Practice Test 9

Time Allowed: 4 hours

Passing Score: 70% (88 out of 125 questions correct)

Instructions:

- Read each question carefully and select the BEST answer
- Mark your answers on a separate sheet
- You may use a calculator for mathematical calculations
- Answer all questions - there is no penalty for guessing
- Review your answers if time permits

SECTION 1: PLANNING AND ESTIMATING (Questions 1-19)

1. What is the purpose of construction insurance certificates?

A. Proof of insurance coverage for owner and lender verification

B. Building permits

C. Contract documents

D. Payment receipts

2. What is general liability insurance coverage?

A. All possible risks

B. Employee injuries

C. Property damage and bodily injury to third parties

D. Vehicle accidents

3. What is builder's risk insurance?

A. Personal liability

B. Property insurance covering building under construction

C. Workers compensation

D. Vehicle insurance

4. What is the difference between occurrence and claims-made policies?

A. No difference

B. Cost only

C. Same coverage

D. Occurrence covers when incident happens; claims-made when claim is filed

5. What is an umbrella policy?

A. Weather insurance

B. Duplicate coverage

C. Temporary insurance

D. Seasonal insurance

6. What is subcontractor default insurance (SDI)?

A. Payment insurance

B. Performance insurance

C. Covering costs if subcontractors default or fail to perform

D. Liability insurance

7. What is the purpose of waivers of subrogation?

A. Liability waiver

B. Preventing insurers from suing other parties after paying claims

C. Payment waiver

D. Contract waiver

8. What is professional liability insurance?

A. General liability

B. Property insurance

C. Vehicle insurance

D. Errors and omissions coverage for design professionals

9. What is the difference between additional insured and loss payee?

A. Additional insured gets liability coverage; loss payee gets property claim payment

B. Same status

C. No difference

D. Cost only

10. What is project-specific insurance versus annual policies?

A. Same coverage

B. No difference

C. Project-specific covers one project; annual covers all projects in year

D. Cost difference only

11. What is wage rate determination for public projects?

A. Minimum wage

B. Establishing prevailing wage rates for project labor

C. Average wages

D. Contractor choice

12. What is Davis-Bacon Act?

A. State law

B. Local ordinance

C. Private sector law

D. Federal prevailing wage law for public works

13. What is certified payroll?

A. Normal payroll

B. Final payroll

C. Emergency payroll

D. Bonus payroll

14. What is fringe benefit reporting?

A. Bonus reporting

B. Tip reporting

C. Documentation of benefits paid for prevailing wage compliance

D. Overtime reporting

15. What is apprentice ratio requirements?

A. No requirements

B. Minimum ratio of apprentices to journeymen on public projects

C. Maximum workers

D. Supervision requirements

16. What is liquidated damages versus actual damages?

A. Same damages

B. No difference

C. Cost only

D. Liquidated is predetermined daily rate; actual is proven costs

17. What is substantial completion versus beneficial occupancy?

A. Substantial means work is usable; beneficial occupancy is partial use before completion

B. Same milestone

C. No difference

D. Time only

18. What is the difference between warranty period and statute of limitations?

A. Same period

B. No difference

C. Warranty is contractor's repair obligation; statute limits time to file legal claims

D. Cost only

19. What is mechanic's lien versus stop notice?

A. Same remedy

B. Lien claims property interest; stop notice freezes construction funds

C. No difference

D. Cost only

SECTION 2: FRAMING AND STRUCTURAL COMPONENTS (Questions 20-44)

20. What is the purpose of expansion joints in concrete?

A. Decoration

B. Structural support

C. Temporary separation

D. Allowing movement preventing cracking from expansion and contraction

21. What is the typical spacing for expansion joints in concrete slabs?

A. Every 10-30 feet depending on conditions and slab type

B. Every 100 feet

C. No specific spacing

D. Every 5 feet

22. What is isolation joint versus control joint?

A. Same joint

B. No difference

C. Isolation separates from other structures; control joint manages cracking location

D. Cost only

23. What is joint filler material?

A. Concrete

B. Compressible material filling expansion joints allowing movement

C. Steel

D. Wood

24. What is the difference between cold joints and construction joints?

A. Temperature only

B. Same joints

C. No difference

D. Cold joints are unplanned from delays; construction joints are planned stops

25. What is a keyway in construction joints?

A. Lock mechanism

B. Decorative element

C. Security feature

D. Storage space

26. What is post-tensioning versus pre-tensioning?

A. Same process

B. No difference

C. Time only

D. Post-tension after concrete cures; pre-tension before pouring

27. What is the advantage of post-tensioned concrete?

A. No advantages

B. More expensive always

C. Weaker structure

D. Slower construction

28. What is tendon in post-tensioned concrete?

A. Muscle reference

B. Decorative element

C. High-strength steel cable tensioned after concrete cures

D. Rebar

29. What is stressing in post-tensioned concrete?

A. Load testing

B. Tensioning cables after concrete reaches required strength

C. Breaking concrete

D. Quality control

30. What is the danger of cutting post-tensioned tendons?

A. No danger

B. Minor concern

C. Cosmetic damage

D. Explosive cable whip and structural failure

31. What is vapor retarder placement under slabs?

A. Below or above gravel base between base and concrete

B. On top of concrete

C. Not needed

D. In concrete

32. What is the purpose of gravel base under slabs?

A. Decoration

B. Temporary support

C. Drainage, capillary break, and uniform support

D. Future expansion

33. What is compaction testing for base materials?

A. Visual inspection

B. Verifying density meets specifications for support

C. Weight testing

D. No testing needed

34. What is the nuclear density gauge used for?

A. Radiation testing

B. Concrete strength

C. Decoration

D. Measuring soil and base compaction density

35. What is proof rolling?

A. Document checking

B. Driving heavy equipment over subgrade identifying soft spots

C. Rolling concrete

D. Paper rolling

36. What is a rebar chair?

A. Furniture

B. Worker seating

C. Support device elevating rebar to proper position in concrete

D. Storage rack

37. What is the purpose of rebar spacers?

A. Decoration

B. Maintaining proper clear cover and spacing

C. Temporary support

D. Future removal

38. What is wire mesh positioning in slabs?

A. On subgrade

B. After concrete placement

C. Random placement

D. Upper third of slab lifted during placement

39. What is the purpose of dowel bars at joints?

A. Transferring loads across joints while allowing movement

B. Preventing movement

C. Decoration

D. Temporary connection

40. What is spalling at joints?

A. Perfect joint

B. Good condition

C. Cracking and breaking at joint edges from stress or corrosion

D. Intentional design

41. What is sawcut timing for control joints?

A. Anytime

B. Within 6-18 hours after finishing while concrete has strength but before cracking

C. Immediately

D. One month later

42. What is the proper sawcut depth for control joints?

A. Full depth

B. Surface only

C. Random depth

D. 1/4 to 1/3 of slab thickness

43. What is the purpose of the sawcut control joint?

A. Creating weak plane directing cracks to occur at joint rather than random locations

B. Decoration

C. Drainage

D. Expansion allowance

44. What is sealed versus unsealed control joints?

A. Same performance

B. No difference

C. Sealed prevents water/debris infiltration; unsealed allows infiltration

D. Cost only

SECTION 3: CORE TRADES (Questions 45-82)

45. What is water hammer effect measurement?

A. Hammer testing

B. Audible banging and pressure spikes from sudden flow changes

C. Water pressure

D. Flow rate

46. What is the cause of water hammer?

A. Pipe leaks

B. Low pressure

C. Proper operation

D. Clean pipes

47. What is the solution for water hammer?

A. Installing arrestors, reducing pressure, securing pipes, and slower-closing valves

B. Ignoring it

C. Increasing pressure

D. Removing pipes

48. What is hydraulic shock in plumbing?

A. Electrical shock

B. Water quality issue

C. Another term for water hammer pressure surge

D. Normal operation

49. What is the purpose of pressure-balancing valves in showers?

A. Increasing pressure

B. Maintaining consistent temperature preventing scalding during pressure fluctuations

C. Decreasing pressure

D. Measuring pressure

50. What is the difference between pressure-balance and thermostatic valves?

A. Same valve

B. No difference

C. Cost only

D. Thermostatic maintains temperature more precisely but costs more

51. What is a tub and shower valve rough-in height?

A. Any height

B. Typically 48 inches for shower only; lower for tub/shower

C. Ground level

D. 8 feet

52. What is the standard shower head height?

A. 72-80 inches depending on preference and fixture type

B. 48 inches

C. 96 inches

D. 36 inches

53. What is ADA compliant grab bar installation?

A. No requirements

B. Any installation

C. Decorative only

D. Specific locations, heights, and blocking required for support

54. What is proper blocking for grab bars?

A. Standard studs

B. No blocking needed

C. Solid blocking or backing providing support for 250-pound loads

D. Drywall only

55. What is a comfort height toilet?

A. Standard height

B. Low height

C. Temporary height

D. Wall-mounted

56. What is a wall-hung toilet advantage?

A. No advantages

B. Easier floor cleaning and adjustable height

C. More difficult installation

D. Lower capacity

57. What is macerating toilet system?

A. Standard toilet

B. Composting toilet

C. Outdoor toilet

D. Incinerating toilet

58. What is a sewage ejector pump?

A. Pump lifting sewage from below-grade fixtures to sewer level

B. Well pump

C. Sump pump

D. Circulating pump

59. What is the difference between sewage pump and sump pump?

A. Same pump

B. No difference

C. Sewage pumps handle solids; sump pumps handle clear water only

D. Cost only

60. What is sewage pump alarm?

A. Security alarm

B. High-level alarm warning of pump failure or excessive inflow

C. Fire alarm

D. Time alarm

61. What is electrical service lateral versus service drop?

A. Same service

B. No difference

C. Cost only

D. Lateral is underground; drop is overhead

62. What is the advantage of underground service?

A. No advantage

B. Cheaper always

C. Easier installation

D. Less maintenance

63. What is minimum burial depth for electrical service lateral?

A. 6 inches

B. 12 inches

C. 24 inches typically (varies by voltage and protection)

D. 48 inches

64. What is a meter socket?

A. Electrical outlet

B. Enclosure housing electric meter connecting utility to building

C. Light socket

D. Tool storage

65. What is a meter bypass?

A. Avoiding payment

B. Temporary connection

C. Normal operation

D. Switch allowing utility work without disconnecting customer

66. What is CT cabinet in electrical service?

A. Current Transformer cabinet for measuring high-amperage service

B. Meter cabinet

C. Breaker cabinet

D. Junction box

67. What is three-phase delta versus wye configuration?

A. Same configuration

B. No difference

C. Delta has no neutral; wye has neutral point

D. Cost only

68. What is single-phase power derived from three-phase?

A. Impossible

B. Using one phase and neutral from three-phase system

C. Requires conversion

D. Needs transformer always

69. What is refrigeration ton?

A. Weight measurement

B. Temperature measurement

C. Pressure measurement

D. Cooling capacity equal to 12,000 BTUs per hour

70. What is a typical residential AC size?

A. 2-5 tons depending on home size and climate

B. 10 tons

C. 1 ton

D. 20 tons

71. What is AC sizing based on?

A. Random selection

B. Biggest available

C. Manual J load calculation considering home size, insulation, windows, climate

D. Contractor preference

72. What is the danger of oversized AC?

A. No danger

B. Better cooling always

C. More efficient

D. Saves energy

73. What is short cycling in HVAC?

A. Normal operation

B. Efficient operation

C. One-time event

D. Continuous operation

74. What is the cause of short cycling?

A. Perfect sizing

B. Proper installation

C. Good maintenance

D. Clean system

75. What is static pressure testing in ductwork?

A. Weight testing

B. Measuring airflow resistance to diagnose restrictions

C. Temperature testing

D. No testing needed

76. What is total external static pressure?

A. Outdoor pressure

B. Building pressure

C. Sum of resistance in entire duct system

D. Filter pressure only

77. What is air filter MERV rating selection?

A. Highest always best

B. Balance filtration needs with system capacity

C. Lowest acceptable

D. Random selection

78. What is the problem with high-MERV filters?

A. No problems

B. Filter less effectively

C. Cheaper

D. Increased airflow resistance potentially reducing system performance

79. What is filter pressure drop?

A. Falling filters

B. Filter weight

C. Filter cost

D. Filter size

80. What is the relationship between filter efficiency and pressure drop?

A. No relationship

B. Inverse relationship

C. Higher efficiency typically means higher pressure drop

D. Lower efficiency means higher drop

81. What is a media air cleaner?

A. News filter

B. High-efficiency filter with larger surface area than standard filters

C. Standard filter

D. No filter

82. What is the advantage of media air cleaners?

A. No advantage

B. Less efficient

C. More restriction

D. Better filtration with less pressure drop than standard high-MERV filters

SECTION 4: FINISH TRADES (Questions 83-107)

83. What is the difference between enamel and latex paint?

A. Enamel has hard glossy finish; latex is water-based with various sheens

B. Same paint

C. No difference

D. Color only

84. What is the benefit of semi-gloss paint?

A. Hides imperfections

B. Difficult to clean

C. Durability and cleanability for trim, kitchens, and bathrooms

D. Absorbs stains

85. What is eggshell paint finish?

A. Made from eggs

B. Low-luster finish between flat and satin

C. Glossy finish

D. Rough texture

86. What is paint sheen measurement?

A. Color intensity

B. Drying time

C. Cost

D. Light reflectance with higher gloss reflecting more light

87. What is the purpose of deglossing liquid?

A. Adding gloss

B. Removing paint

C. Paint thinner

D. Decoration

88. What is TSP in painting preparation?

A. Temperature Setting Point

B. Time Saving Process

C. Trisodium Phosphate cleaner removing grease and grime

D. Tool Storage Point

89. What is the advantage of spray painting versus rolling?

A. No advantage

B. Spray covers faster and reaches difficult areas

C. Less coverage

D. More expensive always

90. What is back-rolling after spraying importance?

A. Wasting time

B. No purpose

C. Making mess

D. Working paint into surface and ensuring even coverage

91. What is curtain or run in paint?

A. Perfect application

B. Drip or sag from too much paint or improper technique

C. Proper thickness

D. Decoration

92. What is a wet edge in painting?

A. Painting in rain

B. Wet surface

C. Maintaining wet border working into it preventing lap marks

D. Water damage

93. What is lap mark in painting?

A. Perfect application

B. Visible line where wet paint overlaps dried paint

C. Proper technique

D. Intentional design

94. What causes lap marks?

A. Perfect technique

B. Proper paint

C. Good conditions

D. Paint drying too fast before blending or improper technique

95. What is paint mildew versus dirt?

A. Same thing

B. No difference

C. Mildew is biological growth; dirt is particulate

D. Color only

96. What is cleaning painted surfaces before repainting?

A. Optional step

B. Unnecessary

C. Wasting time

D. No benefit

97. What is the purpose of blocking paint?

A. Storing paint

B. Rubbing together surfaces with uncured paint causing sticking

C. Paint technique

D. Mixing paint

98. What is anti-blocking additive?

A. Decorative additive

B. Color additive

C. Thinner

D. Additive preventing freshly painted surfaces from sticking together

99. What is flashing in hardwood floors?

A. Perfect appearance

B. Decorative element

C. Even color

D. Intentional design

100. What causes wood floor color variation?

A. Perfect installation

B. One wood species

C. Natural wood variation, different batches, or uneven stain absorption

D. Proper finishing

101. What is the acclimation time for hardwood flooring?

A. 3-14 days depending on conditions and manufacturer requirements

B. No acclimation needed

C. 1 hour

D. 6 months

102. What is moisture meter use in flooring?

A. Decoration

B. Temperature measurement

C. Weight measurement

D. Measuring wood and subfloor moisture before installation

103. What is acceptable moisture difference between subfloor and flooring?

A. Any difference acceptable

B. Within 2-4 percentage points depending on species and conditions

C. 50% difference

D. No relationship

104. What is the purpose of floor nailer versus hand nailing?

A. Same result

B. No difference

C. Floor nailer provides consistent depth and angle faster than hand nailing

D. Hand nailing is faster

105. What is the proper hardwood nailing angle?

A. 45 degrees through tongue into subfloor

B. Straight down

C. Any angle

D. Horizontal

106. What is the purpose of laminate underlayment?

A. Structural support

B. Adhesive layer

C. Temporary layer

D. Sound dampening, moisture barrier, and smoothing imperfections

107. What is floating floor expansion gap?

A. No gap needed

B. Space around perimeter allowing expansion without buckling

C. Installation error

D. Temporary gap

SECTION 5: SAFETY (Questions 108-125)

108. What is a safety stand-down?

A. Work stoppage

B. Safety equipment

C. Voluntary work pause for focused safety training and discussion

D. Permanent shutdown

109. What is silica dust exposure danger?

A. No danger

B. Mild irritation

C. Temporary cough

D. Eye damage only

110. What is required silica dust protection?

A. Cloth mask

B. Water suppression, ventilation, and respirators for high exposure

C. Safety glasses only

D. No protection needed

111. What is the OSHA silica exposure limit?

A. No limit

B. Any amount acceptable

C. 100 micrograms per cubic meter

D. 250 micrograms per cubic meter

112. What is crystalline silica?

A. Glass

B. Plastic

C. Mineral in sand, stone, concrete releasing harmful dust when cut

D. Metal

113. What activities create silica exposure?

A. Painting

B. Plumbing

C. Electrical work

D. Paper work

114. What is medical surveillance for silica?

A. Video monitoring

B. Required health exams for workers with high silica exposure

C. Drug testing

D. Vision tests

115. What is the purpose of lead-safe work practices?

A. Electrical safety

B. Fall protection

C. Fire prevention

D. Preventing lead poisoning during renovation of older homes

116. When is lead-safe certification required?

A. Never required

B. Renovating pre-1978 housing or child-occupied facilities

C. New construction only

D. Commercial work only

117. What is lead testing method?

A. Visual inspection

B. Taste testing

C. Swab tests or XRF analyzers detecting lead paint

D. No testing needed

118. What is lead-safe work practice requirements?

A. No requirements

B. Work anywhere normally

C. Standard practices

D. No special procedures

119. What is asbestos danger?

A. No danger

B. Temporary irritation

C. Mild cough

D. Lung cancer and mesothelioma from fiber inhalation

120. When was asbestos commonly used in construction?

A. Before 1980s particularly 1950s-1970s

B. Currently used

C. Never used

D. 1990s only

121. What requires asbestos testing?

A. All buildings

B. New construction

C. Suspected materials in buildings built before 1980s

D. Never needed

122. What is required for asbestos removal?

A. Anyone can remove it

B. Standard demolition

C. Normal construction

D. Wet methods only

123. What is GFCI requirement for construction sites?

A. Optional

B. Indoor use only

C. Not required

D. Required for temporary power and wet locations

124. What is the purpose of assured equipment grounding program?

A. Optional program

B. Alternative to GFCIs with regular testing verifying equipment grounds

C. Insurance requirement

D. Training program

125. What is the difference between GFCI and AFCI protection?

A. Same protection

B. No difference

C. GFCI protects from ground faults; AFCI protects from arc faults

D. Cost only

Answer Key with Explanations

1. A - Insurance certificates are documents proving contractors carry required insurance coverage. They list policy types, coverage amounts, effective dates, and name the certificate holder (owner or lender). Owners and lenders require certificates before work begins verifying adequate protection. Without proof of insurance, you can't start work on most projects.

2. C - General liability insurance covers property damage and bodily injury to third parties—damage you cause to others' property or injuries to non-employees. If your work damages a neighbor's house or injures a visitor, general liability pays claims. It doesn't cover your employees (that's workers comp) or your property (that's builder's risk).

3. B - Builder's risk insurance is property insurance covering buildings under construction. It protects against fire, theft, vandalism, and weather damage during construction. Once construction completes, standard property insurance takes over. Builder's risk is essential—construction sites are vulnerable, and standard property policies don't cover buildings under construction.

4. D - Occurrence policies cover incidents that occur during the policy period regardless of when claims are filed. Claims-made policies cover claims filed during the policy period regardless of when incidents occurred. Occurrence is better for long-term protection; claims-made is cheaper but requires continuous coverage or expensive tail coverage.

5. A - Umbrella policies provide additional liability coverage above underlying policies (general liability, auto liability). When underlying policy limits are exhausted, umbrella coverage kicks in. They provide high limits (typically $1-5 million) at relatively low cost protecting against catastrophic claims exceeding standard policy limits.

6. C - Subcontractor Default Insurance covers costs when subcontractors default or fail to perform—completing their work, paying claims, or correcting defects. It's an alternative to traditional bonding providing coverage without requiring subs to obtain individual bonds. SDI protects generals from sub failures.

7. B - Waivers of subrogation prevent insurance companies from suing other parties to recover money paid for claims. After paying your claim, insurers normally pursue the party that caused damage. Waivers prevent this, preserving project relationships. They're common in construction contracts protecting all parties from cross-claims.

8. D - Professional liability insurance (also called errors and omissions or E&O) covers design professionals (architects, engineers) for mistakes, negligence, or errors in professional services. If design errors cause problems, professional liability pays claims. General liability doesn't cover professional mistakes—separate professional liability is required.

9. A - Additional insureds get liability coverage under your policy—if they're sued over your work, your insurance defends them. Loss payees get property claim payments—if insured property is damaged or destroyed, they're paid. Lenders are typically loss payees; owners and GCs are typically additional insureds.

10. C - Project-specific insurance covers single projects from start to finish. Annual policies cover all work performed during the year across multiple projects. Project-specific works for very large projects; annual policies are standard for contractors doing multiple projects. Annual policies provide consistent year-round coverage.

11. B - Wage rate determination establishes prevailing wage rates (minimum wages and benefits) for each trade classification on public projects. Government agencies survey wages in the area publishing wage determinations. Contractors must pay at least these rates on covered projects. Rates vary by location and trade.

12. D - The Davis-Bacon Act is federal law requiring contractors on federal construction projects over $2,000 to pay prevailing wages and benefits. It protects local wage standards and worker welfare on government projects. Contractors must submit certified payroll proving compliance. Davis-Bacon applies only to federal projects.

13. B - Certified payroll is weekly payroll reporting for prevailing wage projects documenting worker classifications, hours worked, wages paid, and benefits provided. Contractors certify accuracy under penalty of perjury. Certified payroll proves Davis-Bacon or state prevailing wage compliance. It's submitted weekly to contracting agencies.

14. C - Fringe benefit reporting documents benefits paid (health insurance, retirement, training) for prevailing wage compliance. Contractors can pay fringe benefits directly to workers (added to hourly rate) or contribute to benefit programs. Certified payroll shows which method was used and amounts paid.

15. B - Apprentice ratio requirements mandate minimum ratios of registered apprentices to journeymen on public projects promoting workforce development. Typical ratios are 1:5 or 1:3 depending on trade and jurisdiction. Only registered apprentices in approved programs count. Requirements ensure training opportunities.

16. D - Liquidated damages are predetermined daily amounts (specified in contracts) deducted for late completion without proving actual damages—typically $500-5,000 per day. Actual damages require proving specific costs caused by delay. Liquidated damages are easier to enforce but must be reasonable estimates, not penalties.

17. A - Substantial completion means work is sufficiently complete for owner's intended use with only minor items remaining (punch list). Beneficial occupancy is owner's partial use of portions before full substantial completion—like occupying finished floors while work continues elsewhere. They're different milestones with different implications.

18. C - Warranty periods are contractor obligations to repair defects for specified times (typically 1 year for workmanship, longer for systems). Statutes of limitations are legal deadlines for filing lawsuits (varying by claim type and state, typically 2-10 years). Warranties are contractual; statutes of limitations are legal time bars.

19. B - Mechanic's liens are claims against property securing payment for labor or materials—if unpaid, you can foreclose forcing property sale. Stop notices freeze construction funds requiring owners to

withhold money for unpaid parties. Liens affect property; stop notices affect money. Both protect payment rights.

20. D - Expansion joints allow concrete movement from temperature changes, moisture variation, and settlement preventing cracking. Concrete expands when hot or wet, contracts when cold or dry. Without expansion joints accommodating movement, slabs crack randomly. Joints control where movement occurs.

21. A - Typical expansion joint spacing is 10-30 feet depending on slab type, climate, and restraint. Exterior slabs with temperature exposure need closer spacing; interior slabs less frequent. As a rule of thumb, joint spacing in feet shouldn't exceed 2-3 times slab thickness in inches. Closer spacing provides better crack control.

22. C - Isolation joints completely separate slabs from other structures (walls, columns, other slabs) allowing independent movement. Control joints (also called contraction joints) are partial-depth cuts in slabs creating weak planes directing cracks to joints rather than random locations. Different purposes, different details.

23. B - Joint filler material is compressible foam, rubber, or fiber filling expansion joints allowing them to close during expansion without damage. Common materials include closed-cell foam, cork, or specially designed joint fillers. The filler prevents debris infiltration while accommodating movement. It must compress easily without exerting significant resistance.

24. D - Cold joints are unintentional joints from delays allowing previously placed concrete to partially harden before additional concrete placement. Construction joints are planned stopping points with proper preparation. Cold joints are weak spots; construction joints are properly designed. Cold joints should be avoided or treated as construction joints.

25. A - Keyways are grooves formed in construction joints providing mechanical interlock between concrete pours. They're typically created with beveled wood strips or metal forms creating recesses. The next pour fills the recess creating a key interlocking the sections. Keyways improve shear transfer across joints.

26. D - Post-tensioning tensions cables after concrete cures by jacking against hardened concrete. Pre-tensioning tensions cables before pouring concrete—cables are stretched, concrete poured around them, then tension released after curing. Post-tensioning is more common in buildings; pre-tensioning is common for precast concrete.

27. A - Post-tensioned concrete advantages include longer spans with less material, thinner slabs reducing building height and weight, reduced cracking from compression, and architectural flexibility. The cables put concrete in compression counteracting tensile stresses from loads. This allows more efficient structures.

28. C - Tendons are high-strength steel cables or strands placed in ducts or sleeves through concrete. After concrete cures to required strength, tendons are tensioned using hydraulic jacks and anchored at ends. The tensioned tendons remain permanently stressed putting concrete in compression.

29. B - Stressing is the process of tensioning post-tensioning tendons after concrete reaches required strength (typically 3,000+ PSI). Hydraulic jacks pull tendons to specific force levels, wedges lock them at anchors, and jacks release leaving tendons permanently stressed. Stressing must follow engineering specifications exactly.

30. D - Cutting post-tensioned tendons is extremely dangerous. The cables carry tremendous tension—cutting releases that energy explosively whipping cables violently enough to kill. Structural failure can occur if enough tendons are cut. Always x-ray or scan before cutting concrete in post-tensioned structures. Mark tendon locations during construction.

31. A - Vapor retarders install below or above gravel base (between base and concrete) preventing ground moisture from migrating up into slabs. They're typically 6-10 mil polyethylene. Installing below gravel protects the retarder during construction; above gravel provides better moisture protection. Either location works if properly installed.

32. C - Gravel base provides drainage allowing water to flow away, capillary break preventing moisture wicking upward, uniform support distributing loads, and stable working surface. Properly compacted granular base is essential for slab performance. It shouldn't be omitted trying to save money.

33. B - Compaction testing verifies fill and base materials are compacted to specified density (typically 90-95% of maximum dry density). Nuclear density gauges, sand cone tests, or other methods measure in-place density. Proper compaction ensures adequate support preventing settlement. Testing is required verifying compliance.

34. D - Nuclear density gauges use radioactive isotopes measuring soil and base compaction density quickly without excavation. They're the standard compaction testing method. Results are immediate allowing contractors to recompact if needed. Despite "nuclear" in the name, they're safe with proper handling and licensing.

35. B - Proof rolling drives heavy equipment (loaded dump trucks or rollers) over compacted subgrade. Soft spots deflect noticeably under load. Proof rolling finds problem areas requiring additional compaction or excavation and replacement. It's a simple effective method finding weak areas before placing base or concrete.

36. C - Rebar chairs (also called bolsters, supports, or bar supports) are devices elevating rebar to proper positions in concrete ensuring correct cover. They come in various heights and configurations. Proper chair placement is critical—rebar on the ground provides no cover leading to corrosion.

37. B - Rebar spacers maintain proper clear cover (distance from concrete surface to rebar) and spacing between bars ensuring concrete flows around reinforcement and provides corrosion protection. Proper positioning is critical for performance. Without spacers, rebar settles to the bottom providing inadequate cover and strength.

38. D - Wire mesh installs in the upper third of slabs—on chairs or supports lifted during concrete placement. Mesh on the ground provides no reinforcement. As concrete is placed and vibrated, workers

lift mesh to proper height (approximately 1/3 down from top). Proper positioning is essential for crack control.

39. A - Dowel bars are smooth round bars at joints transferring loads across joints while allowing horizontal movement. They prevent one slab section from settling differently than adjacent sections (faulting). Dowels maintain joint alignment improving performance. They're essential at construction and contraction joints.

40. C - Spalling at joints is cracking, chipping, and breaking at joint edges from traffic stress, corrosion of dowels, or improper joint construction. Poor joint details, inadequate edge support, or missing dowels cause spalling. Proper joint design, dowel installation, and sealing prevent spalling.

41. B - Sawcut control joints within 6-18 hours after finishing while concrete has enough strength to prevent raveling but before internal stresses cause random cracking. Too early and saw edges ravel; too late and cracks form randomly before sawing. Temperature, thickness, and mix design affect optimal timing.

42. D - Sawcut depth should be 1/4 to 1/3 of slab thickness creating adequate weak plane directing cracks. A 4-inch slab needs 1 to 1-1/3 inch sawcuts. Too shallow and cracks form randomly instead of at joints; too deep provides little benefit. Proper depth ensures cracks occur at joints.

43. A - Sawcut control joints create intentional weak planes where concrete cracks in controlled locations rather than random cracking. You're controlling where inevitable cracking occurs. Slabs will crack—joints determine where. Proper joint layout and sawing create attractive controlled cracking patterns.

44. C - Sealed control joints use sealant preventing water, debris, and deicers from infiltrating causing damage, deterioration, and edge spalling. Unsealed joints allow infiltration shortening slab life. Sealing is essential for longevity especially in freeze-thaw climates or where deicers are used. The small sealing cost prevents expensive repairs.

45. B - Water hammer manifests as audible banging noises and pressure surges in pipes from sudden water velocity changes. You hear loud bangs when valves close quickly. The pressure spikes can be 10 times normal pressure causing pipe damage, fitting failure, and fixture damage over time.

46. D - Water hammer is caused by sudden flow changes—rapid valve closure, pump startup/shutdown, or solenoid valve operation. The flowing water's kinetic energy converts to pressure surge when flow stops suddenly. It's physics—momentum must go somewhere creating hydraulic shock.

47. A - Water hammer solutions include installing water hammer arrestors (air chambers or shock absorbers) near fixtures, reducing system pressure, securing pipes so they can't bang, and using slower-closing valves. Multiple approaches may be needed. The solution depends on the specific situation.

48. C - Hydraulic shock is another term for water hammer—both describe pressure surges from sudden flow changes. Different terminology, same phenomenon. Whether you call it water hammer or hydraulic shock, it's the same problem with the same solutions.

49. B - Pressure-balancing valves in showers maintain consistent temperatures despite pressure fluctuations in hot or cold supply lines. When someone flushes a toilet reducing cold water pressure, the valve automatically reduces hot water proportionally preventing scalding. They're code-required safety devices.

50. D - Thermostatic valves maintain temperature more precisely than pressure-balance valves by sensing actual water temperature and adjusting mixing regardless of pressure or temperature fluctuations. They cost more but provide superior temperature control. Pressure-balance valves are adequate for most residential applications; thermostatic valves are premium.

51. B - Rough-in height for tub/shower valves is typically 48 inches above the floor for shower-only applications; lower (around 28-32 inches) for tub/shower combinations allowing use from the tub. Heights vary by fixture manufacturer—always check specific rough-in requirements before installation.

52. A - Standard shower head height is 72-80 inches above the floor depending on preference, fixture type, and user height. 78 inches is typical. Rain heads mount higher; handheld showers have adjustable heights. ADA showers may have different requirements. Rough-in allows adjustment during fixture installation.

53. D - ADA compliant grab bars require specific locations (back wall, side wall), mounting heights (33-36 inches typically), proper lengths, and structural backing supporting 250-pound loads. Specific requirements vary by fixture type. Compliance isn't optional for public facilities—it's required by law.

54. C - Grab bars require solid blocking or backing providing adequate support for 250-pound loads (ADA requirement). Standard studs aren't adequate. Install 2x blocking between studs at grab bar heights or use thicker plywood backing. Surface-mount toggle bolts don't meet code—proper blocking is required.

55. A - Comfort height toilets (also called right-height or chair-height) are taller than standard toilets—17-19 inches rim height versus 15 inches standard. The extra height makes sitting and standing easier especially for elderly or mobility-impaired users. They're increasingly popular as standard residential fixtures.

56. B - Wall-hung toilets mount to in-wall carriers with tanks concealed in walls. Advantages include easier floor cleaning (no toilet base), adjustable height installation, and modern appearance. Disadvantages include more complex installation, higher cost, and difficult repairs since components are in walls.

57. D - Macerating toilet systems (like Saniflo) use electric macerator pumps grinding waste and pumping it through small-diameter pipes (3/4 to 1 inch) to distant drains. They allow toilets in locations without gravity drainage like basements below sewer level. They're not as reliable as gravity toilets but solve difficult drainage situations.

58. A - Sewage ejector pumps lift sewage and wastewater from below-grade fixtures (basement bathrooms, bar sinks) to sewer level. They're submersible pumps in sealed basins handling solids. They're essential for below-grade plumbing since sewage can't flow uphill by gravity.

59. C - Sewage pumps (ejector pumps) handle sewage with solids using specially designed impellers and volutes. Sump pumps handle clear water only (foundation drainage, groundwater)—they can't handle

solids without clogging. Never use sump pumps for sewage—they'll fail quickly. Use the right pump for the application.

60. B - Sewage pump alarms warn of high water levels indicating pump failure, power outage, or excessive inflow. They're essential safety devices preventing sewage backup into living spaces. Alarms give warning allowing corrective action before flooding. They're code-required in most jurisdictions.

61. D - Service laterals are underground electrical service conductors running from utility connections to buildings. Service drops are overhead conductors. The choice depends on utility requirements, cost, aesthetics, and site conditions. Both deliver power but use different routing.

62. A - Underground service advantages include protection from weather and vehicle damage, better aesthetics (no overhead wires), and less maintenance. Disadvantages include higher installation cost, more difficult troubleshooting, and vulnerability to excavation damage. Many communities require underground utilities for appearance.

63. C - Minimum burial depth for residential underground service is typically 24 inches (varies by voltage, protection, and local code). Deeper burial (36-48 inches) may be required for higher voltage or unprotected cable. Always verify local requirements. Proper depth prevents excavation damage.

64. B - Meter sockets (also called meter bases or meter cans) are enclosures housing electric meters connecting utility service to building electrical systems. The utility installs and owns the meter; you provide and install the socket. Meter sockets are the transition point between utility and customer systems.

65. D - Meter bypasses are switching mechanisms allowing utility service without disconnecting customers—for meter testing, replacement, or service work. They're not for avoiding payment (that's meter tampering and illegal). Bypasses maintain customer service during meter maintenance.

66. A - CT (Current Transformer) cabinets house current transformers measuring high-amperage electrical service (400+ amps) too large for standard meter sockets. CTs step down current to measurable levels for metering. They're required for large services where current exceeds direct metering capability.

67. C - Delta three-phase configuration connects phases in triangle pattern with no neutral point. Wye (star) configuration connects phases to common neutral point. Wye provides neutral for single-phase loads; delta doesn't. Both deliver three-phase power but wye is more versatile for combined single-phase and three-phase loads.

68. B - Single-phase power derives from three-phase systems by using one phase and neutral from wye-configured three-phase systems. This is standard in commercial buildings—three-phase for motors and HVAC, single-phase for lighting and outlets. Most three-phase services include neutral allowing single-phase derivation.

69. D - One refrigeration ton equals 12,000 BTUs per hour of cooling capacity. The term originated from the cooling capacity needed to freeze one ton of ice in 24 hours. A 3-ton AC provides 36,000 BTU/hr cooling. Residential units typically range 1.5-5 tons.

70. A - Typical residential AC capacity is 2-5 tons depending on home size, insulation, climate, and other factors. Rules of thumb (like 400-600 square feet per ton) provide rough estimates but proper sizing requires Manual J load calculations. Undersizing causes discomfort; oversizing causes short cycling and poor dehumidification.

71. C - AC sizing must be based on Manual J load calculations considering home size, insulation levels, window area and orientation, air leakage, climate, and internal loads. Manual J provides accurate sizing preventing undersizing (insufficient cooling) or oversizing (short cycling, poor humidity control). Don't size based on square footage alone.

72. D - Oversized AC causes short cycling (frequent on/off), poor dehumidification (doesn't run long enough), uneven temperatures, higher energy costs, and reduced equipment life. Bigger isn't better for AC—proper sizing based on Manual J provides best comfort and efficiency. Oversizing is a common and expensive mistake.

73. D - Short cycling is equipment repeatedly turning on and off in short intervals (every few minutes) rather than running longer cycles. It indicates oversizing, thermostat problems, dirty filters, or refrigerant issues. Short cycling wastes energy, provides poor comfort, and dramatically reduces equipment life.

74. A - Short cycling causes include oversized equipment (most common), thermostat location problems (near heat sources or drafts), refrigerant overcharge, dirty filters restricting airflow, or frozen evaporator coils. Proper sizing prevents most short cycling. Fix the root cause—don't just adjust settings.

75. B - Static pressure testing measures airflow resistance (pressure drop) through duct systems diagnosing restrictions from undersized ducts, closed dampers, dirty filters, or blocked returns. Technicians measure pressure at equipment and throughout systems. High static pressure indicates restrictions requiring correction.

76. C - Total external static pressure is the sum of pressure drop through all duct components—supply ducts, return ducts, filters, coils, and registers. It's measured at equipment showing total system resistance. Equipment specifications include maximum allowable static pressure—exceeding it reduces airflow and damages equipment.

77. B - Select MERV ratings balancing filtration needs with system capacity. Higher MERV filters (11-13) provide better filtration but increase airflow resistance. Verify your system can handle higher MERV without excessive static pressure. MERV 8-11 is typical for residential; MERV 13-16 for hospitals or sensitive applications.

78. D - High-MERV filters have denser media restricting airflow more than low-MERV filters. If your system isn't designed for high-MERV filters, the increased resistance reduces airflow, strains blowers, and may damage equipment. Always verify system compatibility before installing high-MERV filters.

79. A - Filter pressure drop is airflow resistance measured as pressure difference across filters. Clean filters have low pressure drop; dirty filters have high pressure drop. Excessive pressure drop indicates dirty filters needing replacement or filters too restrictive for the system.

80. C - Higher efficiency filters typically have higher pressure drop—denser media captures more particles but resists airflow more. It's a trade-off. Media air cleaners with larger surface area overcome this providing high efficiency with acceptable pressure drop. Size filtration to your system's capacity.

81. B - Media air cleaners use high-efficiency filter media with much larger surface area (often 75-100 square feet) compared to standard filters (1-2 square feet). The larger area allows high filtration efficiency with reasonable pressure drop. They're whole-house filtration systems providing excellent air quality.

82. D - Media air cleaners provide better filtration (MERV 11-16) with less pressure drop than standard high-MERV filters because of dramatically larger surface area. They filter the same air with less resistance. This protects equipment while providing superior air quality. They're the best solution for homeowners wanting high filtration.

83. A - Enamel paint traditionally referred to oil-based paint with hard glossy finish. Modern usage includes any hard glossy finish. Latex paint is water-based available in various sheens. The key difference is historically enamel meant oil-based hard finish; latex meant water-based. Today both types come in multiple sheens.

84. C - Semi-gloss paint provides durability and cleanability making it ideal for trim, doors, kitchens, and bathrooms where surfaces get dirty and need washing. The glossy finish wipes clean easily and resists moisture. It shows surface imperfections more than flat paint but the durability and cleanability are worth it.

85. B - Eggshell is low-luster finish between flat and satin—subtle sheen like an eggshell. It hides imperfections better than glossier finishes while being more durable and cleanable than flat paint. Eggshell is popular for living areas providing good balance of appearance, durability, and cleanability.

86. D - Paint sheen is light reflectance—how much light reflects off the surface. Flat reflects minimal light (5-10%), eggshell 10-25%, satin 25-35%, semi-gloss 35-70%, and gloss 70-85%. Higher gloss reflects more light creating shinier appearance. Gloss also correlates with durability and cleanability.

87. A - Deglossing liquid (also called liquid sandpaper or deglossers) chemically dulls glossy surfaces improving paint adhesion without sanding. It cleans and etches surfaces in one step. It's faster than sanding for cabinets, trim, or large areas. Apply, wait briefly, wipe off, and paint. It's not as effective as sanding but adequate for many applications.

88. C - TSP (Trisodium Phosphate) is powerful alkaline cleaner removing grease, grime, and chalked paint preparing surfaces for painting. It's been the painting prep standard for decades. Mix with water, scrub surfaces, rinse thoroughly. Environmental concerns have led to TSP-substitute products but original TSP remains effective.

89. B - Spray painting advantages include much faster coverage than rolling, reaching difficult areas easily, and smooth professional finish without roller texture. Disadvantages include extensive masking, overspray, and equipment cost. For large open areas or complex surfaces, spraying dramatically reduces time while producing superior finish.

90. D - Back-rolling after spraying lightly rolls sprayed paint working it into surfaces and ensuring even coverage. Spray alone may leave thin spots or not work into porous surfaces adequately. Back-rolling combines spray speed with roller penetration and coverage. Many professionals spray and immediately back-roll for best results.

91. A - Curtains or runs (also called sags or drips) are paint running downward from gravity creating thick drips and uneven coating. They're caused by applying too much paint or improper technique. Proper application thickness and technique prevent runs. Runs must be removed and area repainted—they don't level out.

92. C - Wet edge means maintaining wet border and always working into it preventing lap marks. You paint sections quickly enough that edges stay wet allowing new paint to blend in. If edges dry before you return, you get lap marks. Wet edge technique requires working steadily without long breaks.

93. B - Lap marks are visible lines where wet paint overlaps dried or drying paint creating doubled areas with different sheen or color. They're caused by paint drying before you complete sections or poor wet edge technique. Quality paint with longer open time and proper wet edge technique prevent lap marks.

94. D - Lap marks are caused by paint drying too fast before blending (wrong conditions, cheap paint, or improper technique), inadequate coating thickness, or not maintaining wet edge. Use quality paint with good open time, work in appropriate conditions, maintain wet edge, and apply adequate coverage.

95. C - Mildew is biological growth (fungus) appearing as black or gray spots/blotches usually in damp areas. Dirt is particulate matter. Mildew requires treatment with mildewcide or bleach before painting; dirt just needs cleaning. Test: if bleach removes it, it's mildew; if it doesn't, it's dirt.

96. A - Cleaning painted surfaces before repainting is essential removing dirt, grease, mildew, and chalked paint ensuring new paint adheres properly. TSP or substitute cleaners work well. Proper cleaning prevents adhesion failures and extends paint life. Never paint over dirty surfaces—cleaning is mandatory preparation.

97. B - Blocking (also called print-through or sticking) occurs when freshly painted surfaces touch each other while paint is still soft causing surfaces to stick together. Opening doors or windows before paint fully cures causes blocking. Anti-blocking additives or adequate dry time prevent it.

98. D - Anti-blocking additives modify paint preventing freshly painted surfaces from sticking together before full cure. They're essential for doors, windows, and cabinets that must be moved or closed before complete curing. Modern paints often include anti-blocking agents; additive products are available if needed.

99. A - Flashing in hardwood floors is visible color variation between boards creating checkered or blotchy appearance. It's caused by natural wood variation (different boards from different trees), mixing batches with different dye lot colors, or uneven stain absorption. Prevention includes sorting boards, mixing batches, and using quality stain.

100. C - Wood floor color variation is caused by natural differences between trees and within trees, different dye lot batches mixed together, or uneven stain absorption from varying wood density. Some variation is natural and desirable; excessive variation looks poor. Careful material selection and proper staining minimize unwanted variation.

101. A - Hardwood flooring acclimation time is typically 3-14 days depending on climate, season, wood species, and manufacturer requirements. Flooring must equilibrate to installation space humidity preventing expansion or contraction after installation. Check manufacturer specifications—they vary. Don't skip acclimation trying to speed installation.

102. D - Moisture meters measure moisture content in wood flooring and subfloors verifying they're within acceptable ranges and similar before installation. Install when wood moisture content is 6-12% and within 2-4 points of subfloor moisture. Installing at wrong moisture causes expansion/contraction problems.

103. B - Acceptable moisture difference between subfloor and hardwood flooring is typically 2-4 percentage points depending on species and conditions. Larger differences cause problems as materials equilibrate after installation. If subfloor is 12% and flooring is 6%, wait for flooring to acclimate. They should be close.

104. C - Floor nailers (pneumatic nailers designed for flooring) provide consistent nail depth and angle much faster than hand nailing. They're set for proper depth avoiding overdriving or underdriving. Hand nailing works but is slow and risks inconsistent nailing. Pros use floor nailers for speed and consistency.

105. A - Proper hardwood nailing angle is approximately 45 degrees through the tongue into subfloor. This angle provides strong hold while remaining concealed by the next board's groove. Too steep and nails don't hold well; too shallow and they interfere with groove installation. Nailers automatically set correct angle.

106. D - Laminate underlayment provides sound dampening reducing hollow sound and footfall noise, moisture barrier protecting floating floor from subfloor moisture, and smoothing minor subfloor imperfections. It's essential for floating floors improving performance and comfort. Never skip underlayment with floating floors.

107. B - Floating floor expansion gaps (typically 1/4 to 1/2 inch) around all room perimeters allow floor expansion without buckling against walls. Floating floors move as units with seasonal humidity changes. Without expansion gaps, floors buckle pushing up. Baseboards hide the gaps providing finished appearance.

108. C - Safety stand-downs are voluntary work pauses for focused safety training and discussion. OSHA and industry groups conduct annual stand-downs focusing on specific hazards like fall protection. Companies stop work briefly for concentrated safety emphasis. They're not mandatory but widely participate improving safety awareness.

109. A - Silica dust exposure causes silicosis (incurable progressive lung disease), lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease. It's not minor irritation—it's deadly.

Crystalline silica dust is one of construction's most serious hazards causing hundreds of deaths annually. Protection is essential.

110. B - Required silica dust protection includes water suppression at cutting point (dramatically reducing airborne dust), local exhaust ventilation capturing dust at source, and respirators (N95 minimum, preferably half-face or full-face) when controls are inadequate. Engineering controls are preferred; respirators are backup.

111. D - OSHA silica exposure limit is 50 micrograms per cubic meter time-weighted average over 8 hours. This replaced the old 250 limit (established decades ago) with the new 50 limit (established 2016) based on current science. The lower limit requires more extensive controls protecting workers from silicosis.

112. C - Crystalline silica is a mineral found in sand, stone, concrete, brick, and mortar. Cutting, grinding, drilling, or demolishing these materials creates respirable crystalline silica dust (particles small enough to reach deep lungs). This specific form of silica is the hazard—not all silica is dangerous.

113. D - Silica exposure occurs during cutting, grinding, or drilling concrete, masonry, stone, or tile; tuckpointing or removing mortar; demolishing concrete or masonry; and sawcutting concrete. Any operation creating dust from silica-containing materials creates exposure. Even brief exposure is hazardous.

114. B - Medical surveillance requires periodic medical exams (chest X-rays, breathing tests, and health questionnaires) for workers with high silica exposure. Exams detect early signs of silicosis allowing intervention before severe disease develops. They're required for workers exceeding action level (25 micrograms) for 30+ days annually.

115. D - Lead-safe work practices prevent lead poisoning during renovation of homes built before 1978 when lead paint was common. Practices include containing work areas, minimizing dust, prohibiting certain methods (open-flame burning, machine sanding without HEPA vacuum), and thorough cleaning. They're required by EPA.

116. B - Lead-safe certification (EPA RRP—Renovation, Repair, and Painting) is required when disturbing painted surfaces in housing built before 1978 or child-occupied facilities. Certified renovators must use lead-safe practices. Most renovation work in older homes requires certification. Fines for non-compliance are substantial.

117. C - Lead testing uses chemical swab tests (color-change indicates lead) or XRF analyzers (electronic detectors measuring lead instantly). Swabs are cheap and quick but less accurate. XRF is expensive but definitive. Lab analysis of paint chips is most accurate but slow. Testing before work identifies hazards.

118. B - Lead-safe work practice requirements include containing work areas with plastic sheeting, minimizing dust generation, prohibiting dangerous practices (heat guns over 1100°F, machine sanding without HEPA), cleaning thoroughly with HEPA vacuums and wet methods, and proper waste disposal. Specific practices are mandated by EPA.

119. D - Asbestos causes lung cancer, mesothelioma (aggressive cancer of lung/abdomen lining), and asbestosis (scarring and lung function loss). All are fatal. There's no safe exposure level. Even brief exposure can cause disease decades later. Asbestos is one of construction's deadliest hazards.

120. A - Asbestos was widely used in construction before the 1980s (peak use 1950s-1970s) in insulation, floor tiles, roofing, siding, pipe wrap, drywall compound, and many other products. Buildings built before 1980 likely contain asbestos. Use stopped in phases through the 1970s-1980s as dangers became known.

121. C - Asbestos testing is required for suspected materials in buildings built before 1980s before renovation or demolition. Only lab analysis definitively identifies asbestos. Assume materials in old buildings contain asbestos until testing proves otherwise. Don't disturb suspected materials without testing—exposure is too dangerous.

122. D - Asbestos removal requires licensed abatement contractors, contained work areas (negative pressure enclosures), HEPA filtered equipment and vacuums, protective clothing and respirators, wet methods keeping material damp, proper disposal in sealed labeled bags, and decontamination. It's highly regulated and dangerous requiring specialized training and equipment.

123. D - GFCIs are required for all temporary power on construction sites and all receptacles in wet or outdoor locations. This includes power tools, extension cords, and temporary panels. GFCIs prevent electrocution from ground faults—they're essential construction site safety. The requirement is absolute.

124. B - Assured Equipment Grounding Programs are alternatives to GFCIs requiring visual inspection and continuity testing of equipment grounds and cords before first use, after repair, and every 3 months. They verify proper grounding protecting workers. Most sites use GFCIs instead—they're simpler than maintaining grounding programs.

125. C - GFCIs (Ground Fault Circuit Interrupters) protect from ground faults detecting current leakage to ground and shutting off power in milliseconds preventing electrocution. AFCIs (Arc Fault Circuit Interrupters) protect from arc faults detecting dangerous arcing conditions and shutting off power preventing fires. Different hazards, different protection.