7. A — The K tool (also called the A tool) pulls the lock cylinder out of a door, exposing the latch mechanism behind it. Once exposed, a key tool is inserted into the mechanism to operate the latch manually, defeating the lock with minimal damage.

8. C — Crouching low with one knee on the floor keeps the firefighter below the heat layer, provides a stable platform to absorb nozzle reaction, and allows quick movement. The position also keeps the stream angled upward into the heated atmosphere where it is most effective.

9. B — EDITH stands for Exit Drills In The Home, a public-education program that teaches families to plan and practice escape routes, designate a meeting place outside, and never re-enter a burning structure. The drills convert fire safety knowledge into automatic action during an actual emergency.

10. D — The Stokes basket is a rigid, basket-shaped litter that fully encloses and supports a patient, allowing them to be lifted, lowered, dragged, or hoisted through difficult environments. Its design makes it the standard packaging device for rope, water, confined-space, and wilderness rescues.

11. A — A smoke explosion occurs when smoke gases accumulated in an uninvolved compartment encounter an ignition source and detonate, separate from the original fire compartment. Backdraft requires the introduction of oxygen to an oxygen-depleted, fuel-rich space; smoke explosion needs only the spark.

12. C — The trash line or bumper line is a small-diameter (1 to 1.5 inch) booster line preconnected for quick use on small outside fires like dumpsters, grass, and car fires. Its low flow and small handling needs make it ideal for one-firefighter use on minor fires.

13. B — A 12-hour operational period is the typical planning cycle in ICS for extended incidents, after which the incident action plan is updated and new objectives, assignments, and resources are established. Shorter periods are used in fast-moving incidents, longer ones in protracted operations.

14. D — A preconnected line is permanently connected to a discharge gate on the pump panel and loaded so it can be pulled, charged, and put into operation rapidly without making field connections. The preconnection eliminates setup time at the most critical phase of fire attack.

15. A — A PASS device activates an audible alarm after approximately 30 seconds of motionlessness, with a pre-alarm warning at about 15 to 20 seconds. The alarm allows rescuers to locate a downed firefighter by sound when visibility is limited.

16. C — Wet barrel hydrants have water in the barrel up to each outlet at all times because the main valve is at each outlet, making them suitable only for climates that do not experience hard freezes. In freezing climates, dry barrel hydrants with the valve below frost line are required.

17. B — Hugh Halligan was an FDNY First Deputy Chief who designed the Halligan tool in the late 1940s as an improvement over earlier forcible entry tools. The tool's adz, pick, and fork ends combine prying, cutting, and striking functions into a single tool now standard worldwide.

18. A — A deadman anchor is a buried object such as a log, rock, or driven picket used as an artificial anchor point when no natural anchor is available. The mass and depth of the buried object resist the load applied through the rope above.

19. C — The ladder drop test releases the halyard with the fly section partially extended and verifies that the dogs (pawls) engage each rung as the fly drops. The catch confirms the locking mechanism is functional, which is critical because dog failure could drop the fly section onto firefighters below.

20. D — The "platform" or chassis of a fire pump apparatus is the structural framework on which the pump, water tank, hose, and supporting components are mounted. This integrated framework is engineered to handle the combined weight, vibration, and loads of fire ground operations.

21. B — The first-due engine company's standard tactical assignment is to establish water supply (typically a forward lay from a hydrant), advance the initial attack line, and conduct fire attack. This combination addresses the highest-priority tactical objectives — confinement and extinguishment — immediately on arrival.

22. A — The Fire Ground Commander (FGC) is the incident commander managing overall fire ground operations and tactical decision-making at a working incident. The title is interchangeable with IC in many departments and was historically used before NIMS standardized "IC."

23. D — Size-up is a continuous process throughout the incident, beginning before dispatch and updated as conditions change during operations. Treating it as a one-time activity ignores the dynamic nature of fire behavior, where conditions can shift dramatically minute by minute.

24. B — The command staff in ICS consists of the Safety Officer, Public Information Officer, and Liaison Officer, all reporting directly to the IC. These positions handle specific functions that the IC cannot manage personally during a complex incident.

25. C — NIMS recommends a span of control of 3 to 7 subordinates per supervisor, with 5 considered optimal under emergency conditions. Spans outside this range degrade communication and accountability, making personnel and tactical control unreliable.

26. D — Unified Command is used when an incident crosses jurisdictional or functional boundaries and multiple agencies share authority over the response. The structure allows each agency to contribute to decision-making while maintaining a single, coordinated incident action plan.

27. A — The Accountability Officer tracks the location, function, and welfare of every firefighter operating at the incident through PAR tags, riding lists, or electronic systems. The role exists so that no firefighter can become lost or unaccounted for without rapid detection.

28. B — The Rehab Sector provides medical evaluation, hydration, nutrition, and rest for firefighters during prolonged operations or in extreme weather. Sustained operations cause physiological stress that, if not addressed, leads to medical emergencies and accidents among personnel.

29. D — OSHA 1910.134 includes an explicit exception to the two-in/two-out rule when a known life hazard exists and immediate rescue could save the victim. The exception recognizes that strict compliance could doom a savable victim during the first crucial minutes.

30. C — The Personnel Accountability Report (PAR) is initiated by the incident commander at benchmark events (after primary search, after knockdown, after a Mayday) or at regular intervals to confirm all personnel are accounted for. The PAR is the IC's primary tool for maintaining personnel accountability.

31. C — A Mayday is transmitted as soon as the firefighter recognizes the need for immediate rescue, not after self-rescue attempts have failed. Early transmission preserves the rescue window because conditions deteriorate exponentially after the firefighter loses orientation, air, or mobility.

32. D — The Maltese cross represents bravery and service, tracing back to the Knights Hospitaller, a medieval order that served wounded crusaders and is considered an early model of fire and rescue service. The fire service adopted the symbol as a tribute to that heritage.

33. B — Dave Dodson's smoke reading framework evaluates volume, velocity, density, and color of smoke to predict fire behavior and assess conditions before entry. Each attribute conveys specific information about the size, intensity, and stage of the fire compartment.

34. C — The decay stage is characterized by decreasing heat release as fuel is consumed and combustion slows, often becoming ventilation-limited as oxygen demand drops with the fire. Decay does not mean safe; it can mask conditions ripe for backdraft if oxygen is reintroduced.

35. A — The ignition stage is the initial phase when the heat source contacts the fuel and combustion begins, limited to the area of initial contact. It is the only stage where the fire could likely be controlled with a portable extinguisher before significant fire growth.

36. D — The fully developed stage is when all available fuel within the compartment is burning at the maximum possible heat release rate, with temperatures often above 1,500 degrees Fahrenheit. Interior survival is impossible at this stage without specialized protective measures.

37. C — Photoelectric smoke detectors use a light beam and photo sensor that detects when smoke particles scatter the light, making them most responsive to the larger smoke particles produced by slow smoldering fires. They are recommended for sleeping areas where smoldering ignition is common.

38. A — Ionization smoke detectors use a small radioactive source to ionize the air between two plates; small smoke particles disrupt the current flow and trigger the alarm. They respond most quickly to fast-flaming fires that produce many small particles in high concentration.

39. B — Fixed-temperature heat detectors activate at a predetermined temperature, typically 135 to 165 degrees Fahrenheit, regardless of how fast the temperature rose. They are simple, reliable, and used in environments where rate-of-rise detectors would false-alarm from normal temperature swings.

40. A — Rate-of-rise heat detectors activate when the temperature rises faster than a preset rate, typically 12 to 15 degrees Fahrenheit per minute. They respond before a fixed-temperature detector in fast-developing fires, providing earlier warning in many fire scenarios.

41. D — The annunciator panel displays the location of the initiating device that activated the fire alarm system, allowing responders to identify the area of concern without searching the entire building. Modern panels often include floor plans and zone information for rapid orientation.

42. B — A presignal system notifies trained staff first to investigate the alarm before the general evacuation signal sounds throughout the building. This avoids unnecessary mass evacuation for false alarms while still allowing for prompt suppression if the alarm is genuine.

43. A — "Code 99" or "general alarm" is local fire department terminology for a full structural fire assignment, dispatching multiple engines, trucks, a chief, and rescue. The exact assignment varies by department, but the term always signals a confirmed working fire.

44. C — A knockout panel is a lightweight section of roof or wall designed to be easily removed by firefighters for ventilation access during operations. The panels are common in commercial roofs to allow rapid ventilation without cutting through structural decking.

45. D — Fire Department Connections are located on the exterior front or side of the building within reach of the responding pumper, allowing the engine to support the sprinkler or standpipe system from a hydrant supply. Building codes specify accessibility and visibility requirements for FDC placement.

46. B — A Siamese appliance combines two supply lines into a single outlet, increasing the available water supply to the receiving pumper or FDC. The two-in, one-out flow pattern is essential when one hose cannot supply the required flow alone.

47. C — A gated wye divides one larger line into two smaller lines with a gate valve at each outlet, allowing each downstream line to be controlled independently. The configuration enables two attack lines from a single supply, with valves to start or stop either independently.

48. A — A high-rise pack contains 50 to 150 feet of hose, a nozzle, adapters, fittings, and tools needed to connect to standpipe outlets on the fire floor. The pack is designed to be carried up stairs and put into operation on any floor without requiring a long hose stretch from the apparatus.

49. B — Spotting an aerial apparatus requires positioning that optimizes aerial reach to the target area, avoids the collapse zone, and maintains clear sight lines for the operator. Poor spotting wastes the aerial's reach or exposes personnel to falling debris during collapse.

50. C — The pedestal or turntable controls at the rear of the apparatus are designed for the aerial operator and provide the best view of the aerial's position, the load, and the operating environment. Tip-mounted controls exist on some platforms but are secondary to the pedestal station.

51. A — A quint apparatus integrates the five firefighting functions: water tank, fire pump, hose, ground ladders, and aerial device. The combination allows one apparatus to perform both engine and truck company functions, useful in departments with limited staffing or apparatus.

52. D — A tower ladder or aerial platform has a basket or platform at the tip that serves as a working platform for firefighters during rescue, ventilation, or master stream operations. The platform is safer than working from the tip of a straight aerial and accommodates patient packaging.

53. B — Outriggers and stabilizers must be fully deployed before the aerial device is raised, providing the wide base of support that prevents the apparatus from tipping during operations. Operating without proper stabilization risks catastrophic apparatus tip-over with personnel aloft.

54. A — The swing radius is the clear area required around the apparatus for the aerial to rotate without obstruction, typically marked by red striping or signs on the apparatus. Personnel must stay outside the swing radius to avoid being struck during aerial rotation.

55. D — The scrub area is the part of the building that the aerial can reach from a given setup position, determined by the aerial's length, angle, and rotation. Aerial spotting is selected to maximize scrub area for the specific operation required.

56. C — A mid-mount aerial has the aerial device mounted between the cab and the rear of the apparatus, while a rear-mount has it at the back. Mid-mounts have a lower travel height and shorter overall length but require more rear overhang during operations.

57. A — The load chart shows the maximum tip load at various extensions and elevation angles, accounting for the safety margins built into the aerial's design. Loads beyond chart limits risk structural failure of the aerial sections under stress.

58. B — The below-grade position operates with the aerial below horizontal, with the tip lower than the apparatus platform, used to reach basements, embankments, or below-grade rescue locations. Below-grade operations have specific load limitations because the geometry stresses the aerial differently than overhead work.

59. D — NFPA 1901 requires pumps to deliver 100 percent of rated capacity at 150 psi net pump pressure during the certification test, performed at draft from a static source. The standard ensures the pump can move the rated flow against significant resistance under realistic operational conditions.

60. C — Centrifugal pumps cannot create the vacuum needed to lift water from a static source through air. A separate priming pump (typically rotary vane or positive displacement) removes air from the suction side to allow water to rise into the pump intake.

61. B — Tandem pumping connects two pumpers in series, with the first supplying the intake of the second to boost pressure for long supply lays or high-elevation operations. The arrangement is also called relay pumping when used over longer distances.

62. D — Net Pump Discharge Pressure (NPDP) equals PDP minus intake pressure when the pump is supplied from a pressurized source. The calculation isolates the pump's actual contribution to the system from the contribution of the supply source.

63. A — The Hazen-Williams formula is the empirical equation used to calculate friction loss in fire hose at various flow rates and hose diameters during operations. Fire service simplified formulas ($FL = CQ^2L$) are derived from Hazen-Williams for practical fireground use.

64. B — The discharge coefficient (C) accounts for the shape of the hydrant outlet and the velocity profile of water leaving the hydrant, which affects flow rate calculations from Pitot readings. Standard values are about 0.9 for smooth outlets, 0.8 for square outlets, and 0.7 for protruding outlets.

65. C — The Pitot tube measures the velocity pressure of water flowing from the hydrant outlet during a flow test. The velocity pressure is then converted to flow rate using the formula $GPM = 29.83 \times C \times d^2 \times \sqrt{P}$.

66. A — A reverse lay begins at the fire scene and proceeds back to the water source as the apparatus drives away. The reverse lay is used when the first-due engine arrives at the scene before establishing water supply, allowing it to begin fire attack while a later engine completes the supply line.

67. B — A forward lay begins at the hydrant and proceeds to the fire as the apparatus drives toward the structure. The engine stops at the hydrant to drop a wrap, then drives to the scene paying out supply hose along the way.

68. C — A split lay uses two pumpers laying supply hose from opposite ends — one from the hydrant toward the fire, the other from the fire toward the hydrant — meeting in the middle. The technique is used when neither apparatus can complete the lay alone due to distance or obstacles.

69. D — The load test verifies that the cylinder can withstand 5/3 (167 percent) of its rated service pressure without permanent damage or expansion beyond allowable limits. The test ensures the cylinder has not weakened from cycling and remains safe for service.

70. C — Hydrostatic testing intervals are every 5 years for steel cylinders and every 3 to 5 years for composite cylinders, depending on construction (typically 5 years for hoop-wrapped and 3 years for fully wrapped). The interval accounts for the different fatigue characteristics of the materials.

71. A — The RAT (Rescue Air Tank) strap or RIT bag carries a spare SCBA bottle and regulator that can be deployed quickly to deliver air to a downed firefighter. The kit allows the RIT to restore the firefighter's air supply before attempting removal.

72. D — Buddy breathing uses the Universal Emergency Breathing Safety System (UEBSS), a standardized low-pressure connection on modern NFPA-compliant SCBAs. The connection allows air sharing between SCBAs from different manufacturers without removing facepieces.

73. B — Skip breathing involves a normal inhalation, a brief breath hold, and a slow exhalation to extend cylinder duration during emergency air conservation. The technique reduces minute volume without producing hypercapnia and is taught for emergency egress situations.

74. A — A Personal Escape System under NFPA 1983 includes a rope, anchor, and descent device packaged for emergency egress from upper floors. The complete system gives the firefighter a means to bail out a window when other egress is cut off.

75. D — The bailout technique involves anchoring to a fixed point inside the structure (stud, beam, radiator), throwing the rope out the window, and descending out the window to safety. The technique is a last-resort egress for situations where stairs, ladders, and other exits are unavailable.

76. B — The bailout anchor must be a structural element such as a stud, beam, or radiator that can support the firefighter's weight under dynamic loading. Furniture and door hardware lack the mass and structural connection needed to safely anchor a bailout descent.

77. C — The descent device provides controlled friction to allow the firefighter to descend at a safe rate during egress. Without friction control, the descent would be uncontrolled free fall; without enough friction, the descent would be too fast to manage safely.

78. D — The Mayday protocol requires immediate transmission upon recognizing the need for assistance, including LUNAR information (Location, Unit, Name, Assignment/Air, Resources needed). Early transmission preserves the rescue window before conditions deteriorate further.

79. A — The Rapid Intervention Crew is staged near the primary entry point, fully equipped with tools and ready to deploy immediately on a Mayday. The staging position is selected for the shortest possible deployment time to the most likely rescue location.

80. C — The RIT pack contains a dedicated SCBA — cylinder, regulator, and mask — for the downed firefighter to replace damaged or depleted equipment. Restoring air supply is the immediate priority before any attempt to remove the firefighter.

81. D — The Drag Rescue Device is a built-in webbing handle accessible after opening a flap at the upper back of modern turnout coats. The handle provides a strong, easily grasped attachment point for dragging a downed firefighter out of an IDLH environment.

82. C — An anchor strap or girth hitch creates a loop around an object such as a beam or column that grips itself tightly when loaded with weight. The self-tightening characteristic ensures the anchor remains secure under dynamic loading from the rescue.

83. A — A Z-rig (or 3:1) provides a 3-to-1 mechanical advantage through pulleys and a progress-capture system, multiplying the rescuers' pulling force three times at the load. The Z-rig is a foundational technical rescue system used for hauling and tensioning operations.

84. C — Mechanical advantage is calculated by counting the number of rope strands supporting the load at the moving pulley attached to the load. A single supporting strand is 1:1, two strands is 2:1, three strands is 3:1, and so on.

85. D — A haul team requires a clear, level path and enough rescuers to safely pull the loaded rope through the system. The team must have room to work without obstruction; insufficient space or personnel makes coordinated hauling impossible or unsafe.

86. B — Negative pressure ventilation uses smoke ejector fans positioned at an exhaust opening to draw smoke and heated gases out of the structure. The technique is slower than PPV but useful when positive pressure cannot be safely applied.

87. C — The PPV sequence is to identify the exhaust opening, position the fan at the entry point, then start the flow to establish the planned air path. Starting the fan without an exhaust opening pressurizes the structure and worsens interior conditions for crews and victims.

88. A — A vertical ventilation opening should be located directly above the seat of the fire to allow heat and gases to escape upward and out. Offset openings allow heat and smoke to spread horizontally through the attic or cockloft before exiting.

89. B — Recommended minimum size for a vertical ventilation hole on a residential roof is 4 feet by 4 feet. Smaller holes restrict airflow and reduce effectiveness; larger holes may be required for larger fires or higher heat releases.

90. B — A trench cut is a defensive ventilation tactic, made completely across the roof ahead of the fire to stop horizontal spread through the cockloft or attic. The cut sacrifices the area on the fire side to save the rest of the structure.

91. A — The Mattydale (cross-lay) load is preconnected above the pump panel, perpendicular to the apparatus's long axis. The cross-lay allows rapid deployment from either side of the apparatus, minimizing the time from arrival to flowing water.

92. D — The horseshoe load is loaded along the perimeter of the hose bed in a U-shape with couplings exposed on the outer edge. The pattern minimizes binding and gives quick access to couplings for breaking and reconnecting during deployment.

93. B — The accordion load consists of hose loaded on edge in standing folds resembling the bellows of an accordion. The pattern allows easy inspection of couplings, drains water quickly, and pays out cleanly without tangling.

94. A — The Minuteman load is folded and bundled so the firefighter can carry the entire preconnect on their shoulder and walk toward the fire, paying it out behind them as they go. The load is designed for one-firefighter stretches with minimal kinking.

95. D — A triple layer (triple lay) load folds the preconnect in three equal layers, designed for one-firefighter deployment by grabbing the bundle at the top and walking away from the apparatus. The folding pattern is fast to load and reliable to deploy.

96. C — The donut roll is best suited for carrying and deployment to upper floors or remote areas where the hose bed cannot reach. The compact roll is easy to carry up stairs and unrolls cleanly when thrown into position at the connection point.

97. A — The cylinder duration rating represents the manufacturer's rated air supply time at a standard work rate, not the actual fireground duration. Real-world durations under high work loads and stress are routinely half the rated duration or less.

98. B — The low-pressure alarm on an SCBA activates at 33 percent of rated cylinder pressure, indicating that immediate egress is required. The 33 percent reserve was chosen to give time to exit before air is fully depleted in the unpredictable fireground environment.

99. D — The daily SCBA inspection must verify the cylinder pressure, harness, regulator, facepiece, low-pressure alarm, and PASS device. Checking only one component leaves other failure modes undetected until they cause a problem during interior operations.

100. C — The Date of Manufacture stamped on a cylinder establishes the starting date for service life and hydrostatic testing interval calculations. Service life (typically 15 years for composites) and test intervals are referenced to this date throughout the cylinder's life.

101. D — FL = 2 × (5)² × 2.5 = 125 psi. The calculation uses Q in hundreds of gpm (500/100 = 5) and L in hundreds of feet (250/100 = 2.5), yielding 125 psi friction loss in the section. This level of loss is why 2.5-inch lines are limited in practical length at high flows.

102. A — The friction loss coefficient for 1.75-inch attack hose using the simplified formula $FL = CQ^2L$ is 15.5. The high coefficient reflects the small diameter's significant friction at normal attack flows of 150 to 200 gpm.

103. B — Five-inch LDH is used as a supply line from a hydrant or pumper to the attack engine for high-volume flows (1,000+ gpm). Its low friction loss per length allows long supply lays without intermediate pumping stations.

104. D — Elevation pressure is gained or lost at 0.5 psi per foot of elevation change. Pressure is lost on uphill flows (working against gravity) and gained on downhill flows (assisted by gravity), requiring corresponding pump pressure adjustments.

105. B — Standard appliance loss is approximately 5 psi for flow rates under 350 gpm, increasing with higher flows because the pressure drop across an orifice is proportional to flow squared. The 5 psi rule of thumb is used in pump discharge pressure calculations for typical handlines.

106. A — The standard nozzle pressure for a smoothbore handline tip is 50 psi at the tip. The lower pressure produces less nozzle reaction than fog nozzles, making smoothbore handlines easier to manage at higher flows.

107. C — The standard nozzle pressure for a combination (fog) handline nozzle is 100 psi at the tip. Modern automatic and constant-pressure fog nozzles are designed to operate optimally at this pressure for proper stream pattern and reach.

108. B — An automatic nozzle maintains a constant nozzle pressure (typically 100 psi) by automatically varying the orifice size in response to flow rate changes. This keeps stream quality and reach consistent across a wide range of flows.

109. A — Nozzle reaction for a smoothbore tip is calculated as $NR = 1.57 \times d^2 \times NP$, where d is the tip diameter in inches and NP is nozzle pressure in psi. The formula reflects the conservation of momentum for water leaving a fixed orifice.

110. C — Nozzle reaction for a fog or combination nozzle is calculated as $NR = 0.0505 \times Q \times \sqrt{NP}$, where Q is the flow rate in gpm and NP is nozzle pressure in psi. The formula differs from smoothbore because the fog nozzle's variable orifice and stream pattern alter the momentum exchange.

111. A — Standard residential sprinkler heads activate in the range of 135 to 165 degrees Fahrenheit, with most rated at 155 degrees Fahrenheit. The temperature is chosen to activate well below ceiling temperatures during early fire growth but above normal residential ambient conditions.

112. D — A wet pipe sprinkler system has pressurized water in all piping at all times, with immediate discharge when a sprinkler head activates. The wet pipe design is the simplest, most reliable, and most common sprinkler configuration in heated buildings.

113. C — A dry pipe sprinkler system has pressurized air in the piping that holds water back at the dry pipe valve until a head opens. When the air pressure drops, the valve trips and water flows into the system, with a slight delay before discharge at the head.

114. A — A pre-action system requires both a separate detection device to trip the valve AND a sprinkler head to open before water flows. The double-action requirement prevents accidental discharge in spaces where water damage would be catastrophic, such as computer rooms or archives.

115. B — A deluge system has open sprinkler heads that all discharge simultaneously when the deluge valve is tripped by a separate detection system. The total flooding design is used for high-hazard occupancies requiring rapid suppression across an entire area.

116. D — NFPA 25 governs the inspection, testing, and maintenance of water-based fire protection systems including sprinklers, standpipes, and fire pumps. NFPA 13 covers installation; NFPA 25 covers what to do after installation to keep systems functional.

117. C — A quick response (QR) sprinkler has a more thermally sensitive activation element than a standard response (SR) head, so it operates faster at the same temperature. The faster response reduces room temperature at activation and limits fire growth before suppression begins.

118. A — A Class I standpipe is intended for fire department use only, with 2.5-inch outlets at each floor for connection to attack lines. The 2.5-inch outlets supply the higher flows fire department operations require.

119. B — A Class II standpipe is intended for building occupants only, with preconnected 1.5-inch hose stored in cabinets at each floor. The lower flow and smaller hose allow untrained occupants to attempt incipient suppression while awaiting fire department response.

120. C — A Class III standpipe is intended for both occupants and fire department personnel, with both 1.5-inch and 2.5-inch outlets provided. The combination supports occupant use and full fire department operations from the same system.

121. A — Type I (fire-resistive) construction has structural elements of noncombustible materials with the highest fire-resistance ratings, typically 3 to 4 hours for primary structural members. The construction is used in high-rises and major structures requiring maximum fire endurance.

122. C — Type II (noncombustible) construction has structural elements of noncombustible materials with reduced or no fire-resistance ratings. Unprotected steel and concrete buildings — many warehouses, big-box retail, and industrial structures — fall in this category.

123. B — Type III (ordinary) construction has exterior walls of noncombustible materials (typically masonry) with combustible interior framing of wood. Many older urban storefront and mixed-use buildings are Type III, with concealed combustible voids that hide fire spread.

124. D — Type IV (heavy timber) construction has large cross-section solid wood structural members with no concealed spaces for fire spread. The mass of the timbers slows burn-through, and the lack of voids prevents hidden fire spread.

125. D — Type V (wood frame) construction has all structural elements of combustible materials including framing, sheathing, and finishes. Standard residential and light commercial wood-frame buildings are Type V, the most common construction type in North America.

126. B — Lightweight wood trusses can fail rapidly under fire conditions, often within 5 to 10 minutes of fire exposure. The small cross-sections of the truss members and the vulnerable metal gusset plates collapse quickly under heat, creating a major collapse hazard.

127. A — Balloon frame construction uses continuous wall studs that extend from the foundation to the roof rafters in one piece, creating continuous vertical voids in the walls. Fire in the walls spreads rapidly through these voids from basement to attic without firestopping.

128. B — Platform frame construction frames each floor separately, with floor joists resting on the wall top plate of the floor below. The construction creates inherent fire blocking at each floor level, in contrast to balloon frame's continuous stud cavities.

129. D — Tilt-up concrete construction is most commonly used in commercial warehouses and big-box retail with concrete wall panels supporting a light truss roof. The panels are cast on the ground and tilted into position, supported temporarily until the roof is in place.

130. C — Unprotected structural steel loses about 50 percent of its load-carrying capacity at temperatures around 1100 degrees Fahrenheit. Although steel does not burn, it elongates and weakens at fire temperatures, causing collapse if not protected by spray-on fireproofing or rated assemblies.

131. A — The Thermal Protective Performance (TPP) rating measures the combined insulation of all three layers (outer shell, moisture barrier, thermal liner) against convective and radiant heat. Higher TPP means longer protection time before second-degree burns occur to the wearer.

132. C — The moisture barrier prevents liquid water, blood, and bodily fluids from passing through to the thermal liner and skin. The barrier protects against scalding water from hose lines and bloodborne pathogens during medical responses.

133. A — The thermal liner provides the majority of the insulating capability of the ensemble against heat transfer to the body. The trapped air pockets in the multi-layer liner construction are the principal mechanism slowing convective and conductive heat transfer.

134. D — The outer shell is typically made from aramid fibers such as Nomex, Kevlar, or PBI, selected for flame and abrasion resistance. These fibers do not melt or burn and maintain strength after heat exposure, making them ideal for the outermost protective layer.

135. B — The protective hood is made of knit aramid fibers such as Nomex or PBI, providing flame resistance and a close ear fit. The hood covers the ears, neck, and any skin not protected by the helmet and SCBA facepiece.

136. C — A structural fire helmet provides impact protection, thermal insulation, and identification of rank or company position through color and shape. The traditional shape (eagle or beavertail) also sheds water and debris from the wearer's neck.

137. A — Structural firefighting boots must meet NFPA 1971 standards for puncture resistance, impact protection, thermal insulation, and a steel or composite toe cap. These specifications address the foot hazards of structural firefighting including nails, falling debris, and heated surfaces.

138. D — Structural firefighting gloves must meet NFPA 1971 standards for heat resistance, cut resistance, abrasion resistance, and dexterity sufficient for tool handling. The combination is challenging to achieve, which is why structural gloves are highly engineered ensembles.

139. B — The interface between the turnout coat sleeve and the glove cuff should overlap completely to prevent embers and combustion products from reaching the skin. Gaps at the wrist are common burn locations, so seal at this interface is critical.

140. C — The wristlet inside the cuff of a turnout coat is a snug-fitting knit cuff that creates a close seal at the wrist, preventing embers, water, and debris from entering the sleeve. The wristlet works with the glove to maintain the protective envelope at the wrist.

141. D — The DOT Emergency Response Guidebook (ERG) is organized so responders can identify the material from placards, container shape, or shipping papers and look up initial actions. The recommended actions include isolation distances, protective actions, and first-response priorities.

142. A — The four-digit UN/NA number on a DOT placard identifies the specific chemical or material being transported. The number is then cross-referenced in the ERG to find the specific response guide for that material.

143. B — The hot zone at a hazmat incident is the area where contamination exists or could spread, requiring full PPE to enter or operate. Only properly equipped and trained personnel enter the hot zone, and they undergo decontamination on exit.

144. C — The Levels of Protection classification system (A, B, C, and D) is defined by the EPA and OSHA to specify the protective ensemble appropriate to the hazards encountered. The system standardizes PPE selection across agencies for hazmat response.

145. D — Level A is required when the highest level of skin AND respiratory protection is needed, including a vapor-tight encapsulating suit and SCBA worn inside the suit. The level is used for unknown atmospheres or confirmed high-vapor hazards.

146. A — Level B provides the highest level of respiratory protection (SCBA) with a lower level of skin protection than Level A — typically a chemical-resistant suit that is not vapor-tight. Level B is used when respiratory hazards are severe but skin contact risks are lower.

147. C — Level D protective equipment consists of a standard work uniform without specialized respiratory or chemical-resistant protection. Level D is used only when no respiratory or skin hazards exist at the work location, such as in the cold zone.

148. B — Gross decontamination is the initial rapid removal of the bulk of contamination from people and PPE at the scene, typically a flush with water or specified solution. The phase reduces contaminant load before more thorough technical decon.

149. D — CBRNE stands for Chemical, Biological, Radiological, Nuclear, and Explosive agents or weapons of mass destruction. The acronym is used to categorize the major hazard types in WMD response and planning.

150. C — Shipping papers must identify the proper shipping name, hazard class, UN/NA number, quantity, and emergency contact information. The required information allows responders to quickly evaluate the hazard and obtain expert guidance on the specific material.