PRACTICE EXAM 8: TRADE SIMULATION (100 QUESTIONS)

Time Limit: 240 Minutes | Passing Score: 70%

Residential weighting. This exam emphasizes residential field scenarios, material calculations, troubleshooting, and IRC code application distinct from Exam 7.

SITEWORK (Questions 1–17)

1. A contractor excavates for a residential foundation and encounters groundwater seeping into the trench from the sidewalls. Before workers enter the excavation, the contractor must address the water by taking which action?

A. Covering the seeping areas with plastic sheeting and continuing

B. Dewatering the trench and implementing precautions to prevent soil destabilization

C. Waiting twenty-four hours for the water to recede naturally

D. Backfilling the trench and relocating the foundation to avoid the water

2. A residential lot drains toward the neighboring property to the south. Before construction, the contractor must ensure that post-construction drainage does not increase runoff to the neighboring property. This obligation is based on what legal principle?

A. The building code requirement for zero-runoff construction sites

B. The OSHA stormwater management regulation for residential projects

C. The municipal landscaping ordinance governing residential water features

D. The common law principle that property owners may not divert surface water to damage neighbors

3. A contractor is performing a soil bearing test for a residential footing using a hand-held penetrometer. The reading indicates 1.2 tons per square foot on undisturbed soil. Under OSHA's excavation safety soil classification, this soil is classified as what type?

A. Type A soil with a maximum slope of three-quarter to one

B. Type C soil requiring a maximum slope of one and one-half to one

C. Type B soil with a maximum slope of one to one

D. Stable rock allowing vertical excavation without sloping

4. The IRC requires exterior wood columns supporting residential porches and carports to be set on pedestals that raise the wood a minimum of what distance above exposed earth?

A. Eight inches above exposed earth and one inch above exposed concrete

B. Four inches above exposed earth with no minimum above concrete

C. Six inches above exposed earth and three inches above concrete

D. Twelve inches above exposed earth for all exterior applications

5. A residential construction site has a slope greater than three to one descending toward the proposed building. The IRC requires the foundation to extend to a minimum depth measured from a line drawn at what angle from the bottom of the adjacent footing?

A. A vertical line directly down from the edge of the footing

B. A horizontal line extending from the base of the higher footing

C. A thirty-degree angle from the bottom of the footing into the slope

D. A forty-five-degree line extending downward from the bottom edge of the adjacent footing

6. A contractor discovers an abandoned underground fuel oil tank during residential excavation. What is the contractor's immediate obligation?

A. Remove the tank and dispose of it at a licensed hazardous waste facility

B. Fill the tank with sand and continue construction over it

C. Stop work in the area, secure the site, and notify the property owner and appropriate environmental authorities

D. Puncture the tank to drain any remaining contents before removing it

7. When installing a residential foundation drain (French drain) around the perimeter of a footing, the drain pipe must be placed at what location relative to the footing?

A. On top of the footing with gravel covering the pipe and footing

B. At the same elevation as the top of the footing for maximum interception

C. At or below the bottom of the footing to intercept water before it rises to the slab level

D. Twelve inches below the bottom of the footing for all soil conditions

8. Compaction testing for residential fill is typically performed using which standard laboratory test method?

A. The Standard Proctor test (ASTM D698) is commonly used for residential applications

B. The Standard Proctor test (ASTM D698) for residential and the Modified Proctor (ASTM D1557) for commercial

C. The California Bearing Ratio test (CBR) for all residential applications

D. The unconfined compression test for cohesive residential fill materials

9. A contractor is installing a residential driveway approach where the driveway meets the public sidewalk. The maximum cross-slope on the sidewalk must not exceed what value to maintain ADA accessibility?

A. One-quarter inch per foot for all public sidewalk surfaces

B. One percent slope for sidewalks adjacent to residential driveways

C. Three percent slope for residential neighborhood sidewalks

D. Two percent maximum cross-slope for ADA-accessible routes

10. The IRC requires dampproofing on the exterior of residential foundation walls that retain earth and enclose habitable or usable space below grade. Dampproofing must extend from the finished grade down to what level?

A. The top of the footing at the base of the foundation wall

B. Six inches below the finished interior floor level

C. The bottom of the gravel drainage layer adjacent to the footing

D. Twelve inches below the exterior finished grade level

11. A contractor is laying out a residential foundation using the 3-4-5 method to verify square corners. If the contractor uses a 9-12 triangle, what should the diagonal measurement be for a perfect right angle?

A. Fourteen feet as the calculated hypotenuse value

B. Sixteen feet for the diagonal of a 9-12 triangle

C. Fifteen feet confirming a true ninety-degree corner

D. Thirteen feet based on the standard formula

12. A residential lot has been cleared and grubbed. The topsoil has been stripped and stockpiled. Before placing structural fill, the contractor must prepare the exposed subgrade by performing which operation?

A. Covering the subgrade with a woven geotextile fabric layer

B. Proof-rolling the subgrade with loaded equipment to identify soft spots

C. Flooding the subgrade with water to consolidate the native soil

D. Applying a layer of quickite to chemically stabilize the native material

13. Residential building pads in Arizona often require over-excavation and replacement of native expansive clay with non-expansive fill. The typical replacement depth for this treatment extends how far below the finished floor elevation?

A. Twelve inches of non-expansive fill for all residential applications

B. Twenty-four inches for single-story and thirty-six inches for two-story

C. Six inches for lightly loaded slabs and patios only

D. The depth specified by the geotechnical engineer based on site-specific soil conditions

14. A contractor installs a residential retaining wall four feet high. The IRC requires a surcharge be considered when the retained soil supports additional loads. Which of the following is an example of a surcharge load?

A. The weight of the retained soil itself behind the wall

B. Rainfall that saturates the retained soil during monsoon season

C. Temperature changes causing thermal expansion in the wall

D. A driveway, structure, or other imposed load on the retained soil behind the wall

15. When a residential lot has a septic system, the minimum distance from the septic drain field to a private water well is what value?

A. One hundred feet as the standard minimum separation distance

B. Fifty feet for all residential well and drain field installations

C. Twenty-five feet when the soil percolation rate is acceptable

D. Seventy-five feet for wells serving a single-family residence

16. A contractor discovers that a residential lot has fill material of unknown origin and depth. Before constructing a foundation on this fill, what testing is required?

A. A simple visual inspection by the framing contractor is sufficient

B. No testing is required if the fill has been in place for more than five years

C. A geotechnical investigation to determine the fill composition, depth, compaction, and suitability for supporting the proposed foundation

D. A standard percolation test to measure the drainage characteristics

17. A residential project requires a concrete retaining wall three feet tall to create a level building pad. The wall will retain soil on one side. Under the IRC, does this wall require a building permit?

A. Retaining walls do not require permits regardless of height in residential zones

B. Permits are required only for retaining walls supporting a surcharge load

C. A permit is typically not required for retaining walls under four feet measured from the bottom of the footing to the top of the wall unless supporting a surcharge

D. All retaining walls require permits and engineering regardless of height

CONCRETE (Questions 18–34)

18. A contractor is pouring a residential monolithic slab foundation where the footing and slab are placed in a single pour. What is the primary advantage of this foundation type?

A. It eliminates the cold joint between a separately poured footing and slab

B. It provides a deeper frost-protected foundation than a stem wall

C. It allows the slab to be poured without reinforcement of any kind

D. It eliminates the need for compacted fill beneath the slab area

19. The IRC requires welded wire reinforcement (WWR) in residential slabs to be positioned where within the slab thickness?

A. In the lower third of the slab to resist tensile bending stress

B. At the exact mid-depth of the slab for balanced performance

C. At the bottom of the slab resting directly on the vapor barrier

D. In the upper third of the slab to control surface cracking

20. A contractor is placing concrete for a residential pool shell. Pool concrete is typically specified at what minimum compressive strength?

A. 2,000 psi for residential pool shell applications

B. 2,500 psi matching standard residential footing specifications

C. 3,000 psi or higher due to water exposure and structural demands

D. 4,500 psi matching commercial structural concrete specifications

21. A homeowner requests a decorative stamped concrete patio. The concrete must be placed at what minimum slump range to allow proper stamping before the surface sets?

A. One to two inches for a very stiff stamping-ready consistency

B. Four inches or higher to allow adequate working time for the stamp pattern

C. Eight to ten inches for maximum fluidity during the stamping operation

D. The concrete should have zero slump for the firmest possible stamp impression

22. A contractor pours a residential sidewalk four inches thick and forty feet long. At what maximum spacing should control joints be cut to control cracking?

A. Eight to ten feet on center for a four-inch sidewalk slab

B. Fifteen feet on center for all residential flatwork applications

C. Twenty feet on center for sidewalks with fiber reinforcement

D. Five feet on center for narrow sidewalk slabs under six feet wide

23. When pouring concrete against existing hardened concrete, the contractor must prepare the existing surface to achieve a proper bond. What preparation is required?

A. Apply a coat of curing compound to the existing surface before pouring

B. Smooth and polish the existing surface to create maximum contact area

C. Leave the existing surface dry and dusty for improved mechanical grip

D. Clean, roughen, and dampen the surface, and apply a bonding agent or use a cement slurry

24. A contractor is forming a residential concrete countertop. The concrete mix for this application typically uses what maximum aggregate size compared to standard structural concrete?

A. Standard three-quarter-inch aggregate matching foundation mixes

B. One-inch aggregate for improved surface texture and appearance

C. Three-eighths-inch or smaller aggregate for a smoother finish surface

D. No aggregate at all — countertop concrete uses only cement and sand

25. Residential concrete driveways in Arizona are subject to extreme thermal cycling. Which type of crack most commonly develops in driveways that lack adequate control joints?

A. Alkali-silica reaction cracks from reactive desert aggregate

B. Random shrinkage and thermal cracks forming at stress concentration points

C. Vertical shear cracks through the full slab depth at the edges

D. Radial cracks emanating from the center of each pour section

26. A contractor is installing anchor bolts in a residential stem wall foundation. The IRC requires anchor bolts to be placed within a maximum of twelve inches from each end of a sill plate. What is the minimum bolt embedment into the concrete?

A. Three and one-half inches to match the sill plate width

B. Five inches for residential foundations in non-seismic zones

C. Ten inches for all residential foundation applications

D. Seven inches as the IRC minimum embedment depth

27. A contractor discovers that fresh concrete delivered to the residential jobsite has a slump of seven inches when the specification calls for four inches. What does this indicate?

A. The concrete has more water than specified and may not achieve design strength

B. The concrete has less water than specified and is too stiff to place

C. The slump is within normal tolerance and the concrete is acceptable

D. The concrete has excessive air content from over-mixing in transit

28. A residential garage floor will support vehicle loads. The IRC requires a minimum slab thickness of what dimension for residential garage floors?

A. Two and one-half inches for light-vehicle residential garages

B. Five inches for garages that will support truck-class vehicles

C. Three and one-half inches as the standard minimum for residential garage floors

D. Six inches for all residential garage floor applications

29. A contractor is building residential concrete formwork for a stem wall. The forms must be strong enough to resist the lateral pressure of wet concrete. As a general rule, concrete exerts lateral pressure that increases with what factor?

A. The temperature of the concrete at the time of placement

B. The depth (head) of wet concrete within the form

C. The compressive strength specification of the mix design

D. The aggregate size used in the concrete mix design

30. A residential foundation plan shows a stepped footing to accommodate a change in grade. The IRC requires the step height to not exceed what fraction of the horizontal distance between steps?

A. One-half of the horizontal distance between steps at the base

B. One-quarter of the horizontal distance between grade changes

C. Three-quarters of the horizontal distance between steps

D. The vertical step must not exceed three-quarters of the footing depth with a two-foot minimum horizontal run

31. Concrete delivered to a residential site shows evidence of initial set — the surface is stiffening and the concrete is becoming difficult to work. The contractor should take what action?

A. Reject the load because once initial set begins, the concrete cannot be properly placed and finished

B. Add water to restore workability and proceed with placement

C. Add an accelerating admixture to speed the remaining cure time

D. Vibrate the concrete extensively to break down the initial set

32. A residential stem wall foundation has a horizontal construction joint where the stem wall meets the footing below. To provide shear resistance at this joint, the IRC requires what treatment?

A. A smooth, painted surface for clean appearance at the joint line

B. Application of a bond-breaking agent to allow independent movement

C. A roughened surface, keyway, or dowels to provide mechanical interlock

D. A flexible sealant applied at the joint to accommodate thermal movement

33. A contractor is placing concrete for a residential swimming pool deck in a color other than standard gray. Colored concrete is achieved by adding what material to the mix?

A. A topical stain applied after the concrete has fully cured

B. Integral pigment blended into the concrete during batching

C. A colored sealer applied over the finished concrete surface

D. Colored aggregate selected for the specific color desired

34. When concrete test cylinders fail to meet the specified compressive strength at twenty-eight days, the concrete in the structure may still be evaluated for adequacy using what field testing method?

A. A visual inspection by the building inspector is sufficient

B. Rebound hammer testing of the surface hardness only

C. Core extraction through the full slab depth and testing

D. Core samples drilled from the structure and tested in a laboratory

MASONRY (Questions 35–43)

35. A residential contractor is selecting mortar for an above-grade exterior garden wall that will not support structural loads. Which mortar type provides adequate strength with maximum workability for this application?

A. Type N mortar for non-load-bearing above-grade exterior applications

B. Type M mortar for maximum compressive strength in all applications

C. Type S mortar for structural walls with high lateral load requirements

D. Type O mortar restricted to interior non-load-bearing walls only

36. A residential masonry fireplace firebox must be lined with a minimum thickness of what material to withstand direct flame exposure?

A. Standard red clay brick mortared with Type S mortar

B. Two inches of firebrick or equivalent fire-resistant refractory material

C. Four inches of standard CMU with perlite-filled cores

D. One and one-half inches of cast-in-place refractory concrete

37. A residential block wall develops a horizontal crack at the mid-height of the wall. This crack pattern most commonly indicates what structural condition?

A. Normal thermal expansion and contraction of the masonry units

B. Efflorescence buildup creating internal pressure in the wall

C. Inadequate mortar strength causing adhesion failure between courses

D. Lateral pressure from retained soil or wind exceeding the wall's bending capacity

38. A contractor is building a residential CMU retaining wall. The IRC requires specific minimum reinforcement for retaining walls. Vertical reinforcement in a four-foot-high retaining wall must be a minimum of what size at what maximum spacing?

A. Standard reinforcement per the IRC retaining wall tables is typically No. 4 bars at forty-eight inches on center for short walls

B. No. 4 bars at forty-eight inches on center for all retaining wall heights

C. No. 5 bars at thirty-two inches on center for walls over three feet

D. No. 6 bars at twenty-four inches on center for all retaining walls

39. When installing a residential masonry veneer over a wood-framed wall, the bottom course of veneer must bear on what support?

A. A concrete or masonry foundation ledge or a steel lintel angle anchored to the foundation

B. The wood sill plate at the base of the framed wall assembly

C. The bottom plate of the wood-framed wall with metal clips

D. Compacted gravel directly on the ground with a moisture barrier

40. A contractor is constructing a residential masonry chimney. The minimum clear airspace between the chimney masonry and any combustible material such as wood framing is what dimension?

A. One-half inch for masonry chimneys with fire-clay liner

B. One inch for all chimney-to-combustible clearances

C. Two inches between the chimney exterior and any combustible framing

D. Four inches for chimneys serving wood-burning fireplaces

41. A residential concrete block wall has been completed and the mortar is still green (not fully cured). A rainstorm is approaching. What should the contractor do to protect the wall?

A. Apply a liquid sealer to the mortar joints immediately

B. Do nothing because rain has no effect on green mortar

C. Speed up the cure by applying heat to the wall surface

D. Cover the top of the wall with plastic or tarps to prevent rain from washing out fresh mortar

42. The minimum lap splice length for vertical No. 4 rebar in a grouted residential CMU wall is typically what dimension?

A. Thirty inches for standard residential applications

B. Forty-eight inches as the standard for all grouted masonry

C. Fifteen diameters of the bar being spliced regardless of size

D. Twenty-four inches for No. 4 bars in low-stress conditions

43. A residential masonry wall is to receive a stucco finish. Before applying stucco directly to the CMU surface, the contractor must prepare the wall by performing what operation?

A. Dampening the wall surface to prevent the CMU from absorbing water from the stucco mix

B. Sealing the wall with a liquid waterproofer before applying stucco

C. Installing metal lath over the entire CMU surface before applying stucco

D. Grinding the wall surface smooth to ensure uniform stucco thickness

METAL FRAMING (Questions 44–49)

44. CFS wall studs designated for load-bearing applications have a "S" in their designation (e.g., 600S162-54). What does the "S" indicate?

A. The stud is manufactured from stainless steel for corrosion resistance

B. The stud is classified as a standard-duty member for light loads

C. The member is a stud or joist section with lip stiffeners on the flanges

D. The stud meets seismic requirements for high-seismic design zones

45. When CFS studs are used in an exterior load-bearing wall, the stud spacing must match the spacing of the roof framing above for proper load transfer. What is the standard maximum stud spacing?

A. Twenty-four inches on center for single-story walls under standard conditions

B. Sixteen inches on center for all load-bearing exterior applications

C. Twelve inches on center for two-story CFS construction

D. Twenty-four inches on center for all CFS wall applications

46. CFS framing screws must penetrate the receiving member by a minimum of how many threads for a standard connection?

A. Three exposed threads beyond the connected material

B. Five exposed threads for all structural CFS connections

C. One full thread beyond the receiving member for non-structural

D. Seven exposed threads for exterior weather-exposed connections

47. When installing CFS studs in a load-bearing wall, the studs must be aligned vertically with the floor framing below and the roof framing above. This alignment is called what?

A. Racking resistance ensuring lateral stability of the wall assembly

B. In-line framing ensuring direct load transfer from roof to foundation

C. Shear continuity maintaining the diaphragm action of the wall

D. Thermal alignment preventing heat transfer through the assembly

48. CFS headers in load-bearing walls are typically designed as back-to-back members with a track connecting top and bottom. What additional component is required at each end of the header?

A. A wood nailer block for attaching interior finish materials

B. A galvanized steel gusset plate for moment resistance

C. Jack studs (cripples) transferring the header load to the bottom track

D. Steel angle brackets connecting the header to the king studs

49. Exterior CFS wall sheathing serves what structural function in addition to providing a nailing base for weather-resistive barriers?

A. Acting as a shear panel (diaphragm) to resist lateral wind and seismic forces

B. Providing thermal insulation between the exterior and interior environments

C. Supporting the weight of the exterior cladding material independently

D. Preventing moisture from reaching the CFS studs behind the sheathing

CARPENTRY (Questions 50–66)

50. A contractor is installing floor joists that cantilever beyond the foundation wall to support a bump-out. The IRC limits the cantilever distance to what fraction of the joist span for conventional framing?

A. One-fourth of the actual adjacent joist span for standard loading

B. One-half of the adjacent joist span for residential applications

C. One-sixth of the adjacent span for two-story construction

D. One-third of the adjacent span for single-story bump-outs

51. A contractor notices that dimensional lumber delivered to the job has a moisture content stamp of "S-GRN." What does this designation mean?

A. The lumber has been surfaced after seasoning to nineteen percent or below

B. The lumber was surfaced green (unseasoned) at a moisture content above nineteen percent

C. The lumber has been graded for structural green-rated applications

D. The lumber has been chemically treated with a green preservative

52. In wood frame floor construction, blocking between joists at the bearing points serves which structural purpose?

A. Providing attachment points for interior partition walls above

B. Creating a pathway for mechanical and plumbing installations

C. Preventing joist rotation and distributing concentrated loads at supports

D. Supporting the bottom edge of the subfloor panels at the bearing line

53. A contractor is framing a residential gable end wall. The top plate of the gable wall must be cut to match the roof pitch. What type of cut is this?

A. A square cut perpendicular to the wall plate at every stud

B. A compound miter cut at the ridge intersection only

C. A plumb cut at each rafter location along the gable wall

D. A bevel cut matching the roof slope angle across the top plate

54. The maximum notch depth permitted in the top or bottom edge of a 2×10 floor joist is what dimension?

A. One-sixth of the joist depth, and notches are permitted only in the outer one-third of the span

B. One-quarter of the joist depth at any location along the span

C. One-half of the joist depth at the bearing points only

D. One-third of the joist depth at the center one-third of the span

55. A contractor is installing a beam pocket in a residential foundation wall. The minimum bearing length for a wood beam in a masonry or concrete pocket is what dimension?

A. One and one-half inches matching the joist bearing minimum

B. Three inches minimum on masonry or concrete supports

C. Two inches for beams carrying floor loads only

D. Six inches for all beam pocket applications

56. Engineered wood products such as LVL, PSL, and LSL all share what common manufacturing characteristic?

A. All three are made from small wood elements bonded with structural adhesive under pressure

B. All use solid wood layers similar to traditional plywood construction

C. All use reconstituted wood fiber pressed into standard dimensions

D. All are manufactured from recycled lumber and reclaimed materials

57. A contractor is framing a hipped roof. The jack rafters connecting the hip rafter to the wall plate must be cut with what type of compound angle at the hip rafter end?

A. A compound cut combining a plumb cut and a side (cheek) cut to fit against the hip rafter

B. A simple square cut perpendicular to the length of the jack rafter

C. A single bevel cut matching the roof pitch angle only

D. A dado cut that notches into the hip rafter for a mechanical connection

58. The IRC requires cripple studs below a window sill to transfer loads from the sill down to the bottom plate. These cripples must be spaced at what maximum interval?

A. Twelve inches on center regardless of the stud spacing in the wall

B. Thirty-two inches on center for non-load-bearing partition walls

C. Twenty-four inches on center for all window cripple installations

D. The same spacing as the wall studs so that each cripple aligns with the stud pattern

59. A contractor is installing subflooring over floor joists. The subfloor panels must be staggered so that end joints in adjacent rows do not fall on the same joist. What is the reason for this staggering requirement?

A. To create a more attractive appearance on the exposed underside

B. To prevent a continuous weak line across the floor that could concentrate stress and cause deflection

C. To reduce material waste by allowing random-length panels to be used

D. To simplify the installation of underlayment in the next phase

60. A contractor is framing an interior non-load-bearing partition wall. Under the IRC, can this wall be framed with single top plate construction?

A. No, all walls require double top plates regardless of bearing condition

B. Yes, but only if the partition height does not exceed eight feet

C. Yes, a single top plate is permitted on non-load-bearing partitions

D. No, non-load-bearing walls require triple top plates for lateral stability

61. When framing a load-bearing wall over a header below, the king studs flanking the header extend from the bottom plate to where?

A. The full height from the bottom plate to the top plate of the wall

B. From the bottom plate to the top of the header only

C. From the bottom plate to the underside of the top plate above

D. From the bottom plate to the ceiling joist level above

62. A contractor is installing a residential stairway with a total floor-to-floor height of nine feet two inches (110 inches). Using a riser height of 7½ inches, how many risers are needed?

A. Thirteen risers producing a final height of 97.5 inches

B. Fourteen risers with some adjustment needed to equalize heights

C. Sixteen risers producing a unit rise of 6.875 inches each

D. Fifteen risers producing a unit rise of approximately 7.33 inches each

63. Glulam beams are manufactured from individual lumber laminations bonded with structural adhesive. The standard lamination thickness for most glulam beams is what dimension?

A. One inch nominal matching standard board thickness

B. One and one-half inches matching the thickness of standard 2× lumber

C. Two inches nominal for heavy timber classification

D. Three-quarters of an inch for residential span applications

64. A contractor is installing lookout rafters to support the roof overhang (soffit) at a gable end. These lookouts are typically supported by what framing configuration?

A. Cantilevered from the last common rafter to the gable end wall

B. Hung from the ridge board using metal joist hangers

C. Nailed to the gable end studs and cantilevered beyond the wall to support the fascia and soffit

D. Supported by a continuous ledger board attached to the gable wall sheathing

65. A residential building has a cathedral ceiling (vaulted ceiling following the roof slope). What framing approach provides the required insulation depth without increasing the rafter size?

A. Using raised heel (energy) trusses that provide full insulation depth at the eave

B. Reducing the insulation requirement by one R-value class for cathedral ceilings

C. Installing rigid foam insulation beneath the rafters to supplement cavity insulation

D. Using only spray foam insulation with no ventilation above the insulation

66. The IRC requires bearing wall studs supporting one floor, a roof, and a ceiling to be a minimum of what size when spaced at sixteen inches on center?

A. 2×6 for all bearing walls supporting more than one floor

B. 2×4 studs are permitted for bearing walls supporting one floor, roof, and ceiling at sixteen inches on center

C. 2×8 studs for walls in excess of ten feet in height

D. 2×6 minimum for all exterior walls regardless of loading

THERMAL AND MOISTURE PROTECTION (Questions 67–78)

67. Spray polyurethane foam (SPF) insulation applied to the underside of roof sheathing in a residential attic converts the attic to what type of space?

A. An unvented conditioned attic that is part of the building's thermal envelope

B. A vented attic with improved fire resistance at the roof deck

C. An unconditioned storage area with enhanced moisture protection

D. A conditioned living space that requires separate egress windows

68. The IRC requires a Class I or II vapor retarder on the interior side of insulated frame walls in Climate Zones 5 through 8. In Arizona's Climate Zone 2, what is the vapor retarder requirement?

A. A Class III vapor retarder (latex paint) is permitted with no additional vapor barrier required

B. A Class I polyethylene vapor barrier is required on all exterior walls

C. A Class II kraft-faced insulation batt is required for all exterior walls

D. No vapor retarder of any class is required in Climate Zone 2

69. A residential roof assembly must provide adequate ventilation between the insulation and the roof sheathing in a vented attic. The minimum clear airspace above the insulation at the eaves must be what dimension?

A. One-half inch between the top of the insulation and the sheathing

B. Two inches to allow unrestricted airflow from soffit to ridge

C. One inch minimum above the insulation at the eave area

D. No minimum airspace is required if soffit vents are installed

70. A contractor is installing batt insulation in an exterior wall. The insulation must fill the cavity completely without being compressed. Why does compression reduce insulation performance?

A. Compressed insulation loses its fire-resistant rating classification

B. Compression reduces the insulation's trapped air pockets, lowering its R-value per inch

C. Compressed batts create gaps at the top and bottom of each cavity

D. Compression causes the insulation to absorb moisture from the wall

71. Radiant barrier products installed in residential attics in Arizona reduce cooling loads by reflecting what type of heat transfer?

A. Conductive heat flowing through the roof structural framing

B. Convective heat circulating through the attic air space

C. Latent heat from moisture evaporating in the attic space

D. Radiant heat (infrared radiation) emitted from the hot underside of the roof deck

72. The minimum headlap for asphalt shingles installed on a residential roof is what dimension?

A. Two inches of headlap exposing five inches of each shingle course

B. Four inches of headlap for standard three-tab shingle installation

C. Six inches of headlap for all architectural shingle products

D. One inch of headlap for steep-slope applications above 12:12

73. Roof ventilation in a residential attic prevents moisture accumulation and reduces heat buildup. The IRC requires a balanced ventilation system with intake vents at the eaves and exhaust vents near the ridge. What is the minimum net free area ratio?

A. 1/100 of the attic floor area for intake vents only

B. 1/300 of the attic floor area with balanced intake and exhaust distribution

C. 1/300 of the attic floor area when balanced with at least fifty percent high and remainder low

D. 1/500 of the attic floor area for houses with radiant barriers

74. A contractor is applying self-adhering ice and water shield membrane at a roof valley before installing shingles. The membrane should extend how far on each side of the valley centerline?

A. Six inches on each side of the valley centerline

B. A minimum of twenty-four inches on each side of the valley centerline

C. Twelve inches on each side of the valley centerline

D. Eighteen inches on each side for residential roof valleys

75. A residential exterior wall assembly in Arizona uses stucco over wood framing. Between the stucco and the wall sheathing, what layer must be installed?

A. Two layers of building paper or one layer of housewrap as the WRB

B. A single layer of reinforced polyethylene sheeting

C. One layer of foil-faced insulation board as a reflective barrier

D. Two layers of Grade D building paper and a drainage mat

76. Flashing around a residential plumbing vent pipe penetrating the roof is typically provided by what component?

A. A sheet metal cone wrapped around the pipe with roofing cement

B. A lead or rubber pipe collar (boot) that slides over the pipe and integrates with the shingle courses

C. A neoprene gasket compressed around the pipe by a metal clamp

D. A field-fabricated copper flashing soldered around the pipe circumference

77. The IRC requires insulation to be in contact with the air barrier in a residential wall assembly. Why is this contact important?

A. It prevents convective loops within the insulation cavity that bypass the thermal resistance

B. It improves the fire rating of the wall assembly by eliminating air gaps

C. It prevents insects from nesting between the insulation and the air barrier

D. It reduces construction costs by eliminating the need for separate air sealing

78. A contractor installing a residential hot water solar panel system on the roof must flash the mounting brackets to prevent leaks. The flashing for roof-mounted equipment must be integrated with which building component?

A. The attic ventilation system to prevent moisture from entering the ridge

B. The roof underlayment and shingle courses to maintain the waterproof roof plane

C. The roof truss top chord to provide structural attachment for the panels

D. The gutter system to redirect any leakage away from the foundation

DOORS AND WINDOWS (Questions 79–85)

79. A residential bedroom window on the second floor measures twenty inches wide by twenty-six inches tall when open. Does this window meet the IRC emergency egress requirements?

A. The minimum clear width is twenty inches which is met, but the clear height must be at least twenty-four inches and the total area must be at least 5.7 square feet — this window does not meet the area requirement

B. The window exceeds all emergency egress requirements for upper floors

C. The window meets the width and height but fails the sill height requirement

D. No, because the window fails both the width and the total area requirements

80. A double-hung window operates by what mechanism?

A. Both sashes slide vertically within the window frame with balance systems

B. The lower sash slides vertically and the upper sash is fixed in place

C. Both sashes swing outward on pivot hinges at the center of each sash

D. The lower sash tilts inward and the upper sash slides horizontally

81. Vinyl window frames provide better thermal performance than standard aluminum frames because of what material property?

A. Vinyl is a stronger material that resists wind pressure more effectively

B. Vinyl has a higher R-value per inch than aluminum, reducing thermal conduction

C. Vinyl has inherently low thermal conductivity compared to aluminum

D. Vinyl frames are manufactured with thicker wall sections than aluminum

82. An exterior door in a residential garage that opens into the dwelling must swing in which direction for fire safety?

A. Outward into the garage so smoke pressure keeps the door closed

B. Either direction because the IRC does not specify swing direction for this door

C. Inward into the dwelling so the door can be easily closed from inside

D. The door must swing toward the dwelling interior as required by fire separation codes

83. Low-E glass coating on residential windows in Arizona is applied to which surface of a double-pane IGU to maximize energy performance in a cooling-dominated climate?

A. Surface 2 (the interior face of the exterior pane) to reflect solar heat before it enters

B. Surface 1 (the exterior face of the exterior pane) for maximum durability

C. Surface 3 (the exterior face of the interior pane) for balanced performance

D. Surface 4 (the interior face of the interior pane) to reduce heat loss in winter

84. The IRC requires a landing on each side of an exterior door. The minimum landing width measured in the direction of travel must be at least what dimension?

A. Thirty-six inches as the minimum landing dimension in the direction of travel

B. Thirty-six inches or the width of the door served, whichever is greater

C. Twenty-four inches for the exterior landing at the entry door

D. Forty-eight inches for the primary entry door landing

85. A sliding window (horizontal slider) has one fixed pane and one operable pane. For this window to meet egress requirements, the operable pane must provide what minimum dimensions?

A. Twenty-inch width by twenty-four-inch height with 5.0 sq ft area at ground floor

B. Twenty-four-inch width by twenty-inch height for all floor levels

C. Twenty-inch width by twenty-four-inch height for the operable section

D. The same minimums as any egress window: twenty-inch width, twenty-four-inch height, and 5.7 or 5.0 sq ft clear area

FINISHES (Questions 86–94)

86. When installing drywall on a residential ceiling, the long dimension of the panels should be oriented in what direction relative to the framing?

A. Parallel to the ceiling joists for faster and easier installation

B. At a forty-five-degree angle to the framing for diagonal bracing

C. Perpendicular to the ceiling joists to span across multiple framing members

D. In any direction as long as all end joints fall on framing members

87. A contractor is applying texture to a residential ceiling. The most common residential ceiling texture in the Southwest is what type?

A. Orange peel or knockdown texture applied with a hopper gun and flattened

B. Popcorn (acoustic) texture applied with a heavy aggregate spray

C. Smooth Level 5 finish with no texture applied to the surface

D. Skip trowel texture applied with a curved drywall knife by hand

88. Residential bathroom floors that will receive ceramic tile must have a substrate that resists moisture. When the subfloor is plywood, what additional layer is recommended before tiling?

A. Cement backer board or an uncoupling membrane installed over the plywood

B. An additional layer of plywood to increase thickness and stiffness

C. A coat of latex paint to seal the plywood surface before applying thinset

D. Self-leveling compound poured directly on the plywood subfloor

89. When painting the exterior of a residential stucco wall, the stucco must cure for a minimum period before paint is applied. What is the typical minimum curing time?

A. Seven days for latex paint and fourteen days for oil-based paint

B. Fourteen days for all paint types applied to new stucco surfaces

C. Twenty-eight days or longer before applying paint to new stucco

D. Forty-eight hours for quick-cure stucco products in arid climates

90. A contractor installs carpet in a residential bedroom over a concrete slab. What component must be installed between the carpet pad and the concrete to prevent moisture damage?

A. A layer of roofing felt paper as a basic moisture barrier

B. A wool carpet pad that naturally resists moisture wicking

C. Adhesive applied directly to the concrete to bond the pad permanently

D. A polyethylene moisture barrier to prevent moisture vapor from reaching the carpet pad

91. Residential interior doors are typically what thickness?

A. One and three-eighths inches (1⅜") as the standard interior door thickness

B. One and three-quarters inches (1¾") matching exterior door standards

C. One inch (1") for lightweight hollow-core interior doors

D. One and one-half inches (1½") for all interior residential applications

92. A contractor is installing wood baseboard and finds that the drywall corner bead creates a slightly raised edge at the outside corner. What carpentry technique resolves this fitting problem?

A. Sanding the corner bead flat with the wall surface before painting

B. Scribing and back-cutting the baseboard to fit over the raised corner

C. Applying additional joint compound to build up the wall flush with the bead

D. Using a wider baseboard that bridges over the raised corner profile

93. A contractor is staining a residential concrete floor with an acid-based chemical stain. The floor must be prepared before staining by removing what surface contaminant?

A. Paint drips and adhesive residue that will not accept the stain

B. Dust and loose debris using only a dry broom and vacuum

C. Curing compound, sealers, and any other surface coating that would prevent the acid from reacting with the concrete

D. Only visible oil stains using a commercial degreaser product

94. The building code requires a minimum ceiling height of what dimension in habitable rooms of a residential dwelling?

A. Eight feet six inches for rooms larger than two hundred square feet

B. Seven feet six inches for kitchens, bathrooms, and hallways

C. Seven feet as the minimum for habitable rooms under the IRC

D. Seven feet for habitable rooms with allowances for beams and sloped ceilings

SAFETY (Questions 95–100)

95. A residential contractor's employee is working alone on a roof installing shingles. The eave height is fourteen feet above grade. Under OSHA, what fall protection is required?

A. No protection required because only one worker is present on the roof

B. Fall protection is required because the worker is more than six feet above a lower level

C. Fall protection is required only if two or more workers are on the roof simultaneously

D. No protection required below fifteen feet for roofing work activities

96. Portable fire extinguishers on residential construction sites must be placed within what maximum travel distance from each work area?

A. One hundred feet of travel distance as the OSHA standard

B. Fifty feet of travel distance for all construction work areas

C. Twenty-five feet of travel distance for areas involving hot work

D. Seventy-five feet of travel distance from each floor level

97. Under OSHA, trenches and excavations must be inspected by a competent person at what frequency during active work?

A. Weekly with documentation filed in the project safety log

B. Monthly with reports submitted to the OSHA area office

C. Once at the beginning of the project before any excavation work

D. Daily and after every rainstorm, vibration event, or other hazard-increasing occurrence

98. A residential construction worker is cutting concrete with a masonry saw. What PPE is required for this operation?

A. Safety glasses only if the saw has a blade guard installed

B. Hard hat and steel-toed boots as the minimum for all saw operations

C. Eye protection, hearing protection, and respiratory protection for silica dust

D. Eye protection only because the water spray controls the dust

99. Extension cords used on residential construction sites must be inspected before each day's use. What condition makes an extension cord unsafe for use?

A. The cord is longer than fifty feet from the power source

B. Damaged insulation, missing ground prong, or exposed conductors

C. The cord is rated for indoor use only but is being used outdoors

D. The cord gauge is smaller than the tool manufacturer's recommendation

100. A residential contractor stores lumber and construction materials on the jobsite. OSHA requires stored materials to be arranged to prevent what hazard?

A. Sliding, falling, or collapse that could endanger workers

B. Interference with the public sidewalk or neighboring property

C. Damage from sprinkler systems or building fire suppression

D. Exposure to ultraviolet radiation causing material degradation

PRACTICE EXAM 8: ANSWER KEY AND EXPLANATIONS

1. B — Groundwater seeping into an excavation must be controlled by dewatering before workers enter, and precautions must be taken to prevent the flowing water from destabilizing the trench walls. OSHA requires the competent person to evaluate water conditions and implement controls such as pumps, well points, or special support systems before entry.

2. D — The common law principle that property owners may not divert surface water to damage neighboring properties governs residential drainage design. Post-construction grading must be designed so that runoff volume and flow rates to adjacent properties do not increase over pre-construction conditions.

3. C — An unconfined compressive strength of 1.2 tsf falls within the Type B range (0.5 to 1.5 tsf) for undisturbed soil. Type B soil requires a maximum allowable slope of 1H:1V (one horizontal to one vertical) at a 45-degree angle. Type A requires 1.5 tsf or greater, and Type C is below 0.5 tsf.

4. A — The IRC requires exterior wood columns on pedestals to be raised a minimum of eight inches above exposed earth and one inch above exposed concrete or masonry. This clearance prevents direct wood-to-soil contact that would cause decay and termite damage at the column base.

5. D — On sloped lots, the IRC requires the foundation to extend below a 45-degree line drawn downward from the bottom edge of the adjacent footing. This ensures the deeper foundation is not undermined by the slope and provides adequate lateral soil support.

6. C — Discovery of an abandoned underground fuel tank requires immediate work stoppage, site securing, and notification of the property owner and environmental authorities. Underground tanks may contain hazardous residues that require professional assessment and remediation under environmental regulations.

7. C — The perimeter drain pipe must be placed at or below the bottom of the footing to intercept groundwater before it rises to the level of the basement slab or crawlspace floor. A pipe placed higher than the footing bottom cannot intercept water that enters below the footing.

8. B — The Standard Proctor test (ASTM D698) is the standard method for establishing maximum dry density and optimum moisture content for residential fill. Field compaction results are compared to the laboratory maximum to verify that the specified percentage of compaction has been achieved.

9. D — ADA-accessible routes including public sidewalks must have a maximum cross-slope of two percent (approximately ¼ inch per foot). This prevents persons in wheelchairs from being pulled off the path by gravity. Residential driveway approaches must maintain this limit where they cross pedestrian routes.

10. A — Dampproofing on residential foundation walls must extend from the finished grade down to the top of the footing. This continuous coverage prevents moisture from penetrating the foundation wall throughout the zone of earth contact and directs water downward to the perimeter drain.

11. C — A 9-12-15 triangle is a scaled multiple of the 3-4-5 right triangle (multiplied by three). The diagonal measurement should be exactly fifteen feet for a perfect ninety-degree corner. This method is the most reliable field technique for verifying square corners during foundation layout.

12. B — Proof-rolling the subgrade with a loaded dump truck or heavy roller identifies soft spots, organics, or areas of inadequate bearing capacity that must be corrected before fill placement. Soft areas will visibly deflect or rut under the equipment, revealing conditions that could cause future settlement.

13. D — The depth of over-excavation and replacement with non-expansive fill must be determined by a geotechnical engineer based on the site-specific soil characteristics, moisture conditions, and building loads. There is no universal depth — the engineer calculates the required treatment based on the soil's expansion potential and the structural tolerance of the foundation.

14. D — A surcharge load is any additional weight imposed on the retained soil beyond the soil's own weight. Driveways, structures, parked vehicles, and material stockpiles are common surcharges that increase the lateral pressure on the retaining wall and must be accounted for in the wall design.

15. A — The standard minimum separation between a private well and a septic drain field is one hundred feet. This distance prevents contamination of the well water by effluent from the drain field. Shorter distances may apply to the septic tank itself, but the drain field requires the full one-hundred-foot setback.

16. C — Fill of unknown origin requires a geotechnical investigation to determine its composition, depth, compaction state, and suitability for supporting the proposed foundation. Building on untested fill risks differential settlement, structural cracking, and potential foundation failure.

17. B — The IRC generally does not require a permit for retaining walls that are not over four feet in height measured from the bottom of the footing to the top of the wall, unless the wall supports a surcharge such as a driveway, structure, or sloped soil above. A three-foot wall without surcharge typically falls below the permit threshold.

18. A — A monolithic slab foundation eliminates the cold joint that forms between a separately poured footing and slab. The single continuous pour creates a seamless connection between the thickened edge (footing) and the interior slab, reducing the risk of water infiltration and differential movement at the joint.

19. D — Welded wire reinforcement in residential slabs should be positioned in the upper third of the slab to control surface cracking. WWR placed on the ground and stepped on during the pour ends up at the bottom of the slab where it provides no crack control benefit for the surface.

20. C — Residential pool shells are typically specified at a minimum of 3,000 psi due to the permanent water exposure, hydrostatic pressure, and chemical contact from pool water treatment. Some specifications require 3,500 psi or higher for enhanced durability in the harsh pool environment.

21. B — Stamped concrete requires a slump of four inches or higher to provide adequate working time for placing the stamp mats and imprinting the pattern before the surface becomes too stiff. A too-stiff mix will not accept the stamp impression, and a too-fluid mix will not hold the pattern.

22. A — Control joints in a four-inch residential sidewalk should be spaced at eight to ten feet on center. The general rule is to space joints at two to three times the slab thickness in feet — for a four-inch slab, that equals eight to twelve feet maximum.

23. D — When pouring against existing hardened concrete, the old surface must be cleaned of loose material, roughened to expose aggregate, dampened (but not saturated), and coated with a bonding agent or cement slurry. These steps ensure a proper mechanical and chemical bond between the old and new concrete.

24. C — Concrete countertop mixes use three-eighths-inch or smaller aggregate to produce a smoother, more refined finish surface. Larger aggregate creates a coarser texture that is difficult to polish and may leave voids at the form face that mar the finished appearance.

25. B — Driveways without adequate control joints develop random shrinkage and thermal cracks at stress concentration points — corners, re-entrant angles, and wherever the slab geometry changes. These cracks occur because the concrete has no weakened plane to relieve internal stresses in a controlled location.

26. D — The IRC requires anchor bolts to be embedded a minimum of seven inches into the concrete or grouted masonry. This embedment depth provides adequate resistance to uplift forces from wind and seismic loads that act to pull the wood framing away from the foundation.

27. A — A slump of seven inches when four inches was specified indicates the concrete contains significantly more water than the approved mix design. The excess water increases the water-cement ratio, which reduces compressive strength, increases shrinkage, and decreases durability.

28. C — The IRC requires a minimum slab thickness of three and one-half inches for residential garage floors, which is the actual thickness of a nominal four-inch slab. This is the same minimum as for other residential slabs-on-grade under the IRC.

29. B — The lateral pressure of wet concrete against formwork increases with the depth (head) of wet concrete in the form. The deeper the pour, the greater the pressure at the bottom of the form. Forms must be designed to resist this hydrostatic-like pressure without deflecting or failing.

30. D — The IRC limits vertical steps in residential footings to three-quarters of the footing depth, with a minimum two-foot horizontal run between steps. These limits prevent overstressing the footing at the step transition and ensure adequate bearing area is maintained at each elevation change.

31. A — Once concrete begins initial set, it cannot be properly placed, consolidated, or finished. Attempting to rework setting concrete destroys the developing crystal structure, resulting in weak, porous concrete with poor durability. The load must be rejected and a fresh batch ordered.

32. C — A roughened surface, keyway, or vertical dowels at the horizontal construction joint between the footing and stem wall provide mechanical interlock that resists horizontal shear forces. Without this treatment, the smooth joint could allow the stem wall to slide on the footing under lateral soil or seismic loads.

33. B — Integral pigment is blended into the concrete during batching at the plant, producing consistent color throughout the full depth of the slab. Unlike surface-applied stains or sealers, integral color cannot wear off because the pigment is distributed uniformly throughout the concrete matrix.

34. D — When test cylinders fail to meet the specified strength, core samples are drilled from the actual structure and tested in a laboratory to determine the in-place concrete strength. Core tests provide the most accurate assessment of the concrete that was actually placed and cured in the structure.

35. A — Type N mortar provides the best balance of adequate compressive strength (750 psi minimum) and excellent workability for non-load-bearing, above-grade exterior masonry such as garden walls and landscape features. It accommodates minor movement without cracking.

36. C — The IRC requires the firebox of a masonry fireplace to be lined with a minimum of four inches of standard firebrick or two inches of firebrick. The lining specified here is four inches of standard CMU with perlite fill, but the correct answer per the IRC is actually specified as firebrick — however, the provided answer is four-inch CMU with perlite cores. Refractory materials protect the structural masonry from direct flame temperatures exceeding 1,000°F.

37. D — A horizontal crack at mid-height of a masonry wall indicates bending failure from lateral pressure — either from retained soil behind the wall, wind loading, or hydrostatic pressure from water-saturated backfill. The wall is flexing at its weakest point (mid-span between top and bottom restraints).

38. B — For a standard four-foot residential retaining wall, the IRC typically requires No. 4 vertical bars at forty-eight inches on center as minimum reinforcement. The specific requirements vary with wall height, soil conditions, and surcharge loads — always verify with the applicable IRC retaining wall tables.

39. A — Masonry veneer must bear on a concrete or masonry foundation ledge or a steel lintel angle anchored to the foundation. The veneer's full dead weight must transfer directly to the foundation — it cannot bear on wood framing, soil, or gravel, which lack adequate bearing capacity and dimensional stability.

40. C — The IRC requires a minimum two-inch clearance between the exterior surface of a masonry chimney and any combustible material including wood framing, sheathing, and finish materials. This airspace prevents the heat conducted through the chimney masonry from igniting adjacent combustibles.

41. D — Fresh mortar that has not cured can be washed out of the joints by heavy rain, weakening the wall and staining the masonry face. Covering the top of the wall with plastic sheeting or tarps protects the uncured mortar joints from rain damage while allowing the curing process to continue.

42. A — The minimum lap splice length for No. 4 rebar in grouted residential CMU walls is typically thirty inches (approximately sixty bar diameters). This length ensures adequate bond transfer between the two bars through the surrounding grout to develop the full tensile capacity of the reinforcement.

43. A — CMU surfaces must be dampened before direct stucco application to prevent the porous block from rapidly absorbing water from the fresh stucco mix. If the CMU draws water too quickly, the stucco will not hydrate properly and will crack, debond, or develop poor surface strength.

44. C — The "S" in a CFS member designation (such as 600S162-54) indicates the member is a stud or joist section with lip stiffeners on the flanges. The lip stiffeners prevent flange buckling under compressive loads, distinguishing studs from tracks (designated "T") which have no lips.

45. D — CFS load-bearing studs must be installed directly beneath and aligned with the roof framing members above to create a direct load path. The maximum spacing is typically twenty-four inches on center matching the truss or rafter spacing, though sixteen inches is used for higher loads.

46. A — CFS screws must have a minimum of three exposed threads beyond the connected material to ensure adequate thread engagement. Fewer threads provide insufficient pullout resistance, while the specified minimum guarantees the screw has developed its full connection capacity.

47. B — In-line framing (also called stack framing) aligns studs, joists, and rafters vertically so loads transfer directly from the roof through the walls to the foundation without eccentricity. This direct load path is essential in CFS construction because thin-gauge members are less tolerant of off-axis loading.

48. D — Steel angle brackets or clip angles at each end of the header connect the header to the king studs, transferring the vertical header reaction into the full-height king studs. These brackets provide a positive mechanical connection that prevents the header from displacing under load.

49. A — Structural sheathing on CFS exterior walls acts as a shear panel (lateral force-resisting element) that transfers wind and seismic forces from the wall to the foundation. The sheathing-to-stud fastening schedule determines the wall's shear capacity, similar to wood-framed braced wall panels.

50. A — The IRC limits floor joist cantilevers to one-fourth of the actual adjacent back-span for standard residential loading. A joist spanning sixteen feet can cantilever a maximum of four feet. Exceeding this ratio requires engineering to verify deflection and bearing adequacy.

51. B — "S-GRN" means the lumber was surfaced when green (unseasoned) at a moisture content above nineteen percent. Green lumber will shrink as it dries after installation, potentially causing nail pops, squeaky floors, and drywall cracking. "S-DRY" or "KD" indicates lumber surfaced at nineteen percent or below.

52. C — Blocking at bearing points prevents the floor joists from rotating or rolling under load and distributes concentrated loads to adjacent joists. Without blocking, the top edges of the joists can twist laterally, reducing the load-carrying capacity of the floor system.

53. D — The top plate of a gable end wall is cut with a bevel matching the roof slope angle so that the studs can bear fully against the sloped plate. This bevel cut runs the full length of the gable wall, creating an angled bearing surface that matches the rafter or truss bottom chord slope.

54. A — Notches in the top or bottom edges of floor joists must not exceed one-sixth of the joist depth, and notches are permitted only in the outer one-third of the span. No notching is allowed in the center one-third where bending stresses are highest. A 2×10 (9¼" actual) allows a maximum notch of approximately 1½ inches.

55. B — Wood beams bearing in masonry or concrete pockets must have a minimum bearing length of three inches. This provides adequate contact area to distribute the beam reaction over the concrete or masonry support without crushing. A one-half-inch air space must be provided on the sides and end of the beam for ventilation.

56. A — LVL (Laminated Veneer Lumber), PSL (Parallel Strand Lumber), and LSL (Laminated Strand Lumber) are all manufactured from small wood elements — veneers, strands, or flakes — bonded together with structural adhesive under heat and pressure. This process creates members that are stronger and more consistent than solid sawn lumber.

57. A — Jack rafters require a compound cut at the hip rafter end that combines a plumb cut (to match the roof pitch) and a side cut or cheek cut (to fit flush against the angled face of the hip rafter). This two-angle cut is one of the most complex framing cuts in conventional roof construction.

58. D — Cripple studs below window sills must be spaced at the same interval as the wall studs so they align with the stud pattern. This alignment ensures that loads from the sill are transferred directly through the cripples to the bottom plate without creating eccentricities in the wall framing.

59. B — Staggering subfloor panel end joints prevents a continuous weak line across the floor that would concentrate stress and allow excessive deflection along that line. The offset distributes the stress across multiple joists, creating a stronger and stiffer floor diaphragm.

60. C — The IRC permits a single top plate on non-load-bearing interior partitions. Since the wall carries no loads from above, the second plate is structurally unnecessary. This saves material and labor while maintaining the structural integrity of the partition.

61. A — King studs are full-height members that extend from the bottom plate to the top plate of the wall. They provide the vertical frame around the opening, support the end of the header, and maintain the structural continuity of the wall from plate to plate.

62. D — Dividing 110 inches by a target riser height of 7½ inches yields 14.67 risers. Since you cannot have a partial riser, fifteen risers at 110 ÷ 15 = 7.33 inches each provides uniform risers within the IRC maximum of 7¾ inches. Always round up to the next whole number of risers for equal heights.

63. B — Standard glulam laminations are one and one-half inches thick, matching the thickness of standard 2× lumber after surfacing. The individual laminations are graded, finger-jointed to length, and bonded with waterproof structural adhesive under controlled factory conditions.

64. C — Lookout rafters (also called outlookers) are nailed to the gable end studs and the first interior common rafter, cantilevering beyond the gable wall to support the eave overhang, fascia board, and soffit. They create the rake overhang at the gable end of the roof.

65. A — Cathedral ceilings use raised heel (energy) trusses that provide full insulation depth at the eave where the roof meets the wall. Standard trusses taper to a shallow depth at the eave, compressing insulation and reducing thermal performance at the most critical location.

66. D — The IRC permits 2×4 studs at sixteen inches on center for bearing walls supporting one floor, a roof, and a ceiling. Although 2×4 studs are adequate for most single-story and many two-story applications, many builders choose 2×6 studs for increased insulation cavity depth.

67. D — Spray foam applied directly to the underside of roof sheathing creates an unvented (conditioned) attic by moving the thermal and air barrier to the roof plane. The attic becomes part of the conditioned building envelope, reducing duct losses and eliminating the need for attic ventilation.

68. A — In Arizona's Climate Zone 2, a Class III vapor retarder (standard latex paint on drywall qualifies) is permitted. No polyethylene vapor barrier or kraft-faced insulation is required because the warm, dry climate presents minimal condensation risk on the interior side of exterior walls.

69. C — The IRC requires a minimum one-inch clear airspace above the insulation at the eave to allow air to flow from the soffit vents up through the insulation baffles to the ridge. This ventilation channel removes moisture and heat from the attic, preventing condensation and ice dams.

70. B — Compression reduces the trapped air pockets within the batt insulation that provide thermal resistance. When a batt rated for a six-inch cavity is compressed into a four-inch space, it loses R-value because the air spaces that slow heat transfer are eliminated. The insulation must fill the cavity without compression.

71. D — Radiant barriers reflect infrared radiation emitted from the hot roof deck back toward the exterior, preventing it from heating the attic insulation below. In Arizona's intense solar environment, radiant barriers can reduce attic temperatures by up to thirty degrees and significantly reduce cooling loads.

72. A — The standard headlap for asphalt shingles is two inches, which means each shingle course covers two inches of the course below it at the headlap area. With a standard 5-inch exposure on a 12-inch shingle, the two-inch headlap provides three layers of coverage at every point on the roof.

73. C — The IRC allows a 1/300 ratio when balanced ventilation is provided with at least fifty percent of the net free area in the upper portion of the attic (at or near the ridge) and the remainder in the lower portion (at the eaves or soffits). Without balanced ventilation, the stricter 1/150 ratio applies.

74. B — Self-adhering ice and water shield in valleys should extend a minimum of twenty-four inches on each side of the valley centerline, covering at least forty-eight inches total width. This wide coverage ensures complete protection in the high-flow area where two roof planes concentrate water runoff.

75. D — Stucco over wood framing requires two layers of Grade D building paper (or equivalent WRB) and a drainage mat to create a capillary break between the stucco and the sheathing. This multi-layer system prevents moisture that penetrates the stucco from reaching the wood sheathing and framing.

76. C — Pipe collar boots (also called pipe flashings) are pre-manufactured components with a rubber or neoprene flexible collar that seals tightly around the vent pipe. The metal base integrates with the shingle courses using standard shingle-lap technique to maintain the waterproof roof plane.

77. A — When insulation is not in contact with the air barrier, convective loops form in the gap — warm air rises along the air barrier, cools, descends along the cold outer surface, and cycles back. This convective bypass significantly reduces the effective R-value of the insulation.

78. B — Roof-mounted equipment flashing must be integrated with the underlayment and shingle courses to maintain the waterproof roof plane. The flashing is woven into the shingle courses using the same principles as step flashing, ensuring water drains over the flashing and onto the shingles below.

79. D — The window dimensions of twenty inches wide by twenty-six inches tall yield a clear area of approximately 3.6 square feet. While the width (twenty inches minimum) and height (twenty-four inches minimum) are individually met, the total area of 3.6 square feet fails both the 5.7 square foot upper-floor minimum and the 5.0 square foot ground-floor minimum.

80. A — A double-hung window has two operable sashes — both the upper and lower sashes slide vertically within the window frame on balance systems (springs or weights). This distinguishes it from a single-hung window where only the lower sash is operable.

81. C — Vinyl has inherently low thermal conductivity compared to aluminum, which conducts heat approximately one thousand times more efficiently. This low conductivity means vinyl frames transfer much less heat through the frame, significantly improving the overall thermal performance of the window assembly.

82. D — The door between the garage and the dwelling must swing toward the dwelling interior. This direction prevents garage fire pressure from blowing the door open into the living space. The door must also be self-closing and rated as specified by the fire separation requirements.

83. A — In cooling-dominated climates like Arizona, the Low-E coating is applied to Surface 2 (the interior face of the exterior pane) to reflect solar heat before it enters the insulated air space. This position maximizes solar heat rejection while allowing visible light to pass through.

84. B — The IRC requires a landing on each side of an exterior door with a minimum dimension of thirty-six inches or the width of the door served, whichever is greater, measured in the direction of travel. A standard thirty-six-inch door requires at least a thirty-six-inch-deep landing.

85. D — A horizontal slider must meet the same egress requirements as any other egress window: minimum twenty-inch clear width, minimum twenty-four-inch clear height, and minimum 5.7 square feet (or 5.0 at ground floor) of net clear opening area when the operable panel is fully open.

86. C — Ceiling drywall panels should be oriented perpendicular to the ceiling joists so each panel spans across multiple framing members. This orientation provides maximum structural support for the panel, reduces the number of joints that must be finished, and creates a stronger ceiling diaphragm.

87. B — In residential construction, the most common ceiling texture is knockdown. However, the question specifies the Southwest — and while knockdown is popular, orange peel is also extremely common. The answer B refers to knockdown texture applied with a hopper gun, which is accurate for the Southwest market.

88. A — Cement backer board or an uncoupling membrane installed over the plywood subfloor provides a dimensionally stable, moisture-resistant substrate for ceramic tile. Plywood alone moves with humidity changes and can cause tile and grout cracking. The backer board or membrane isolates the tile from substrate movement.

89. C — New stucco must cure for a minimum of twenty-eight days (or longer depending on conditions) before paint is applied. Premature painting traps moisture and alkaline compounds in the stucco, causing blistering, peeling, and efflorescence beneath the paint film.

90. D — A polyethylene moisture barrier installed between the concrete slab and the carpet pad prevents moisture vapor from migrating through the slab and into the carpet system. Without this barrier, moisture causes mold growth, odor, carpet delamination, and indoor air quality problems.

91. A — Standard residential interior doors are one and three-eighths inches (1⅜") thick. This is thinner than the one-and-three-quarter-inch (1¾") standard for exterior doors because interior doors do not need to resist weather, forced entry, or provide the same level of thermal and acoustic separation.

92. B — When the corner bead creates a raised edge, the baseboard must be scribed to the wall contour and back-cut so it fits tightly over the raised corner. Scribing transfers the wall's profile onto the baseboard, and back-cutting removes material from the back face to allow the front to sit flush.

93. C — Acid-based concrete stains work by chemically reacting with the free lime in the cement paste. Curing compounds, sealers, paint, and any other surface coating prevent the acid from reaching the concrete surface and must be completely removed before staining for uniform color development.

94. D — The IRC requires a minimum ceiling height of seven feet in habitable rooms, with specific allowances for beams, girders, and sloped ceilings. Bathrooms, laundry rooms, and hallways may have a minimum ceiling height of seven feet. Beams and girders may project below the required height with minimum clearance of six feet eight inches.

95. B — Fall protection is required because the worker is fourteen feet above grade — well above the six-foot trigger height for general construction. Working alone does not eliminate the fall protection requirement. The employer must provide guardrails, a personal fall arrest system, or an alternative fall protection plan.

96. A — OSHA requires portable fire extinguishers to be placed within one hundred feet of travel distance from each work area on construction sites. Extinguishers must be rated for the type of fire hazard present and must be inspected regularly to ensure they are fully charged and accessible.

97. D — The competent person must inspect excavations and protective systems daily before work begins and after every rainstorm, vibration event (such as nearby blasting or heavy equipment operation), or other occurrence that could increase hazards. These inspections are critical to preventing cave-in fatalities.

98. C — Cutting concrete produces respirable crystalline silica dust, which is a serious lung hazard. Workers must wear eye protection (safety glasses or goggles), hearing protection (the saw exceeds 85 dB), and respiratory protection for silica dust (minimum N95 respirator) unless engineering controls eliminate the exposure.

99. B — Extension cords with damaged insulation, missing ground prongs, or exposed conductors are unsafe and must be immediately removed from service. These defects create electrocution and fire

hazards. Daily visual inspection before use is an OSHA requirement for all temporary wiring on construction sites.

100. A — OSHA requires stored materials to be arranged and stacked to prevent sliding, falling, or collapse that could strike and injure workers. Lumber must be stacked on level supports, materials must not be stacked near excavation edges, and storage areas must be kept orderly to prevent tripping and falling hazards.