Practice Test 2

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 primary purpose of building codes?

A. To increase construction costs

B. To establish minimum standards for health, safety, and welfare

C. To prevent any construction

D. To favor certain contractors

2. Which organization publishes the International Building Code (IBC)?

A. OSHA

B. NFPA

C. International Code Council (ICC)

D. Local governments only

3. What is a building permit?

A. Official authorization from the local jurisdiction to begin construction work

B. Business license

C. Contractor license

D. Insurance policy

4. When must a building permit typically be posted?

A. In the contractor's office

B. At home

C. Never required

D. Visibly at the job site

5. What is a zoning ordinance?

A. Temperature zones

B. Time zones

C. Local regulations controlling land use, building types, and setbacks

D. Electrical zones

6. What is a setback requirement in zoning?

B. Minimum distance a building must be from property lines

C. Time delay for permits

D. Budget reduction

7. What is the purpose of a site survey?

A. Determining exact property boundaries, elevations, and existing conditions

B. Customer satisfaction survey

C. Employee survey

D. Market research

8. What information is typically shown on a site plan?

A. Interior room layouts

B. Electrical circuits

C. Plumbing fixtures

D. Property boundaries, building location, setbacks, utilities, and topography

9. What is a soils report used for?

A. Gardening advice

B. Paint selection

C. Determining soil bearing capacity and recommendations for foundation design

D. Landscaping only

10. What does bearing capacity refer to in soil testing?

A. Direction soil faces

B. The load per square foot that soil can safely support

C. Soil color

D. Soil temperature

11. What is substantial completion of a project?

A. 50% complete

B. Materials ordered

C. Contract signed

D. Work sufficiently complete for owner's intended use with only minor items remaining

12. What is a warranty in construction?

A. A guarantee that work and materials will perform as intended for a specified period

B. A warning

C. A discount

D. A penalty

13. What is included in project close-out documents?

A. Initial estimates only

B. Business cards

C. As-built drawings, warranties, operating manuals, and final paperwork

D. Marketing materials

14. What is the purpose of a certificate of occupancy?

B. Certifying the building meets codes and may be legally occupied

C. Certificate of insurance

D. Business certificate

15. What is retainage typically released after?

A. Contract signing

B. Permit approval

C. First payment

D. Final completion, inspection, and acceptance of all work

16. What is a performance bond?

A. A financial guarantee that the contractor will complete the project per contract terms

B. Employee bonus

C. Music concert

D. Savings account

17. Which project delivery method typically results in the fastest completion?

A. Design-bid-build

B. Multiple prime contracts

C. Fast-track or design-build allowing overlapping design and construction phases

D. Traditional sequential method

18. What is the purpose of a pre-bid meeting?

B. To answer questions, clarify project requirements, and ensure all bidders understand the project

C. To select the winner

D. To socialize

19. What is included in general conditions of a contract?

A. Specific materials only

B. Paint colors

C. Landscaping preferences

D. Administrative provisions, responsibilities, procedures, and legal terms

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

20. What is the purpose of a footing in foundation construction?

A. Spreading building loads over a larger soil area to prevent settlement

B. Foot protection for workers

C. Decorative element

D. Temporary support

21. What is the typical minimum width for a continuous wall footing?

A. Equal to wall thickness

B. Half the wall thickness

C. Twice the wall thickness or as engineered

D. Any width works

22. What is the minimum depth for frost footings in cold climates?

B. Below the frost line to prevent heaving from frozen ground

C. 6 inches deep

D. Depth doesn't matter

23. What is a spread footing?

A. Footing with jelly

B. Temporary footing

C. Removable footing

D. An enlarged concrete pad at the base of columns distributing loads

24. What is the typical spacing for anchor bolts in sill plates?

A. 6 feet maximum with bolts near plate ends and corners

B. 20 feet apart

C. One per wall

D. No specific spacing needed

25. What is platform framing?

A. Stage construction

B. Temporary platforms

C. Floor platform built first, then walls erected on top, repeated for each story

D. Roof platform

26. What diameter anchor bolts are typically used for residential construction?

A. 1/4 inch

B. 1 inch

C. 2 inches

D. 1/2 inch

27. What is balloon framing?

A. Party decorations

B. Temporary framing

C. Modern standard method

D. Weather balloons

28. What determines the required size of a beam?

A. Available lumber

B. Personal preference

C. Span, load, lumber species, and grade

D. Beam color

29. What is a glulam beam?

A. Glue mistake

B. Engineered beam made of lumber layers glued together for strength

C. Temporary beam

D. Decorative beam

30. What does the grade stamp on lumber indicate?

A. School grades

B. Slope angle

C. Color rating

D. Species, grade, moisture content, and mill information

31. What is the maximum moisture content for framing lumber at time of installation?

A. 19% or less (typically 15% or less for quality work)

B. 50%

C. Any moisture content acceptable

D. Must be completely dry (0%)

32. What is a load-bearing wall's function?

A. Decorative purpose

B. Dividing rooms only

C. Supporting structural loads from above

D. Holding insulation only

33. What is a point load?

B. Concentrated load at a specific location rather than distributed over an area

C. Sharp object

D. Decimal point

34. What is live load in structural engineering?

A. Electrical loads

B. Dead weight of structure

C. Permanent loads

D. Temporary or moving loads like people, furniture, and snow

35. What is dead load?

A. The permanent weight of the building structure and fixed components

B. Temporary loads

C. Moving loads

D. Snow load only

36. What is the purpose of a pier foundation?

A. Boat dock

B. Decorative element

C. Deep foundation supporting loads on isolated points, often used on slopes

D. Temporary support

37. What is a crawl space?

B. Shallow space between ground and first floor, typically 18-48 inches high

C. Attic space

D. Closet

38. What is the minimum height for a crawl space?

A. 6 inches

B. 12 inches

C. 24 inches

D. 18 inches minimum for access

39. What is a monolithic slab?

A. Single large stone

B. Temporary slab

C. Decorative slab

D. Two-part slab

40. What is a T-foundation?

A. Foundation shaped like letter T

B. Temporary foundation

C. Spread footing with stem wall forming inverted T-shape in cross-section

D. Foundation for T-shaped buildings only

41. What is the purpose of rebar chairs in concrete work?

A. Seating for workers

B. Holding reinforcing steel at proper height within concrete

C. Decorative elements

D. Formwork supports

42. What is the minimum concrete cover over rebar in slabs on grade?

A. No cover needed

B. 1/4 inch

C. 4 inches

D. 3/4 inch (typically 2 inches in practice)

43. What is a keyway in concrete foundations?

A. Lock mechanism

B. Decorative element

C. Drainage channel

D. Piano keys

44. What is the purpose of foundation ventilation in crawl spaces?

A. Cooling the house

B. Heating the crawl space

C. Removing moisture and preventing wood rot and mold

D. Fresh air for animals

SECTION 3: CORE TRADES (Questions 45-82)

45. What is a fixture unit in plumbing design?

A. Light fixture

B. Measurement of probable discharge load from plumbing fixtures

C. Cabinet unit

D. Tool

46. What is the minimum slope for horizontal drain pipes?

A. Level (no slope)

B. Any slope

C. 10% slope

D. 1/4 inch per foot (2% slope) for pipes 3 inches or smaller

47. What is a vent stack in plumbing?

A. Vertical vent pipe extending through the roof allowing sewer gases to escape

B. Exhaust fan

C. Chimney

D. Air conditioner vent

48. What is water hammer in plumbing?

A. Tool for plumbers

B. Frozen pipes

C. Loud banging noise when water flow is suddenly stopped

D. Water pressure test

49. What device prevents water hammer?

A. Hammer

B. Water hammer arrestor (shock absorber) installed on supply lines

C. Larger pipes

D. Nothing can prevent it

50. What is the purpose of a building trap?

A. Catching animals

B. Preventing entry

C. Creating maintenance problems

D. Preventing sewer gases from entering building (though no longer code-approved in most areas)

51. What is the minimum size for a clothes washer drain?

A. 1 inch

B. 1-1/2 inches

C. 2 inches

D. 3 inches

52. What is an air gap in plumbing?

A. Missing pipe section

B. Broken connection

C. Leak

D. Installation error

53. What is the typical residential water pressure range?

A. 5-10 PSI

B. 200 PSI

C. 100-150 PSI

D. 40-80 PSI (with 50-60 PSI ideal)

54. What type of pipe is typically used for natural gas lines?

A. PVC

B. Black steel pipe or approved flexible gas lines

C. Copper water pipe

D. PEX

55. What is the purpose of a sediment trap in gas piping?

A. Trapping fish

B. Decorative element

C. Collecting sediment and debris before it enters appliances

D. Gas storage

56. What is a service disconnect in electrical systems?

A. Unplugging appliances

B. Light switch

C. Circuit breaker

D. Dimmer switch

57. What is the minimum service size for most modern residences?

A. 60 amps

B. 30 amps

C. 500 amps

D. 200 amps (though 100 amps minimum code in many areas)

58. What is a sub-panel in electrical systems?

A. Submarine electrical

B. Underground panel

C. Secondary distribution panel fed from main panel

D. Temporary panel

59. What is the purpose of a neutral bus bar in an electrical panel?

B. Providing connection point for neutral wires

C. Supporting the panel

D. Decorative element

60. What color wire connects to the brass-colored terminal on a receptacle?

A. Black (hot wire)

B. White (neutral)

C. Green (ground)

D. Any color

61. What is a multiwire branch circuit?

A. Multiple circuits run separately

B. Temporary wiring

C. Illegal wiring

D. Circuit using shared neutral wire serving two hot conductors

62. What is a junction box used for?

A. Connecting trains

B. Storage

C. Protecting electrical connections and splices

D. Light fixture only

63. What is the minimum burial depth for rigid metal conduit with conductors?

A. 6 inches

B. 36 inches

C. 48 inches

D. 12 inches

64. What is the maximum number of 90-degree bends allowed in a conduit run between boxes?

A. No limit

B. Four quarter-bends (360 degrees total)

C. One

D. Ten

65. What does NM cable stand for?

A. New Mexico

B. Night Mode

C. Nominal Metal

D. Non-Metallic sheathed cable (Romex)

66. What is the purpose of HVAC load calculation?

A. Weighing equipment

B. Calculating installation costs

C. Properly sizing heating and cooling equipment for the building

D. Estimating energy bills only

67. What is a Manual J calculation?

A. Operating manual

B. Safety manual

C. Installation manual

D. Building manual

68. What is the recommended supply air temperature for cooling systems?

A. 32°F

B. 55-58°F leaving the unit

C. 85°F

D. 100°F

69. What is the purpose of a thermostat anticipator?

A. Predicting weather

B. Creating fear

C. Anticipating problems

D. Fine-tuning temperature control by sensing temperature change before room temp reaches setpoint

70. What is the minimum ventilation rate for residential bathrooms?

A. No ventilation required

B. Windows only

C. 50 CFM exhaust fan or operable window

D. 200 CFM

71. What does CFM measure in HVAC?

A. Cubic Feet per Minute (airflow rate)

B. Cold air Formation Measurement

C. Ceiling Fan Motor

D. Cost Factor Multiplier

72. What is ductwork typically made from?

B. Sheet metal (galvanized steel), fiberglass duct board, or flexible duct

C. Concrete

D. Wood

73. What is the purpose of duct insulation?

A. Sound deadening only

B. Fire protection only

C. Appearance

D. Preventing heat loss/gain and controlling condensation

74. What is static pressure in HVAC systems?

A. Electrical static

B. Weight of air

C. Resistance to airflow in the duct system

D. Air temperature

75. What is the maximum slump for typical structural concrete?

A. 4-5 inches for most applications

B. 10 inches

C. 12 inches

D. No limit

76. What is the purpose of a concrete vibrator?

A. Making noise

B. Consolidating concrete and removing air pockets for denser, stronger concrete

C. Mixing concrete

D. Breaking concrete

77. How soon after pouring can you typically strip concrete forms?

A. After concrete reaches sufficient strength (typically 1-7 days depending on loading)

B. Immediately

C. Never remove forms

D. After one year

78. What is honeycombing in concrete?

A. Decorative pattern

B. Desirable finish

C. Voids and gaps in concrete surface from incomplete consolidation

D. Intentional texture

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

A. Making concrete elastic

B. Decorative lines

C. Weakening concrete

D. Allowing movement from temperature changes and preventing cracking

80. What is screeding in concrete work?

A. Yelling at the concrete

B. Concrete testing

C. Formwork

D. Mixing concrete

81. What is a darby used for in concrete finishing?

A. Measuring tool

B. Smoothing and leveling concrete after screeding

C. Breaking concrete

D. Mixing tool

82. What is concrete curing compound?

A. Medicine for concrete

B. Concrete mix

C. Formwork release

D. Liquid applied to concrete surface to retain moisture during curing

SECTION 4: FINISH TRADES (Questions 83-107)

83. What is the purpose of a transition strip in flooring?

A. Temporary flooring

B. Changing direction

C. Covering joints between different flooring materials or levels

D. Decorative only

84. What is engineered hardwood flooring?

A. Extra hard wood

B. Temporary flooring

C. Plastic flooring

D. Metal flooring

85. What is luxury vinyl plank (LVP) flooring?

A. Expensive vinyl records

B. Resilient flooring that mimics wood appearance with vinyl construction

C. Solid wood

D. Carpet

86. What is the Janka hardness test?

A. Testing student knowledge

B. Concrete strength test

C. Soil test

D. Test measuring wood's resistance to denting and wear

87. What is site-finished hardwood flooring?

A. Prefinished at factory

B. No finish required

C. Flooring sanded and finished after installation on site

D. Painted flooring

88. What is the standard height for chair rail molding?

A. 32-36 inches above floor (about one-third wall height)

B. 6 inches above floor

C. At ceiling

D. 72 inches above floor

89. What is crown molding?

A. Royal decoration

B. Decorative trim at the junction of walls and ceiling

C. Floor trim

D. Door trim

90. What is the standard reveal for door and window casing?

A. 1/2 inch

B. 2 inches

C. None (flush)

D. 1/4 to 3/8 inch setback from jamb edge

91. What is a miter joint in trim carpentry?

A. Butt joint

B. Lap joint

C. Two pieces cut at angles (typically 45 degrees) meeting at a corner

D. Glued joint

92. What is a coped joint used for?

A. Interior corners in baseboard and crown molding where one piece is cut to fit the profile of the other

B. Outside corners

C. Flat surfaces

D. Temporary joints

93. What is MDF used for in millwork?

A. Concrete form

B. Medium Density Fiberboard - engineered wood product for trim and cabinetry

C. Metal panel

D. Roofing material

94. What is the difference between paint-grade and stain-grade trim?

A. No difference

B. Color only

C. Price only

D. Paint-grade uses lower quality wood for painting; stain-grade uses clear wood for transparent finishes

95. What is a Level 4 drywall finish?

A. Fourth floor only

B. Minimal finish

C. Smooth finish with joint compound covering all joints and fasteners, suitable for flat paint

D. No finish required

96. What is a Level 5 drywall finish?

A. Highest level with skim coat over entire surface for critical lighting and gloss paint

B. Lowest level

C. Same as Level 1

D. Not a real level

97. What is orange peel texture in drywall finishing?

B. Spray-applied texture resembling orange skin, used to hide imperfections

C. Paint color

D. Wallpaper pattern

98. What is the purpose of a backer rod in caulking joints?

A. Storage rod

B. Measuring tool

C. Decorative element

D. Foam rod inserted in deep joints to control caulk depth and prevent three-sided adhesion

99. What is the recommended caulk joint width?

A. 1 inch or larger

B. No limit

C. 1/4 to 1/2 inch for best performance

D. As narrow as possible

100. What is the purpose of taping drywall joints?

A. Temporary hold

B. Decoration

C. Color coding

D. Sound control

101. What is mesh tape versus paper tape in drywall?

A. Identical materials

B. Both outdated

C. Color difference only

D. Cost only

102. What is the purpose of primer on new drywall?

A. Final coat

B. Decorative layer

C. Temporary coating

D. Moisture barrier only

103. What is venetian plaster?

A. Plastic product

B. Smooth decorative plaster finish with polished appearance

C. Exterior stucco only

D. Temporary finish

104. What is wainscoting?

A. Ceiling treatment

B. Wall paneling on lower portion of walls, typically 32-48 inches high

C. Roofing material

D. Flooring

105. What is beadboard?

A. Jewelry

B. Roofing

C. Concrete form

D. Paneling with narrow vertical grooves creating a lined appearance

106. What is the standard backsplash height in kitchens?

A. 4 inches minimum, often 18 inches to bottom of cabinets

B. 1 inch

C. 8 feet

D. Not required

107. What is quartz countertop made from?

A. Pure quartz stone

B. Plastic

C. Engineered material combining crushed quartz with resins

D. Wood

SECTION 5: SAFETY (Questions 108-125)

108. What is the purpose of a safety harness D-ring?

A. Decorative jewelry

B. Attachment point on back of harness connecting to fall arrest lanyard

C. Tool holder

D. Name tag attachment

109. What is the maximum free fall distance allowed with fall arrest systems?

A. No limit

B. 20 feet

C. 50 feet

D. 6 feet

110. What must be done with a fall arrest system after it arrests a fall?

A. Remove it from service and have it inspected or replaced per manufacturer

B. Reuse immediately

C. Clean it only

D. Nothing required

111. What is a lifeline in fall protection?

A. Emergency phone

B. First aid

C. Vertical or horizontal rope or cable providing fall protection connection point

D. Safety meeting

112. What is a tie-off point for fall protection?

B. Secure anchor capable of supporting required loads (typically 5,000 lbs per person)

C. Any available object

D. Temporary attachment

113. What is the minimum breaking strength for a fall protection anchor?

A. 500 lbs

B. 1,000 lbs

C. 2,000 lbs

D. 5,000 lbs per attached worker

114. What is a shock-absorbing lanyard?

A. Regular rope

B. Elastic cord

C. Chain

D. Wire rope

115. What is the proper storage for power tools?

A. Leave in weather

B. On floor where people walk

C. Clean, dry, secure location protecting from damage and unauthorized use

D. In vehicles overnight

116. What is the purpose of a ground fault circuit interrupter on power tools?

A. Increasing power

B. Protecting against electric shock by detecting ground faults

C. Speed control

D. Battery charging

117. What is the three-prong plug ground for on tools?

A. Stability

B. Decoration

C. International compatibility

D. Providing safe path for fault current to protect against shock

118. When should power tools be inspected?

A. Before each use for damage or defects

B. Once per year

C. Never needed

D. Only when they malfunction

119. What is lockout/tagout used for?

A. Locking job site

B. Employee time tracking

C. Controlling hazardous energy during equipment servicing

D. Security system

120. What must be done before servicing electrical equipment?

B. Disconnect, lockout, tag, and test to ensure power is off

C. Work quickly

D. Wear gloves only

121. What is confined space entry?

A. Small room

B. Crowded area

C. Low doorway

D. Entry into space with limited access, not designed for continuous occupancy

122. What is a confined space attendant's role?

A. Entering the space to work

B. Supervising from outside, monitoring entrants, and initiating rescue if needed

C. Taking breaks

D. Operating equipment only

123. What atmospheric hazards exist in confined spaces?

A. None

B. Wind only

C. Oxygen deficiency, toxic gases, or flammable atmospheres

D. Temperature only

124. What PPE is required when cutting concrete or masonry?

A. None

B. Respirator for silica dust, safety glasses, hearing protection, and gloves

C. Sunglasses only

D. Hard hat only

125. What is crystalline silica?

A. Crystal decorations

B. Glass cleaner

C. Paint additive

D. Hazardous dust from cutting concrete, stone, or masonry causing lung disease

Answer Key with Explanations

1. B - Building codes set minimum standards protecting public health, safety, and welfare. They cover structural integrity, fire safety, sanitation, energy efficiency, and accessibility. Codes aren't about making construction expensive—they're about keeping buildings safe and preventing deaths, injuries, and property damage.

2. C - The International Code Council publishes the I-Codes including the International Building Code, International Residential Code, and other model codes. Local jurisdictions adopt these codes, sometimes with local amendments, as their enforceable building regulations.

3. A - A building permit is official authorization from your city or county to proceed with construction. It means you've submitted plans, they've been reviewed for code compliance, and you're legally allowed to start work. Building without required permits can result in fines and forced removal of work.

4. D - The building permit must be posted visibly at the job site where inspectors and anyone else can see it. This proves you have legal authorization to be building and makes it easy for inspectors to reference when they show up.

5. C - Zoning ordinances are local laws controlling what you can build where. They regulate land use (residential, commercial, industrial), building height, lot coverage, setbacks from property lines, and parking requirements. Zoning protects property values and ensures compatible land uses.

6. B - Setbacks are minimum distances buildings must be from property lines. Front setbacks keep houses lined up nicely along streets. Side setbacks provide fire separation between buildings and access for maintenance. Rear setbacks provide privacy and green space.

7. A - A site survey by a licensed surveyor determines exact property boundaries, elevations, locations of existing structures and utilities, easements, and topography. Surveys prevent building on your neighbor's land and provide accurate information for design and construction.

8. D - Site plans are bird's-eye views showing property boundaries, building footprint and location, setbacks, driveways, utilities, topography, drainage, landscaping, and other site features. They show how the building relates to the property and surroundings.

9. C - Soils reports by geotechnical engineers test soil bearing capacity (how much weight soil can support) and provide foundation recommendations. They identify problem soils, groundwater depth, and special requirements. Building foundations without soil testing is gambling with structural failure.

10. B - Bearing capacity measures how many pounds per square foot soil can safely support without excessive settlement. Sandy gravel might support 3,000-4,000 PSF, while clay might only handle 1,500-2,000 PSF. Your foundation must distribute building loads within the soil's bearing capacity.

11. D - Substantial completion means the work is complete enough for the owner to occupy and use the building for its intended purpose, with only minor punch list items remaining. It triggers final payment timelines, warranty periods, and transfer of risk to the owner.

12. A - Warranties guarantee that work and materials will perform as intended for a specified period. Standard warranties cover workmanship defects for one year and major structural defects for longer periods. Warranties give owners recourse if problems develop.

13. C - Project close-out documents include as-built drawings, warranties and guarantees, equipment operation and maintenance manuals, spare parts and keys, final lien waivers, and other final paperwork. These documents transfer to the owner for future reference and maintenance.

14. B - A certificate of occupancy (CO) is issued by the building department after final inspection certifying the building meets all codes and may be legally occupied. You can't legally move in or open for business without a CO. It's the official stamp of approval.

15. D - Retainage (typically 5-10% of contract value) is withheld throughout the project and released after final completion, inspection, acceptance of all work, receipt of final lien waivers, and any required warranty periods beginning. It's your final payment and the owner's leverage ensuring you finish everything.

16. A - Performance bonds guarantee you'll complete the project according to contract terms. If you default or abandon the project, the surety (bonding company) pays to have another contractor finish or compensates the owner for losses up to the bond amount. Large projects and public works often require performance bonds.

17. C - Fast-track construction and design-build delivery methods allow overlapping design and construction phases. You can start foundations while upper floors are still being designed, dramatically shortening project schedules. Traditional design-bid-build sequences everything, taking much longer.

18. B - Pre-bid meetings let potential bidders tour the site, ask questions about confusing or ambiguous items, and clarify project requirements. All bidders receive the same information ensuring fair competition. Meetings are documented with written minutes distributed to all bidders.

19. D - General conditions cover administrative, procedural, and legal provisions of the contract—things like payment terms, change order procedures, dispute resolution, warranty requirements, insurance requirements, and responsibilities of all parties. They're the "rules of engagement" for the project.

20. A - Footings spread concentrated building loads over larger soil areas preventing excessive settlement. A 12-inch wide wall concentrates loads that would punch through soil, but spreading that load over a 24-inch wide footing reduces pressure to levels soil can safely support.

21. C - Continuous wall footings typically need to be at least twice the wall thickness, though soil conditions and loads determine actual width. A 10-inch thick foundation wall usually needs a 20-inch wide footing minimum. Weaker soils need wider footings spreading loads over even more area.

22. B - Frost footings must extend below the frost line (the depth where ground freezes in winter). Frozen ground expands, heaving foundations and causing severe damage. Frost depth varies by climate—maybe 12 inches in mild areas but 4+ feet in cold regions.

23. D - Spread footings are enlarged concrete pads at the base of columns or posts distributing point loads over enough area that soil can support them. Think of snowshoes—they spread your weight preventing you from sinking. Spread footings do the same for building loads.

24. A - Anchor bolts securing sill plates to foundations space 6 feet maximum on center, with bolts within 12 inches of plate ends and at corners. This spacing resists uplift from wind and provides adequate connection preventing walls from sliding off foundations.

25. C - Platform framing builds one floor at a time—floor platform first, then walls erected on that platform, then next floor platform on those walls, repeating upward. Each floor provides a working platform for the next level. This is the standard modern framing method.

26. D - Residential sill plate anchor bolts are typically 1/2 inch diameter. This size provides adequate strength resisting uplift and shear forces while being easy to install. Commercial construction might use larger bolts, but 1/2 inch is residential standard.

27. A - Balloon framing was an old method with studs running continuously from foundation to roof (two stories tall). Floor joists hung off ribbon boards attached to studs. This created fire hazards with continuous wall cavities and required special long lumber. Modern construction uses platform framing instead.

28. C - Beam size depends on the span (how far it reaches), the loads it carries (dead load plus live load), lumber species (Douglas Fir is stronger than pine), and grade (select structural grade is stronger than standard grade). All these factors work together determining required beam size.

29. B - Glulam (glued laminated timber) beams are made from dimensional lumber layers glued together with grain running parallel. This creates beams larger and stronger than available from single trees. Glulams can span longer distances than solid sawn lumber.

30. D - Grade stamps on lumber show the mill that produced it, lumber species, grade (quality level), moisture content at manufacture, and grading agency. This stamp tells you the lumber's strength properties and appropriate uses. Never paint or cut through grade stamps.

31. A - Framing lumber should have 19% or less moisture content, though 15% or less is better for quality work. Wet lumber shrinks as it dries causing squeaky floors, drywall cracks, and nail pops. MC-15 stamped lumber is dried to 15% moisture content maximum.

32. C - Load-bearing walls support structural loads from roof, floors, or upper levels, transferring those loads down to foundations. Removing or modifying load-bearing walls without proper engineering and temporary support can cause catastrophic collapse. Not all walls are load-bearing.

33. B - Point loads are concentrated loads at specific locations rather than distributed over areas. Examples include columns, beams bearing on walls, or heavy equipment. Point loads require reinforced framing (doubled or tripled studs, posts, or beams) to handle the concentration.

34. D - Live loads are temporary or movable loads on structures—people, furniture, vehicles, stored materials, snow, and wind. They're called "live" because they can be there one moment and gone the next. Structures must safely support the maximum expected live loads.

35. A - Dead loads are the permanent weight of the structure itself—framing, roofing, drywall, flooring, cabinets, and mechanical systems. Dead loads never go away. They're always there, and structures must support their own weight plus all live loads.

36. C - Pier foundations use isolated concrete columns or masonry piers extending down to stable soil or bedrock. They're ideal for slopes, weak surface soils, or elevated structures. Piers support beams which support floors, keeping buildings above the ground.

37. B - Crawl spaces are shallow areas between ground and first floor, typically 18-48 inches high. They provide access to plumbing, wiring, and HVAC without full basement excavation cost. The name comes from having to crawl on hands and knees to move around in them.

38. D - Building codes require 18 inches minimum crawl space height for access. Workers need to get in there for inspections, repairs, and maintenance. Less than 18 inches makes access nearly impossible, particularly with ductwork and utilities taking up space.

39. A - Monolithic slabs are single continuous concrete pours with the floor slab and foundation edges (thickened slab edges serving as footings) poured together at once. "Monolithic" means one piece—there's no separate footing and slab. This method is fast and common in warm climates.

40. C - T-foundations (also called spread footings with stem walls) form an inverted T-shape in cross-section—wide footing at bottom, narrow stem wall rising to support floor framing. The T-shape efficiently distributes loads from stem wall across wider footing.

41. B - Rebar chairs (metal or plastic supports) hold reinforcing steel at the proper height within concrete. Rebar sitting on the ground provides no concrete cover and corrodes. Chairs maintain proper spacing so rebar ends up in the middle third of the slab where it's most effective.

42. D - Code requires 3/4 inch minimum concrete cover over rebar in slabs on grade, though 2 inches is typical in practice for better protection. Adequate cover prevents corrosion and ensures rebar doesn't "telegraph" through (show as visible lines on) finished surfaces.

43. A - A keyway is a groove formed in the top of footings (using a 2×4 or special form) creating a mechanical interlock between footing and foundation wall poured later. The key prevents the wall from sliding horizontally off the footing.

44. C - Crawl space ventilation removes moisture preventing wood rot, mold, and pest problems. Traditional building required vents around the perimeter. Modern practice often uses sealed crawl spaces with controlled conditioning instead, but either way moisture control is critical.

45. B - A fixture unit is a standardized measure of probable water discharge from plumbing fixtures used to size drain pipes. A toilet might be 3 fixture units, a lavatory 1 fixture unit. Fixture unit tables determine required drain pipe sizes based on total fixture units served.

46. D - Horizontal drain pipes need minimum 1/4 inch per foot slope (2%) for pipes 3 inches or smaller. Steeper slopes work but aren't necessary. Flatter slopes allow solids to settle causing clogs. Too steep and water runs faster than solids causing problems too.

47. A - Vent stacks are vertical pipes extending through the roof allowing sewer gases to escape outside and air to enter the drainage system preventing vacuum formation. Every plumbing system needs adequate venting to drain properly and prevent trap siphoning.

48. C - Water hammer is loud banging when water flow stops suddenly—like shutting off a faucet quickly. Fast-moving water slams to a stop creating shock waves that bang through pipes. It sounds like someone hitting pipes with a hammer and can damage pipes and fittings over time.

49. B - Water hammer arrestors are shock absorbers installed on supply lines near fixtures or appliances. They contain air chambers or springs that cushion the shock when water stops suddenly, eliminating the banging noise and protecting pipes from damage.

50. D - Building traps were once installed where the building drain exits to prevent sewer gases from backing into the building. However, they're no longer code-approved in most areas because they create maintenance problems and the vent system provides better protection.

51. C - Clothes washer drains require 2-inch minimum pipe size to handle the large volume of water discharged quickly during drain cycles. Smaller pipes can't handle the flow rate causing overflows. The standpipe receiving washer discharge should be 18-30 inches above the trap.

52. A - An air gap is physical space separation between a water outlet and any contaminated source preventing backflow through siphoning. Examples include the gap between a faucet and sink rim, or dishwasher drain hose elevated above potential backup. Air gaps are the most reliable backflow prevention.

53. D - Normal residential water pressure ranges 40-80 PSI with 50-60 PSI being ideal. Below 40 PSI feels weak and appliances don't work well. Above 80 PSI wastes water, creates noise, and damages fixtures and appliances. Pressure-reducing valves control excessively high pressure.

54. B - Natural gas lines use black steel pipe (threaded connections) or approved flexible gas connector lines (corrugated stainless steel). Never use copper water pipe, PVC, or other unapproved materials for gas—it's extremely dangerous and illegal. Gas piping must meet specific safety codes.

55. C - Sediment traps (also called drip legs) are short vertical pipes with caps at gas appliances collecting sediment, debris, and moisture before they reach appliances. They protect controls and burners from contamination extending appliance life.

56. A - The service disconnect (main breaker) at the service panel allows shutting off all power to the building at once. It's your emergency shutoff and required by code for safety. Electricians can work safely with power disconnected at the main breaker.

57. D - Most modern residences need 200-amp minimum service panels, though 100 amps is minimum code in many areas. Modern homes with electric heat, air conditioning, and multiple appliances draw significant power. Older homes with 60-100 amp service often need upgrades when adding loads.

58. C - Sub-panels are secondary distribution panels fed from the main service panel extending circuits to distant areas like garages, shops, or additions. They're smaller than main panels and fed through a circuit breaker at the main panel.

59. B - The neutral bus bar provides connection points for neutral wires (white wires) returning current from circuits. It connects to the neutral service conductor. In main panels the neutral and ground buses bond together; in sub-panels they must remain separate.

60. A - Black hot wires connect to brass-colored terminals on receptacles. White neutral wires connect to silver-colored terminals. Green ground wires connect to green ground screws. Never reverse these connections—reversed polarity creates dangerous situations.

61. D - Multiwire branch circuits use shared neutral wires serving two hot conductors on different phases. They're efficient but require special attention during installation and maintenance. All circuit breakers serving a multiwire circuit must shut off simultaneously (using handle ties or double-pole breakers).

62. C - Junction boxes protect and contain wire connections and splices making them accessible for future maintenance. All wire connections must be in approved boxes—never bury splices in walls or ceilings. Junction box covers must remain accessible, not covered by drywall.

63. A - Rigid metal conduit (RMC) with conductors requires 6 inches minimum burial depth. Different conduit types and wiring methods have different burial requirements ranging from 6 to 24 inches. Always check code tables for specific wiring methods and locations.

64. B - Conduit runs between boxes can't have more than four quarter-bends (90-degree bends) totaling 360 degrees maximum. More bends make pulling wire too difficult or impossible. If you need more bends, you must install a pull box or junction box breaking the run into segments.

65. D - NM cable (Non-Metallic sheathed cable) is commonly called Romex. It has plastic sheathing containing insulated conductors—typically black (hot), white (neutral), and bare or green (ground). NM cable is used in residential wiring within walls, floors, and ceilings.

66. C - HVAC load calculations determine heating and cooling requirements by calculating heat loss and heat gain for the building considering insulation, windows, infiltration, occupancy, and climate. Proper sizing ensures comfort and efficiency. Oversized equipment costs more and doesn't control humidity well.

67. A - Manual J is the standard residential load calculation method published by Air Conditioning Contractors of America. It's room-by-room calculation accounting for all factors affecting heating and cooling loads. Proper Manual J calculations ensure correctly sized equipment.

68. B - Air conditioning supply air typically leaves the unit at 55-58°F. Mixed with return air at room temperature (around 75°F), this achieves comfortable cooling. Supply air temperature depends on outdoor conditions, system design, and humidity control requirements.

69. D - Heat anticipators (in older thermostats) or electronic equivalents in modern ones sense when room temperature is approaching the setpoint and shut off heating/cooling slightly early preventing temperature overshoot. This provides tighter temperature control and comfort.

70. C - Residential bathrooms need 50 CFM minimum exhaust ventilation or operable windows meeting size requirements. Ventilation removes moisture and odors preventing mold and improving air quality. Exhausted air must discharge outdoors, not into attics.

71. A - CFM (Cubic Feet per Minute) measures airflow rate in HVAC systems. A 2,000 square foot house might need 800-1,000 CFM of supply air for proper heating and cooling. CFM measurements ensure adequate airflow for comfort and system performance.

72. B - Ductwork is made from sheet metal (galvanized steel is most common), fiberglass duct board (insulated rigid board formed into ducts), or flexible duct (wire-reinforced flexible tubes with insulation). Each type has appropriate applications and installation requirements.

73. D - Duct insulation prevents heat loss from heating ducts and heat gain to cooling ducts in unconditioned spaces like attics. It also prevents condensation on cold ducts in humid conditions. Properly insulated ducts improve system efficiency significantly.

74. C - Static pressure measures resistance to airflow in ductwork. Higher static pressure means the system must work harder to move air. Causes include dirty filters, undersized ducts, or too many bends. Excessive static pressure reduces efficiency and airflow.

75. A - Maximum slump for most structural concrete is 4-5 inches. Foundation walls often use 4-inch slump. Slump measures consistency—higher slump flows easier but can be weaker and segregate. Very low slump is hard to place but stronger when properly consolidated.

76. B - Concrete vibrators consolidate fresh concrete, removing air pockets and ensuring complete filling of forms around rebar. Vibration makes concrete flow into all spaces creating dense, strong, uniform concrete. Over-vibration can cause segregation; under-vibration leaves honeycombing.

77. A - Forms can be stripped after concrete gains sufficient strength to support itself and construction loads. For foundations this might be 12-24 hours. For slabs supporting formwork for upper levels, 7+ days. Cold weather requires longer times. Always check structural engineer requirements.

78. C - Honeycombing is defect where concrete has voids and gaps on surfaces from incomplete consolidation. It weakens concrete and looks terrible. Proper vibration, form design, and concrete mix design prevent honeycombing. Severe honeycombing requires repair or removal and replacement.

79. D - Expansion joints allow concrete to expand and contract with temperature changes without cracking. They typically separate sections like buildings from sidewalks, or slabs from walls. Expansion joints are full-depth separations often filled with flexible material.

80. A - Screeding is leveling fresh concrete using a straight board (screed) pulled across the surface. The screed strikes off excess concrete and fills low spots bringing the surface to proper grade. Screeding is the first step in finishing concrete surfaces.

81. B - A darby is a long flat tool (3-6 feet) used after screeding to smooth and level concrete further. It embeds large aggregate slightly below the surface and removes high and low spots preparing surfaces for additional finishing operations like floating and troweling.

82. D - Curing compounds are liquids sprayed on concrete surfaces forming membranes that retain moisture during curing. They're alternatives to wet curing (keeping concrete moist with water). Curing compounds allow concrete to gain proper strength by preventing premature drying.

83. C - Transition strips cover and protect joints between different flooring materials (carpet to tile, wood to vinyl) or different floor levels (raised thresholds). They provide smooth transitions preventing tripping hazards and protecting vulnerable flooring edges from damage.

84. A - Engineered hardwood has a real wood veneer surface bonded to plywood or HDF core. It's more dimensionally stable than solid hardwood (less prone to warping), can be installed over concrete, and costs less. Top layer can be refinished depending on thickness.

85. B - Luxury vinyl plank is resilient flooring made from vinyl with realistic wood-grain printing and embossed textures mimicking real wood. LVP is waterproof, durable, comfortable underfoot, and costs less than hardwood while looking remarkably similar. It's become extremely popular.

86. D - The Janka hardness test measures wood's resistance to denting and wear by measuring force required to embed a steel ball halfway into wood. Brazilian walnut rates around 3,684 lbf (very hard), red oak around 1,290 lbf (moderate), and pine around 690 lbf (soft).

87. C - Site-finished hardwood installs raw, then gets sanded smooth and finished (stained and sealed) on site after installation. This allows custom stain colors, eliminates grooves between boards, and provides seamless appearance. Prefinished flooring comes with factory finish already applied.

88. A - Chair rail typically installs 32-36 inches above floor, about one-third the wall height in rooms with 8-foot ceilings. Originally it protected walls from chair backs. Now it's mostly decorative, defining upper and lower wall sections with different paint colors or wallpaper.

89. B - Crown molding is decorative trim at the wall-ceiling junction bridging that corner with an angled profile. It adds elegance and visual interest to rooms. Crown molding requires compound miter cuts at corners making it challenging to install properly.

90. D - Standard reveal is 1/4 to 3/8 inch setback from door or window jamb edges to casing edges. This subtle shadow line adds dimension and provides tolerance for minor variations in wall thickness or jamb straightness. Reveals create professional-looking installations.

91. C - Miter joints cut two pieces at angles (typically 45 degrees each) meeting at corners forming 90-degree corners. Miters are used for outside corners in trim, baseboard, and crown molding. They require precise cutting and fitting for professional results.

92. A - Coped joints are used for inside corners in baseboard and crown molding. One piece runs into the corner, the second piece is cut with a coping saw following its profile to fit precisely against the first piece's profile. Coped joints look better than mitered inside corners and accommodate wall irregularities.

93. B - MDF (Medium Density Fiberboard) is engineered wood product made from wood fibers and adhesive pressed into boards. It's very smooth, consistent, and machines beautifully making it ideal for paint-grade trim and cabinet parts. It's heavier and weaker than plywood but costs less.

94. D - Paint-grade trim uses less expensive wood like finger-jointed pine or MDF intended for painting. Stain-grade uses clear wood without defects (like select pine, oak, or maple) intended for transparent stains or clear finishes showing wood grain. Stain-grade costs significantly more.

95. C - Level 4 drywall finish has all joints taped and covered with multiple coats of compound, surfaces smooth and free from tool marks, suitable for flat paint and light wall textures. It's the standard finish for most residential applications. Level 5 adds a skim coat over entire surfaces.

96. A - Level 5 is the highest drywall finish with thin skim coat of joint compound over all surfaces creating perfectly uniform appearance. It's required for critical lighting conditions, gloss or semi-gloss paint, and when using dark colors or strong sidelighting showing every imperfection.

97. B - Orange peel texture is spray-applied texture resembling orange skin—fine bumpy texture covering drywall imperfections while still showing some wall surface. It's easy to apply, hides minor flaws, and is easier to paint than heavier textures. Very popular in modern construction.

98. D - Backer rod is round foam rope inserted into deep caulk joints before caulking. It supports the caulk at proper depth, prevents three-sided adhesion (which prevents caulk movement), and reduces caulk quantity needed. Proper joint design with backer rod makes caulk last longer.

99. C - Caulk joints should be 1/4 to 1/2 inch wide for best performance. Narrower joints don't allow enough caulk adhesion area. Wider joints require too much caulk depth and may not seal properly. Joint depth should equal width for optimal flexibility.

100. A - Taping embeds paper or fiberglass mesh tape in joint compound over drywall seams reinforcing joints and preventing cracks. Without tape, joint compound alone would crack. Tape provides tensile strength compound lacks, creating strong lasting joints.

101. D - Paper tape is stronger and provides smoother joints but requires embedding in compound. Mesh tape is self-adhesive, easier for DIY but weaker and tends to show through paint. Professional finishers prefer paper tape for best results; mesh works for repairs.

102. A - Primer on new drywall seals porous surface, evens absorption differences between paper and compound, and improves paint adhesion and coverage. It prevents "flashing" where joint compound and drywall show differently through topcoat. Never skip primer on new drywall.

103. B - Venetian plaster is decorative plaster finish applied in multiple thin layers then burnished (polished) with steel trowels creating smooth marble-like appearance with depth and variation. It's ancient technique experiencing modern popularity for high-end accent walls.

104. B - Wainscoting is decorative wall paneling on the lower portion of walls, typically 32-48 inches high with top rail, often using beadboard, raised panels, or flat panels. Originally it protected walls from damage; now it's mostly decorative adding visual interest.

105. D - Beadboard is paneling with narrow vertical grooves creating lined appearance. Traditional beadboard used individual boards with bead profiles. Modern beadboard comes in 4×8 sheets with milled grooves. It's popular for wainscoting, ceilings, and cottage-style interiors.

106. A - Kitchen backsplashes are minimum 4 inches high behind counters (protecting walls from splashes) but commonly run 18 inches high to the bottom of upper cabinets. Behind ranges they often extend to hood bottom or higher. Backsplashes are practical and decorative.

107. C - Quartz countertops are engineered surfaces combining crushed natural quartz (about 90-95%) with polymer resins. They're non-porous, stain-resistant, very durable, and available in countless colors and patterns. Unlike natural stone, quartz requires no sealing.

108. B - The D-ring on back of safety harnesses is the attachment point for connecting your fall arrest lanyard. It's positioned on the back between shoulder blades for proper fall arrest positioning. Never attach lanyards to side D-rings or waist belts—only the dorsal (back) D-ring is rated for fall arrest.

109. D - Maximum free fall distance is 6 feet for personal fall arrest systems. Falling further generates higher forces when the lanyard arrests your fall. Systems must be set up so you can't fall more than 6 feet before the lanyard catches you. Proper anchor point height and lanyard length are critical.

110. A - After a fall arrest system catches a fall, remove it from service immediately. The shock load may have damaged components even if damage isn't visible. Equipment must be inspected by qualified person or manufacturer before reuse, or replaced. Never reuse fall protection after it's arrested a fall without proper inspection.

111. C - Lifelines are vertical or horizontal ropes or cables providing tie-off points for multiple workers or allowing movement while maintaining fall protection. Vertical lifelines hang down from anchors above; horizontal lifelines stretch between anchors allowing sideways movement while staying protected.

112. B - Tie-off points must be secure anchors capable of supporting 5,000 pounds per attached worker (or certified system anchors rated for their specific load). Never tie off to guardrails, pipes, ducts, or questionable points. Proper anchorage is life-or-death critical.

113. D - Fall protection anchors must support 5,000 lbs per attached worker or maintain 2:1 safety factor under maximum arrest force. This accounts for dynamic forces generated when fall arrest systems catch falling workers. Insufficient anchor strength means the anchor fails and you hit the ground.

114. A - Shock-absorbing lanyards contain internal energy absorbers (usually tearing or deforming elements) that stretch during fall arrest, reducing peak forces on your body. Without shock absorption, stopping suddenly generates tremendous forces causing injury. The absorber deploys once then must be replaced.

115. C - Store power tools clean and dry in secure locations protecting them from damage, weather, theft, and unauthorized use. Dirty tools with sawdust and concrete dust accumulate moisture causing corrosion and electrical problems. Clean tools before storing and keep them locked up.

116. B - GFCIs on power tools protect against electric shock by detecting ground faults (current leaking to ground through you) and shutting off power in milliseconds. Wet conditions, damaged cords, and tool malfunctions can cause ground faults. GFCIs prevent electrocutions in these situations.

117. D - The third prong (ground pin) on power tool plugs connects the tool's metal housing to ground. If internal wiring shorts to the case, ground carries current safely away tripping the breaker instead of electrocuting you. Never remove ground pins—that's removing your protection.

118. A - Inspect power tools before every use checking for damaged cords, loose parts, damaged guards, or other defects. Don't use damaged tools. Catching problems early prevents injuries. Regular inspections are simple but critical safety practice.

119. C - Lockout/tagout controls hazardous energy during equipment servicing by shutting off power, locking switches in off position, and tagging them so no one can turn equipment on while someone's working on it. Accidental startups kill and injure workers every year. Proper LOTO prevents these tragedies.

120. B - Before servicing electrical equipment, disconnect power, lock the disconnect in off position with your lock, tag it explaining why it's locked, then test with meter to verify power is actually off. Never trust switches or breakers—always test. Assume equipment is energized until proven otherwise.

121. D - Confined space entry means entering spaces with limited or restricted entry/exit, not designed for continuous human occupancy—tanks, manholes, tunnels, pits, silos, or crawl spaces. These spaces often have atmospheric hazards and special entry procedures are required.

122. B - Confined space attendants remain outside monitoring entrants, maintaining communication, tracking who's inside, preventing unauthorized entry, and initiating rescue if problems develop. Attendants never enter the space. They're the lifeline for workers inside.

123. C - Confined spaces can have oxygen deficiency (suffocation risk), toxic gases (poisoning), or flammable atmospheres (explosion/fire). Normal air is 20.9% oxygen—below 19.5% causes impairment, below 16% causes death. Spaces must be tested before entry and monitored continuously.

124. B - Cutting concrete or masonry generates crystalline silica dust requiring respirators (N95 minimum for short exposure, half-face or full-face for extended work), safety glasses, hearing protection (saws are loud), and gloves. Silica dust causes silicosis, an incurable lung disease. Water suppression and dust collection reduce exposure.

125. D - Crystalline silica is hazardous component of concrete, brick, stone, and mortar. Cutting, grinding, or drilling these materials creates respirable silica dust (tiny particles reaching deep into lungs). Chronic exposure causes silicosis (scarred lungs), lung cancer, and other serious diseases. OSHA now strictly regulates silica exposure requiring exposure controls.