

# PRACTICE EXAM 25: OREGON CCB SIMULATION (80 QUESTIONS)

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**80 Multiple-Choice Questions | 200 Minutes | Open-Book Format**

1. A contractor is preparing to bid on a mixed-use commercial and residential building in Oregon. The project includes ground-floor retail spaces, upper-floor residential apartments, and a below-grade parking garage. What CCB license endorsement does the contractor need to perform this work?

- A. A commercial general contractor endorsement because the project includes commercial retail and parking components that classify the entire building as commercial construction work
- B. A residential endorsement only because the upper-floor apartments constitute the majority of the building's square footage
- C. Both commercial and residential endorsements must be held simultaneously on the same license for mixed-use buildings
- D. No specific endorsement is needed because the CCB issues a universal license covering all construction types in Oregon

2. A contractor is managing a commercial project and the specifications require the contractor to install a commissioning-ready building automation system. The BAS must include trending capability for all critical control points. What does trending capability allow the commissioning agent to evaluate?

- A. The total number of building occupants entering and exiting the building each day for security and emergency planning
- B. The real-time market value of the building's energy consumption compared to regional utility rate fluctuations over time
- C. The historical performance of the building's mechanical systems over time by recording and graphing control point data such as temperatures, pressures, and equipment status to verify the systems are operating as designed
- D. The building's structural settlement patterns over the first year of occupancy by monitoring foundation movement sensors

3. Under Oregon law, a homeowner hires a contractor to install a new roof. The contractor's crew damages the homeowner's satellite dish during the tear-off process. The contractor claims the damage was unavoidable. Who bears the cost of replacing the satellite dish?

- A. The homeowner bears the cost because the satellite dish was in the contractor's work area and should have been removed before the roofing began
- B. The contractor bears the cost because the contractor has a duty to protect the homeowner's existing property during construction and should have either protected or temporarily relocated the dish before beginning the tear-off
- C. The satellite television provider bears the cost because the dish is leased equipment covered under the provider's service agreement
- D. The cost is shared equally between the contractor and the homeowner because both parties failed to address the dish before work began

4. A contractor is building a commercial structure and the structural plans specify welded wire reinforcement in the concrete slab on grade. The plans show WWR six-by-six W two-point-nine by W two-point-nine. During the pour, the contractor's crew walks on the WWR and pushes it to the bottom of the slab. The WWR remains at the bottom rather than being pulled up to the proper position. What is the consequence?

- A. The WWR at the bottom of the slab provides minimal crack resistance because reinforcement must be positioned in the upper portion of the slab to control surface cracking caused by shrinkage and applied loads
- B. The WWR position has no structural impact because concrete slabs on grade do not rely on reinforcement for crack control
- C. The bottom position is the correct location for WWR because reinforcement in slabs on grade should always be in the tension zone
- D. The WWR at the bottom improves the slab's bearing capacity on the subgrade by creating a reinforced interface between surfaces

5. A contractor is hired to construct a residential retaining wall. The wall is designed to retain a slope above a driveway. During construction, the contractor discovers that the soil behind the wall contains a high percentage of clay that swells when wet. The structural engineer's original design assumed granular soil behind the wall. What should the contractor do?

- A. Proceed with the original wall design because all retaining walls are designed to accommodate any soil type behind the wall
- B. Notify the structural engineer of the actual soil conditions because the expansive clay exerts significantly higher lateral pressure on the wall than granular soil, and the wall design may need to be modified
- C. Add a two-inch layer of gravel between the clay soil and the wall to reduce the lateral pressure from the expansive clay

D. Compact the clay soil tighter behind the wall to prevent it from swelling and generating the additional lateral pressure

6. A contractor operates a construction company in Oregon and wants to expand into public works contracting. The contractor has experience with private residential and commercial projects but has never worked on a public project. What key difference should the contractor understand about public works contracting in Oregon?

A. Public works projects use the same contracting laws and procedures as private construction with no additional requirements

B. Public works projects require only the contractor's standard CCB license with no additional certifications or qualifications

C. Public works projects are exempt from prevailing wage requirements because the funding comes from tax revenue already collected

D. Public works projects require compliance with prevailing wage laws, certified payroll reporting, competitive bidding requirements, and specific bonding and insurance provisions that do not apply to private construction

7. A contractor is building a residential home and the plans specify a sealed combustion gas furnace. The furnace draws combustion air directly from the outdoors through a dedicated intake pipe rather than using indoor air. What is the primary advantage of a sealed combustion furnace compared to a naturally aspirated furnace?

A. A sealed combustion furnace does not depressurize the living space by consuming indoor air for combustion, which prevents backdrafting of other fuel-burning appliances and improves indoor air quality

B. A sealed combustion furnace operates at a higher temperature than a naturally aspirated furnace, producing more heat per unit of gas consumed

C. A sealed combustion furnace is less expensive to install because it requires only a single pipe for both intake and exhaust venting

D. A sealed combustion furnace can be installed without any venting because the sealed design contains all combustion gases within the unit

8. A contractor is managing a commercial project and the specifications require the contractor to perform a hydrostatic test on the fire sprinkler system piping before the system is placed in service. The test requires the piping to hold a specified pressure for two hours with no loss. During the test, the pressure drops steadily. What does this indicate?

A. The pressure drop is normal for fire sprinkler systems because the piping expands slightly under pressure during the initial test

- B. The test was performed at too high a pressure and should be repeated at a lower pressure to achieve a passing result
- C. The system has one or more leaks at pipe joints, fittings, or connections that must be identified and repaired before the system can pass the hydrostatic test and be placed in service
- D. The pressure gauge is defective and should be replaced with a calibrated gauge before the test results are evaluated

9. Under Oregon employment law, a contractor must provide employees with accurate pay stubs each pay period. An employee discovers that the contractor has been miscalculating overtime by using a blended rate instead of the regular rate for overtime calculations. What is the contractor's liability?

- A. The contractor has no liability because blended rate calculations are an accepted alternative for overtime computation in Oregon
- B. The contractor may owe back wages for the underpaid overtime plus potential penalties from the Bureau of Labor and Industries because overtime must be calculated at one and one-half times the employee's regular rate of pay
- C. The contractor's liability is limited to the current pay period because Oregon law does not allow retroactive wage claims
- D. The employee must file a federal complaint because Oregon has no state-level oversight of overtime payment compliance

10. A contractor is building a commercial structure and the architect specifies a curtain wall system with thermally broken aluminum frames. What is the purpose of a thermal break in curtain wall framing?

- A. The thermal break increases the structural capacity of the aluminum frame by adding a reinforcing element at the midpoint
- B. The thermal break provides a gasket seal that prevents water infiltration between the glass and the aluminum frame members
- C. The thermal break is an insulating barrier within the aluminum frame that prevents heat from conducting through the metal, reducing energy loss and preventing interior condensation on the frame surface
- D. The thermal break allows the curtain wall frame to flex during seismic events without transferring forces to the glass panels

11. A contractor is performing a residential renovation and discovers that the existing home's plumbing system uses lead solder joints on the copper water supply piping. The home was built in nineteen eighty. Under Oregon regulations, what must the contractor address regarding the lead solder?

- A. Lead solder was banned from potable water systems by the Safe Drinking Water Act amendments, and the contractor should inform the homeowner of the potential health hazard and recommend replacement of the lead-soldered joints with lead-free connections
- B. Lead solder was standard practice in nineteen eighty and remains acceptable under current plumbing codes without modification
- C. Lead solder affects only the taste of the water and poses no health risk to the building's occupants during normal use
- D. The contractor must remove all copper piping with lead solder and replace the entire plumbing system with PEX tubing immediately

12. A contractor is managing a commercial project and the mechanical engineer requires commissioning of the HVAC system's economizer controls. During testing, the economizer fails to switch from mechanical cooling to free cooling when outdoor conditions are favorable. What is the likely cause and consequence of this malfunction?

- A. The economizer damper actuator or outdoor air temperature sensor may be miscalibrated or defective, causing the system to miss opportunities for free cooling
- B. Economizer systems waste energy during free cooling mode and the malfunction actually improves the building's energy performance
- C. The malfunction is normal during the first year of operation because economizer controls require a twelve-month calibration period
- D. The economizer failure affects only the indoor humidity level and has no impact on the building's energy consumption or costs

13. A contractor is building a residential home and the structural plans specify a concrete masonry unit foundation wall with horizontal bond beam reinforcement at the top course. The contractor fills the bond beam course with grout but does not place the specified horizontal reinforcement. What structural consequence does this omission create?

- A. The grout alone provides adequate tensile capacity and the horizontal reinforcement is a redundant element in the bond beam
- B. The bond beam without reinforcement provides the same structural function because the grout carries all applied forces
- C. The missing reinforcement affects only the wall's appearance and has no impact on the structural performance of the foundation
- D. The bond beam without reinforcement cannot resist the lateral forces from soil pressure and the vertical forces from the structure above, which the horizontal rebar was designed to carry

14. A contractor is reviewing a commercial project's specifications and discovers that the specifications require the contractor to provide a mock-up of the exterior wall assembly for the architect's approval. The mock-up must include the full wall section from the structural frame through the exterior finish. What is the primary purpose of this full-section mock-up?

- A. The mock-up allows the architect to experiment with different color combinations before selecting the final exterior finish colors
- B. The mock-up verifies the constructability of the wall assembly, demonstrates the quality and workmanship standards, confirms the material appearance, and serves as the reference standard for the remainder of the exterior installation
- C. The mock-up is required by the building department as a mandatory step before the exterior wall construction permit is issued
- D. The mock-up provides the structural engineer with load test data that verifies the wall assembly's structural adequacy

15. A contractor is building a commercial warehouse and the fire code requires the installation of a fire sprinkler system throughout the building. The warehouse will store combustible materials including cardboard boxes stacked to a height of twenty feet. The fire protection engineer classifies this storage as high-piled combustible storage. How does this classification affect the sprinkler system design?

- A. High-piled storage classification has no impact on the sprinkler system because all warehouse sprinkler systems use the same design criteria
- B. The classification reduces the sprinkler system requirements because high-piled storage is considered a lower fire hazard than general warehouse storage
- C. The classification requires only smoke detectors in the storage area and sprinklers are optional for high-piled combustible storage
- D. High-piled combustible storage requires a more aggressive sprinkler design with higher water density, larger water supply, potentially in-rack sprinklers, and specific storage arrangement controls to manage the increased fire hazard

16. Under Oregon law, a contractor is hired to build a residential home on a lot with a seasonal creek running through the backyard. The construction plans show the house setback from the creek per the local setback requirements. During excavation, the contractor discovers that the actual creek location is twenty feet closer to the house than shown on the survey. What should the contractor do?

- A. Proceed with construction because the building permit has already been issued based on the original survey information
- B. Move the house foundation twenty feet farther from the creek without obtaining a revised building permit or engineering approval

- C. The contractor should stop work, notify the owner and architect of the discrepancy, and obtain a new survey to determine whether the house location complies with the required creek setback before proceeding
- D. Fill in the creek with compacted fill to relocate the waterway twenty feet away from the planned house foundation location

17. A contractor is managing a commercial project and the building inspector requires the contractor to demonstrate that the installed fire-rated door assemblies have the correct rating. The contractor shows the inspector the door labels. What information on the fire-rated door label verifies the door's fire-resistance rating?

- A. The door manufacturer's brand name and model number are sufficient to verify the fire-resistance rating during inspection
- B. The label shows the fire-resistance rating in hours, the name of the testing laboratory that evaluated the door, and the applicable test standard, which the inspector uses to verify the door meets the specification
- C. The door hinge manufacturer's stamp on each hinge indicates the fire rating of the complete door assembly installation
- D. The paint color code on the door frame indicates the fire-resistance rating through a standardized industry color coding system

18. A contractor is building a residential addition and the existing home has a forced-air heating system with a single thermostat controlling the entire house. The addition will significantly increase the conditioned floor area. The contractor connects the addition's ductwork to the existing system without evaluating the system's capacity. What problem is likely to result?

- A. The existing system will heat the addition and the existing house equally because forced-air systems automatically balance airflow
- B. The addition will overheat because the new ductwork creates a shorter air path that receives a disproportionate share of airflow
- C. The existing system operates identically because residential HVAC systems are designed with fifty percent excess capacity
- D. The existing system may be undersized for the increased load, resulting in inadequate heating of both the addition and the existing spaces, longer run times, increased energy costs, and potential equipment failure from overwork

19. A contractor is reviewing a commercial project's specifications and discovers that the specifications require all concrete to be placed using a pump. The contractor prefers to use a crane and bucket for the elevated pours. Can the contractor use an alternative placement method without approval?

- A. Yes, because the placement method is the contractor's means and methods decision and does not require architect approval
- B. The contractor should inform the building inspector of the change but does not need the architect's or engineer's approval
- C. The contractor may use any placement method as long as the concrete achieves the specified slump at the point of placement
- D. The contractor should submit an RFI or request approval because the specification requires pump placement, and deviating from specified means and methods may require documentation even if it falls within contractor discretion

20. A contractor is building a residential home and the plans show a bathroom exhaust fan rated at eighty cubic feet per minute. The contractor installs a fan rated at fifty CFM. Under the Oregon Residential Specialty Code, what is the consequence of installing an undersized exhaust fan?

- A. The installation passes inspection because fifty CFM meets the minimum code requirement for all residential bathroom exhaust fans
- B. The fifty-CFM fan provides adequate ventilation for bathrooms under one hundred square feet regardless of the code specification
- C. The undersized fan affects only the noise level in the bathroom and has no impact on moisture removal performance
- D. The installation may not meet the ventilation rate specified in the plans or the minimum code requirement, resulting in inadequate moisture removal that can cause mold growth, paint peeling, and moisture damage

21. A contractor is managing a commercial project and the owner asks the contractor to explain the difference between a bid bond and a performance bond. Which statement accurately describes the fundamental difference?

- A. A bid bond guarantees the contractor will enter into the contract at the bid price if awarded, while a performance bond guarantees the contractor will complete the work per the contract terms after the contract is executed
- B. A bid bond and a performance bond provide identical protection and the terms are interchangeable in all construction contexts
- C. A bid bond is required only on private projects while a performance bond is required only on public works construction projects
- D. A bid bond guarantees payment to subcontractors while a performance bond guarantees the quality of the completed work

22. A contractor is performing a commercial renovation and the architect specifies a specific acoustic ceiling tile with a minimum Ceiling Attenuation Class rating of thirty-five. The contractor installs tiles with a CAC rating of twenty-five. What is the practical consequence of this lower rating?

- A. The CAC rating affects only the tile's fire resistance and has no impact on the acoustic performance between adjacent rooms
- B. The lower-rated tiles provide better sound absorption within the room and the reduced CAC is an improvement over the specification
- C. The lower CAC rating has no practical impact because ceiling tiles do not affect sound transmission between adjacent spaces
- D. More sound will transmit through the ceiling plenum between adjacent rooms, reducing speech privacy and potentially compromising confidential conversations in offices, examination rooms, or conference spaces

23. Under Oregon law, a contractor performing residential construction must include specific disclosures in the written contract. One required disclosure is the Information Notice to Owner. If the contractor fails to include this notice, what right does the homeowner gain?

- A. The homeowner may use the contractor's failure to include the required notice as grounds for a CCB complaint and the omission may affect the enforceability of certain contract provisions
- B. The homeowner gains no additional rights because the notice is an informational courtesy with no legal significance
- C. The homeowner automatically receives a fifty percent discount on the total contract price as a penalty for the missing notice
- D. The homeowner may cancel the contract at any time without any financial obligation to the contractor for work completed

24. A contractor is building a commercial structure and the structural engineer specifies a specific concrete mix design for the elevated floor slabs that includes silica fume as a supplementary cementitious material. What property does silica fume impart to the concrete?

- A. Silica fume significantly reduces the concrete's compressive strength to make the floor more flexible under occupant loads
- B. Silica fume adds a decorative sparkle to the concrete surface that improves the aesthetic appearance of the polished floor
- C. Silica fume increases the concrete's air entrainment level automatically without requiring a separate air-entraining admixture
- D. Silica fume produces a denser, less permeable concrete with higher compressive strength and improved resistance to chloride penetration and chemical attack

25. A contractor is managing a residential project and discovers that the electrical subcontractor has installed the main electrical panel in a bedroom closet. Under the National Electrical Code, is this installation location acceptable?

- A. The installation is acceptable if the closet has a minimum depth of thirty inches to provide the required working clearance
- B. The panel may be installed in a bedroom closet if the closet door is a minimum thirty-six inches wide for emergency access
- C. The installation is acceptable because bedroom closets provide a concealed location that is protected from household traffic
- D. The NEC requires electrical panels to be installed in readily accessible locations with adequate working clearance, and a bedroom closet may not meet these requirements depending on the specific installation conditions

26. A contractor is performing a commercial renovation and the fire protection engineer requires the contractor to install fire-stopping at all penetrations through fire-rated floor assemblies. The contractor installs intumescent firestop sealant at all pipe and conduit penetrations but does not firestop the cable tray penetrations. Why is this a deficiency?

- A. Cable trays are classified as non-combustible components and do not require firestopping at any floor penetration location
- B. Cable tray penetrations are small enough that the natural draft in the building prevents smoke from passing through them
- C. Cable tray penetrations through fire-rated floors create unprotected openings that allow fire and smoke to spread between floors, and all penetrations regardless of type must be properly firestopped to maintain the rated assembly
- D. Cable trays require firestopping only when they carry power cables exceeding two hundred forty volts and not for low-voltage data cables

27. A contractor is building a residential home and the plans specify engineered floor trusses with a clear span of twenty-six feet. The trusses require specific bearing conditions at the support walls. The truss manufacturer specifies a minimum bearing length of three and one-half inches on each support. The contractor frames the bearing wall with the truss bearing only one and one-half inches on the top plate. What is the structural concern?

- A. The reduced bearing concentrates the truss reaction force on a smaller area of the top plate, potentially crushing the wood and causing the truss to slip off the bearing, resulting in floor collapse
- B. The one-and-one-half-inch bearing is adequate for residential floor trusses because the top plate distributes the load evenly

- C. The reduced bearing affects only the truss installation speed and has no impact on the structural capacity of the floor system
- D. The bearing length requirement applies only to steel trusses and wood trusses may bear on any available plate width

28. A contractor is reviewing a commercial project's pay application and the owner has been withholding retainage at ten percent on all progress payments. The project is now seventy-five percent complete and the contractor requests a reduction in retainage. Under standard AIA contract terms, at what project milestone may the contractor typically request a retainage reduction?

- A. Retainage reduction requests are not permitted under AIA contract terms and the original percentage must be maintained throughout
- B. The contractor may request a retainage reduction after the project reaches fifty percent completion or at substantial completion, depending on the specific contract language and the owner's approval
- C. Retainage is automatically reduced to zero at the sixty percent completion milestone under all AIA standard contract versions
- D. Retainage reduction is only available on public works projects and is never permitted on private commercial construction

29. A contractor is performing a residential renovation and the homeowner wants to add a wood-burning fireplace insert to the existing masonry fireplace. The existing chimney flue is unlined. Under Oregon building codes, what is required before the fireplace insert can be installed?

- A. The existing unlined chimney may be used without modification because masonry chimneys do not require liners for fireplace inserts
- B. The homeowner must obtain a special permit from the Oregon Department of Environmental Quality before any wood-burning appliance
- C. The fireplace insert may be installed if the contractor applies a fireproof coating to the interior of the existing masonry chimney
- D. A chimney liner must be installed inside the existing masonry chimney to meet the building code requirements for the fireplace insert, ensuring proper sizing, draft, and fire safety

30. A contractor is managing a commercial project and the specifications require all structural steel connections to be inspected by a qualified independent testing agency. The testing agency discovers that several bolted connections have bolts that are not tightened to the specified minimum tension. Under the structural steel specification, what must the contractor do?

- A. Accept the connections because bolt tension variations within twenty percent of the specified value are within normal construction tolerance
- B. Retighten all bolts in the deficient connections to the specified minimum tension using the approved tightening method, and have the connections reinspected by the testing agency to verify compliance
- C. Replace all bolts in the deficient connections with the next larger diameter bolt to compensate for the reduced tension
- D. Submit the test results to the building inspector for a variance allowing the lower bolt tension as an acceptable field condition

31. A contractor is building a residential home and the energy code requires the installation of a heat pump water heater in the garage. The heat pump water heater extracts heat from the surrounding air to heat the water. The contractor installs the unit in a small enclosed closet within the garage. What operational problem does this installation create?

- A. The heat pump operates identically in a closet and an open garage because the heat source is the water entering the unit
- B. The enclosed closet provides better performance because the concentrated heat in the small space improves the heat pump efficiency
- C. The heat pump requires a minimum volume of surrounding air to extract heat from, and the small enclosed closet does not provide adequate air volume, causing the unit to underperform, overcool the closet, and potentially frost up
- D. The closet location is preferred because it reduces the noise impact of the heat pump compressor on the adjacent living spaces

32. Under Oregon law, a contractor is required to provide specific disclosures in residential construction contracts. The contract must include information about the contractor's dispute resolution process. What is the purpose of including dispute resolution information in the residential contract?

- A. The dispute resolution disclosure satisfies the CCB's annual reporting requirement for all active residential construction contracts
- B. The disclosure allows the contractor to select the judge who will hear any disputes that arise during the construction project
- C. The disclosure is a marketing tool that demonstrates the contractor's professionalism to potential customers during the bid process
- D. The disclosure ensures the homeowner understands the available options for resolving disputes before they arise, including the CCB complaint process and any contractual mediation or arbitration provisions

33. A contractor is managing a commercial project and the structural engineer requires post-installed adhesive anchors in existing concrete to attach a new steel canopy structure to the building facade. The anchor installation is classified as a special inspection item. During the special inspection, the inspector discovers that the contractor did not clean the drilled holes before injecting the adhesive. Why is this a critical deficiency?

- A. Uncleaned holes have no impact on adhesive anchor performance because the adhesive bonds to any surface including dust particles
- B. The drilling dust affects only the adhesive's curing time and the anchors will reach full strength after an extended curing period
- C. Uncleaned holes contain drilling dust and debris that prevent the adhesive from bonding to the concrete substrate, reducing the anchor's capacity to a fraction of its rated load and creating a potential structural failure
- D. The dust contamination affects only the anchor's corrosion resistance and has no impact on the structural pullout capacity

34. A contractor is building a residential addition and the existing home has a conventional septic system. The addition includes two new bedrooms. Under Oregon regulations, what must the contractor verify before the addition is approved?

- A. The existing septic system has adequate capacity to handle the increased wastewater load from the additional bedrooms, because septic system sizing is based on the number of bedrooms in the dwelling
- B. No septic verification is needed because the addition connects to the existing plumbing system which already serves the septic
- C. The existing septic tank must be pumped and inspected, but the drain field capacity is not affected by additional bedrooms
- D. Only the water supply must be verified because the septic system capacity is determined by the property lot size only

35. A contractor is performing a commercial building envelope air leakage test. The test pressurizes the building to a specified pressure differential and measures the air leakage rate. The test result exceeds the maximum allowable leakage rate specified in the energy code. The contractor must identify and seal the leakage paths. What is the most common source of air leakage in commercial building envelopes?

- A. Air leakage occurs primarily through the exterior glass panels because glass is a naturally porous material at the molecular level
- B. Joints between different building envelope materials, penetrations for mechanical and electrical systems, transitions at the roof-to-wall junction, and construction joints at floor lines are the most common sources of air leakage

- C. Air leakage occurs exclusively through the building's entry doors when occupants open and close them throughout the day
- D. The HVAC supply ductwork is the primary source of building envelope air leakage because the positive pressure pushes air outward

36. A contractor is building a residential home and the plans specify a truss roof system with attic trusses that provide a habitable room within the truss space. The attic truss manufacturer's drawings show specific load-bearing points that differ from standard truss bearing. What must the contractor verify before installing attic trusses?

- A. That the bearing walls and floor system below are designed to support the concentrated loads from the attic truss bearing points, which may be different from standard truss bearing locations
- B. That the attic trusses are installed with the same bearing details as standard trusses because all trusses use identical support
- C. That the attic insulation is installed before the trusses are set because the insulation cannot be installed after the trusses are in place
- D. That the attic room has a minimum ceiling height of six feet because attic trusses are exempt from the standard eight-foot requirement

37. Under Oregon employment law, an employer must provide employees with a safe workplace. A contractor's project involves demolition of a structure built in nineteen sixty. Before demolition begins, what hazardous material surveys must the contractor ensure have been completed?

- A. Surveys for asbestos-containing materials and lead-based paint must be completed because buildings from this era commonly contain both hazardous materials that require special handling and disposal procedures during demolition
- B. No surveys are required because buildings constructed before nineteen sixty-five are automatically classified as hazardous-free
- C. Only a radon survey is required because radon is the primary hazardous material concern in buildings from this construction era
- D. Only a mold survey is required because mold is the only regulated hazardous material found in buildings from this time period

38. A contractor is managing a commercial project and the concrete subcontractor is placing a post-tensioned elevated slab. The structural engineer requires the contractor to maintain shoring on the floor below until the post-tensioning stressing is complete and the concrete reaches the specified strength. The contractor removes the shoring two days early to allow work on the floor below. What risk does this premature shoring removal create?

- A. Early shoring removal has no structural impact because the concrete gains strength rapidly in the first forty-eight hours of curing
- B. The slab may deflect excessively or fail because it has not yet achieved the strength needed to support its own weight plus construction loads without the support of the shoring below
- C. The early removal affects only the slab's surface finish quality and has no impact on the structural capacity of the floor system
- D. The shoring can be removed early if the contractor places temporary supports at the column locations to carry the concentrated loads

39. A contractor is building a residential home and the homeowner asks whether the home needs a radon mitigation system. The property is in a designated high-radon zone. Under Oregon building codes, what is typically required for new residential construction in high-radon zones?

- A. Radon testing is required but no mitigation system is needed unless the post-construction test shows elevated radon levels
- B. Radon mitigation systems are optional in Oregon and are installed only at the homeowner's specific written request and expense
- C. Only homes with basements require radon mitigation because slab-on-grade construction is not susceptible to radon infiltration
- D. New homes in designated high-radon zones typically require installation of a passive radon mitigation system during construction, which can be upgraded to an active system if post-construction testing shows elevated levels

40. A contractor is reviewing a commercial project's mechanical specifications and the engineer requires the installation of a dedicated outdoor air system with energy recovery. The DOAS provides one hundred percent outdoor air to the occupied spaces. What is the primary advantage of a DOAS compared to a conventional mixed-air HVAC system?

- A. A DOAS eliminates the need for ductwork by delivering outdoor air directly through the building's exterior wall louvers
- B. A DOAS provides better ventilation air quality control by separating the ventilation function from the space conditioning function, ensuring each occupied space receives the code-required volume of fresh outdoor air regardless of the zone's heating or cooling demand
- C. A DOAS reduces the building's total cooling capacity requirement by pre-cooling outdoor air to below sixty degrees Fahrenheit
- D. A DOAS eliminates the need for any space conditioning equipment because the tempered outdoor air provides all heating and cooling

41. A contractor is performing a residential renovation and discovers that the existing home's foundation has horizontal cracks in the basement wall at the midheight location. The cracks show evidence of inward displacement. What structural condition do these cracks indicate?

- A. The cracks are normal settling cracks that occur in all concrete block foundations during the first ten years after construction
- B. The horizontal midheight cracks with inward displacement indicate the foundation wall is being pushed inward by lateral soil pressure, and the wall may be at risk of structural failure if the cracking progresses
- C. The cracks are caused by thermal expansion of the concrete block and will close during warm weather without any intervention
- D. The cracks indicate the foundation is settling evenly and the displacement is within the acceptable tolerance for residential foundations

42. A contractor is managing a commercial project and the building automation system integrator reports that the HVAC system's variable air volume boxes are not responding to the building automation commands. The boxes remain at maximum airflow regardless of the thermostat settings. What energy consequence does this malfunction have?

- A. The malfunction improves energy efficiency because maximum airflow provides the most effective temperature control in all zones
- B. The constant maximum airflow has no energy impact because the fan speed adjusts automatically to compensate for the fixed boxes
- C. The malfunction affects only the noise level in the occupied spaces and has no relationship to the building's energy consumption
- D. The malfunction wastes significant energy because the system overconditions every zone at maximum airflow instead of modulating the airflow to match each zone's actual demand, defeating the purpose of the VAV system

43. Under Oregon law, a contractor completes a commercial project and the owner withholds final payment claiming that the project was completed late. The contract includes a liquidated damages clause of five hundred dollars per calendar day. The project was completed twelve calendar days late. The contractor claims the delay was caused by the owner's late decision on a change order. What is the contractor's defense against the liquidated damages?

- A. The contractor has no defense because liquidated damages apply automatically regardless of who caused the delay on the project
- B. The contractor must pay the liquidated damages and then file a separate claim against the owner for the cost of the delay
- C. The contractor's defense is limited to proving that the daily rate of five hundred dollars is excessive and constitutes a penalty

D. If the contractor can demonstrate that the owner-caused delay was responsible for the late completion, the contractor may be entitled to a time extension that eliminates or reduces the liquidated damages for the delay days attributable to the owner

44. A contractor is building a residential home and the plans specify a whole-house dehumidifier integrated with the HVAC system. The dehumidifier is designed to maintain indoor humidity levels between thirty and fifty percent relative humidity. The contractor installs the HVAC system but omits the dehumidifier. What indoor environmental quality problem may develop?

A. The HVAC system alone adequately controls humidity in all Oregon climate conditions without a supplemental dehumidifier

B. The missing dehumidifier affects only the homeowner's comfort preference and has no impact on the building's durability

C. Without the dehumidifier, indoor humidity levels may exceed fifty percent during humid seasons, promoting mold growth, dust mite proliferation, condensation on cold surfaces, and deterioration of building materials

D. The HVAC system's cooling mode removes more moisture than the dehumidifier and the substitution actually improves performance

45. A contractor is managing a commercial project and the fire marshal requires the building to have a fire alarm system with elevator recall capability. What does elevator recall do during a fire alarm activation?

A. Elevator recall locks all elevators in place on their current floor and prevents any movement until the fire department resets

B. Elevator recall increases the elevator speed to allow faster evacuation of building occupants from the upper floors to the lobby

C. Elevator recall opens all elevator doors simultaneously on every floor to provide additional egress routes for building evacuation

D. Elevator recall automatically returns all elevators to the designated recall floor, typically the ground level, opens the doors, and takes them out of normal service so firefighters can use them for emergency operations

46. A contractor is building a residential addition and the structural engineer specifies a concrete grade beam foundation system because the soil conditions require the building loads to be supported on piers extending to stable soil. The contractor pours the grade beam but does not extend the piers to the depth specified by the engineer. What structural risk does this create?

- A. The shallow piers may not reach the stable bearing stratum, causing the foundation to settle when the building loads are applied
- B. The pier depth has no structural impact because the grade beam distributes all building loads to the soil surface uniformly
- C. Shallow piers improve the foundation's performance by reducing the friction between the pier surface and the surrounding soil
- D. The grade beam compensates for shallow piers by spanning between the piers and distributing loads across the full foundation area

47. A contractor is reviewing a commercial project's mechanical specifications and the engineer requires the installation of ultraviolet germicidal irradiation lights inside the air handling unit. What is the primary purpose of UV-C lights in an air handling unit?

- A. UV-C lights improve the aesthetic appearance of the air handler's interior by illuminating the coils for visual inspection during service
- B. UV-C lights heat the supply air to a temperature that kills airborne pathogens before the air is distributed to the occupied spaces
- C. UV-C lights destroy microbial growth on the cooling coils and in the airstream, improving indoor air quality by reducing mold, bacteria, and viruses that would otherwise circulate through the building
- D. UV-C lights reduce the energy consumption of the air handling unit by improving the coil's heat transfer efficiency by twelve percent

48. A contractor is performing a residential renovation and the homeowner wants to convert the unfinished attic into a habitable bedroom. Under the Oregon Residential Specialty Code, what minimum requirements must be met for this conversion?

- A. The attic space must meet the minimum ceiling height, egress window, electrical outlet, smoke alarm, heating, and ventilation requirements for a habitable room as specified by the applicable residential code
- B. No building permit is required for converting an unfinished attic to a bedroom because the space is already enclosed within the roof
- C. The conversion requires only the installation of a smoke alarm and flooring over the existing attic joists without other modifications
- D. Attic conversions are prohibited in all Oregon residential buildings because attic floor joists are never designed for habitable loads

49. A contractor is managing a commercial project and the specifications require the contractor to install a stormwater quality monitoring system that samples runoff from the developed site.

The monitoring data is reported to the local stormwater authority. What is the purpose of this monitoring requirement?

- A. The monitoring system measures the total volume of stormwater runoff to calculate the building's monthly sewer service charges
- B. The monitoring system verifies that the stormwater treatment measures are effectively removing pollutants before the runoff is discharged, ensuring compliance with the project's stormwater management permit
- C. The monitoring system tracks rainfall intensity to forecast future weather patterns for the building's climate control systems
- D. The monitoring system measures the stormwater temperature to ensure it does not exceed the maximum discharge temperature limit

50. Under Oregon tax law, a contractor who operates as an S-corporation must file annual tax returns at both the federal and state levels. How is the S-corporation's income treated for Oregon state income tax purposes?

- A. Oregon does not recognize S-corporation election and taxes the corporation at the standard corporate income tax rate on all income
- B. Oregon exempts all S-corporation income from state taxes because the income is already taxed at the federal level
- C. S-corporation income is taxed at a flat rate of five percent regardless of the total income earned during the fiscal year
- D. Oregon generally recognizes the S-corporation election and the income passes through to the shareholders' personal Oregon tax returns, though the S-corporation may also be subject to a minimum tax at the entity level

51. A contractor is building a commercial structure and the plans require a green roof system over the occupied office space. The specifications require leak detection testing of the waterproof membrane before the overburden layers are installed. Why is pre-overburden leak testing critical for green roof systems?

- A. Leak testing is optional for green roof systems because the multiple layers above the membrane provide redundant waterproofing
- B. The leak test is required only for aesthetic purposes to ensure the membrane color is uniform before the overburden conceals it
- C. Once the drainage layer, filter fabric, growing medium, and vegetation are installed over the membrane, locating and repairing leaks becomes extremely difficult and expensive, making pre-overburden testing the only practical opportunity to verify membrane integrity
- D. The leak test verifies the structural capacity of the roof deck to support the overburden weight and is not related to waterproofing

52. A contractor is performing a residential renovation and discovers that the existing home has a single-point-of-use tankless water heater under the kitchen sink. The homeowner wants to add a similar unit in the master bathroom. The existing electrical panel has a two-hundred-ampere service. Each tankless electric water heater draws one hundred twenty amperes at full demand. Can both units operate simultaneously on the existing two-hundred-ampere service?

A. Both units can operate simultaneously because the two-hundred-ampere service has adequate capacity for two hundred forty amperes of combined water heater demand plus all other household circuits

B. No, two units drawing a combined two hundred forty amperes would exceed the service capacity even before accounting for all other household electrical loads, and the contractor must evaluate whether a service upgrade is needed

C. The units never operate simultaneously because the plumbing system prevents hot water demand at two fixtures at the same time

D. The electric tankless water heaters draw only half their rated amperage during normal operation and never reach full demand level

53. A contractor is managing a commercial project and the building envelope consultant requires the contractor to install a continuous air barrier that is tested to meet the specifications. The air barrier system includes multiple materials and components across different building surfaces. What is the most critical aspect of the air barrier installation?

A. The air barrier material must be the same color as the exterior cladding to provide a uniform appearance behind the finish

B. The air barrier must be installed before any structural framing to ensure the barrier is positioned behind all building components

C. The continuity of the air barrier at transitions between different materials, wall-to-roof junctions, penetrations, and construction joints is the most critical aspect because any gap or discontinuity creates an air leakage path

D. The air barrier thickness must be uniform across all building surfaces to provide consistent thermal resistance at every location

54. A contractor is building a residential home and the plans specify a whole-house surge protection device at the main electrical panel. During a lightning storm, the surge protector activates and diverts a voltage spike to ground. After the storm, the contractor's electrician inspects the surge protector and finds that the indicator light shows the device has been compromised. What must the contractor do?

A. The surge protector continues to provide full protection even after activation and the indicator light is informational only

- B. Reset the surge protector by cycling the main breaker off and on to restore the device to its normal protective state
- C. The surge protector may continue to function but should be monitored for future lightning events before replacement is needed
- D. Replace the compromised surge protector because a device that has absorbed a significant surge may no longer provide adequate protection against future voltage spikes

55. A contractor is managing a commercial project and the owner requests that the contractor provide a warranty inspection at the eleven-month mark, one month before the one-year warranty period expires. What is the purpose of the eleven-month warranty inspection?

- A. The inspection is a marketing opportunity for the contractor to present proposals for additional work to the building owner
- B. The inspection allows the owner to identify any defects or deficiencies before the warranty period expires, giving the contractor the opportunity to make repairs while the warranty is still in effect
- C. The inspection is required by the building department to maintain the certificate of occupancy for the second year of operation
- D. The inspection verifies that the building's property value has increased since construction and satisfies the lender's requirements

56. A contractor is building a residential home and the plans specify a minimum concrete slab thickness of four inches for the garage floor. The contractor pours the slab at three inches thick to save on concrete costs. Three years later, the garage floor cracks under the weight of a standard passenger vehicle. What caused the premature failure?

- A. The cracking was caused by the vehicle's tire pressure exceeding the maximum rated pressure for residential garage floor surfaces
- B. All garage floors crack within three years regardless of thickness because concrete has a limited lifespan under vehicle traffic
- C. The three-inch slab is too thin to resist the concentrated wheel loads from a vehicle, and the reduced thickness provides inadequate structural capacity for the garage floor's intended use
- D. The cracking was caused by improper curing and would have occurred at any slab thickness due to the curing method used

57. Under Oregon law, a contractor is hired to perform a residential renovation. The homeowner asks the contractor to start work immediately without a written contract because the project is urgent. The project value is thirty-two thousand dollars. Should the contractor begin work without a written contract?

- A. No, Oregon law requires a written contract for residential construction projects, and the contractor should prepare and sign the required contract before beginning any work regardless of the urgency
- B. Yes, because Oregon allows verbal contracts for residential projects under fifty thousand dollars when the homeowner requests immediate start
- C. Yes, because the urgency of the project overrides the written contract requirement under Oregon's emergency construction provisions
- D. No, but the contractor may begin work if the homeowner provides a signed letter of intent in lieu of the full written contract

58. A contractor is managing a commercial project and the building's curtain wall system is being installed during winter months. The sealant manufacturer specifies a minimum application temperature of forty degrees Fahrenheit for the structural sealant used at the curtain wall joints. The ambient temperature drops to twenty-five degrees Fahrenheit during the sealant application. What is the consequence of applying the sealant below the minimum temperature?

- A. The sealant cures faster in cold temperatures and achieves a stronger bond because the cold slows the chemical reaction evenly
- B. Cold-applied sealant may not cure properly, resulting in poor adhesion to the substrate, reduced flexibility, and eventual joint failure that allows water infiltration through the curtain wall system
- C. The cold temperature affects only the sealant's color and has no impact on the bond strength or weatherproofing performance
- D. The sealant manufacturer's temperature requirement is a guideline and the product performs identically at any application temperature

59. A contractor is building a residential home and the plans show a bathroom with a freestanding soaking tub weighing one hundred eighty pounds empty. When filled with water and occupied, the total weight is approximately fourteen hundred pounds concentrated on approximately twenty square feet of floor area. The floor joists beneath the tub are standard two-by-ten joists at sixteen inches on center. What should the contractor verify?

- A. Standard two-by-ten floor joists always provide adequate capacity for any residential bathroom fixture regardless of the weight
- B. The floor framing is decorative in this location and the tub weight transfers directly to the foundation through the subfloor
- C. The contractor should verify with the structural engineer that the floor framing provides adequate capacity for the concentrated load from the filled tub, which creates a seventy-pound-per-square-foot load significantly exceeding the standard forty-pound residential live load
- D. The tub weight is insignificant compared to the floor's designed capacity and no verification is needed for standard bath fixtures

60. A contractor is managing a commercial project and the project reaches substantial completion. The architect issues the certificate of substantial completion. What legal and contractual significance does this certificate have?

A. The certificate is a courtesy document with no legal or contractual significance beyond recording the completion date for filing

B. The certificate triggers several important contractual events including the start of the warranty period, the owner's ability to occupy the building, the transfer of certain risk and insurance responsibilities, and the commencement of the time period for retainage release

C. The certificate releases the contractor from all future obligations including punch list work and warranty responsibilities

D. The certificate is issued only on public works projects and has no application to private commercial construction contracts

61. A contractor is building a residential addition and discovers that the existing home's roof trusses were designed with a bottom chord bearing condition, but the addition's bearing wall is positioned to support the trusses at a panel point along the bottom chord. This creates a point load on the bottom chord that the truss was not designed to resist. What structural risk does this create?

A. Bottom chord bearing trusses can accept point loads at any location along the bottom chord without structural consequence

B. The point load creates a compression force in the bottom chord at the bearing location that may cause the chord to buckle or the web members adjacent to the bearing to fail because the truss was designed for bearing only at the endpoints

C. The truss manufacturer's warranty covers any damage caused by improper bearing conditions during the first five years of service

D. The additional bearing point strengthens the truss by reducing the span and decreasing the bending stress in the bottom chord

62. Under Oregon law, a contractor who fails to pay subcontractors on a private commercial project may face consequences beyond the subcontractor's direct legal remedies. What broader business consequence can result from a pattern of not paying subcontractors?

A. The CCB may take disciplinary action against the contractor's license based on complaints from unpaid subcontractors, and the contractor's bonding capacity and surety relationship may be jeopardized

B. No consequences exist beyond the individual subcontractor's legal remedies because the CCB does not regulate payment disputes

- C. The Oregon Attorney General automatically files criminal charges against contractors who fail to pay subcontractors on time
- D. The contractor's insurance company cancels the general liability policy when subcontractor payment complaints are filed

63. A contractor is performing a commercial renovation and the existing building has a fire sprinkler system with painted sprinkler heads. During the renovation, the contractor's painting crew paints over several additional sprinkler heads. Why is painting sprinkler heads a fire safety concern?

- A. Paint on sprinkler heads is an aesthetic issue that affects only the visual appearance of the fire protection system equipment
- B. Painted sprinkler heads function identically to unpainted heads because the paint melts instantly when exposed to fire temperatures
- C. Paint only affects the sprinkler head's coverage pattern and has no impact on the activation temperature or response time
- D. Paint on the sprinkler head may not affect activation but is prohibited because paint can be a sign of prior activation or tampering

64. A contractor is building a residential home and the plans specify a high-efficiency mini-split heat pump system for heating and cooling. The outdoor unit is connected to multiple indoor units throughout the house. The contractor installs the outdoor unit on the north side of the house where it is shaded by the building year-round. During heating season, frost buildup on the outdoor coil is excessive. What installation factor contributed to this problem?

- A. The outdoor unit placement has no effect on frost buildup because all heat pump systems produce the same amount of frost
- B. The shaded north-side location receives no solar radiation to help melt frost accumulation on the outdoor coil, and the cooler microclimate increases the frequency and duration of defrost cycles, reducing the system's heating efficiency
- C. The frost buildup is caused by a refrigerant charge error and is unrelated to the outdoor unit's location or sun exposure
- D. The outdoor unit should be installed on the north side specifically to prevent overheating during summer cooling operation

65. A contractor is managing a commercial project and the fire protection engineer requires the contractor to install a clean agent fire suppression system in the building's telecommunications room. The system uses FM-200 as the suppressing agent. After installation, the contractor discovers that the room has a ventilation supply register that was not shown on the fire protection plans. What must be addressed before the system can be commissioned?

- A. The supply register must be equipped with an automatic damper that closes when the clean agent system activates, preventing the agent from being diluted by incoming ventilation air and maintaining the design concentration
- B. The ventilation register has no impact on the clean agent system performance because the agent is heavier than air and stays low
- C. The register should be permanently sealed because the telecommunications room does not require ventilation during normal operation
- D. The clean agent system must be redesigned with a larger tank to compensate for the air dilution from the ventilation supply

66. A contractor is building a residential home and the energy code requires the contractor to verify that all ductwork is properly sealed before the duct leakage test. The contractor uses standard cloth duct tape on the longitudinal seams and mastic on the transverse joints. The energy inspector notes that the cloth tape does not meet the code requirement. What is the acceptable sealing method?

- A. Standard cloth duct tape is acceptable on longitudinal seams because only transverse joints require mastic sealant for code compliance
- B. All duct seams must be sealed with either mastic sealant or UL one-eighty-one-listed duct tape because standard cloth tape fails over time
- C. The energy code requires duct sealing only on the return air side of the system and supply ductwork is exempt from sealing requirements
- D. Standard cloth tape is acceptable if the contractor applies two layers at each longitudinal seam instead of the single layer installed

67. A contractor is managing a commercial project and the building's emergency generator is tested monthly as required by the fire code. During the most recent test, the generator fails to start. The contractor's maintenance team discovers that the battery charger for the starting batteries has failed, and the batteries are depleted. Under the fire code, what must be done?

- A. The generator test may be postponed until the next scheduled monthly test date because one missed test is within acceptable limits
- B. The battery charger must be repaired or replaced immediately and the generator must be tested to verify reliable starting because the emergency power system must be maintained in a ready-to-operate condition at all times
- C. The building may continue to operate normally because the generator is a backup system and the utility power provides primary service
- D. The fire marshal must be notified but no corrective action is required until the next scheduled annual generator maintenance visit

68. A contractor is building a residential home and the homeowner asks the contractor to explain why the building code requires tempered glass in certain locations. Which of the following locations requires safety glazing under the residential building code?

- A. All windows in the house regardless of location, size, or proximity to walking surfaces or water sources must use tempered glass
- B. Only skylights and roof windows require tempered glass because they are the only glazing exposed to impact from above
- C. Glass in doors, sidelights adjacent to doors, windows within specified distances of bathtubs and showers, glass adjacent to stairways and landings, and glass in locations where impact is likely based on proximity to walking surfaces
- D. Only bathroom windows require tempered glass because bathrooms are the only wet locations in residential construction

69. A contractor is managing a commercial project and the building's HVAC system includes a chilled water plant with two chillers operating in a lead-lag configuration. The building automation system is programmed to stage the second chiller when the cooling demand exceeds the capacity of the first chiller. During commissioning, the staging sequence fails and both chillers run simultaneously at all times. What energy consequence does this malfunction have?

- A. Running both chillers simultaneously improves energy efficiency because each chiller operates at a lower percentage of capacity
- B. The simultaneous operation has no energy impact because the total cooling output matches the building's maximum design capacity
- C. The malfunction causes the building to overcool during low-demand periods and wastes energy from running the second chiller when only one is needed
- D. Running both chillers simultaneously wastes significant energy because the second chiller runs continuously at partial load when it is not needed, consuming energy for compressor operation, condenser water pumping, and cooling tower fan operation during periods of low demand

70. A contractor is performing a residential renovation and discovers that the existing home has a Federal Pacific Electric panel. The homeowner has experienced occasional breaker trips and flickering lights. The contractor recommends panel replacement but the homeowner declines due to cost. The contractor proceeds with the renovation without replacing the panel. If a fire occurs due to the panel's failure to trip during an overcurrent event, what liability does the contractor face?

- A. No liability because the homeowner declined the recommendation and the contractor documented the conversation in writing

- B. No liability because the existing panel was not part of the contracted renovation scope and the contractor has no duty to upgrade
- C. Full liability because the contractor should have refused to perform any work until the homeowner agreed to replace the panel
- D. The contractor's liability depends on whether the contractor adequately documented the recommendation and the homeowner's refusal, but having knowledge of a known safety hazard and proceeding without resolution may create exposure

71. A contractor is building a commercial structure and the specifications require the installation of a building information modeling coordination process during construction. The BIM model is used to detect clashes between the structural, mechanical, electrical, and plumbing systems before installation. What is the primary benefit of BIM clash detection?

- A. BIM clash detection improves the building's aesthetic appearance by ensuring all exposed systems are visually coordinated
- B. BIM models replace the need for construction documents because the three-dimensional model contains all necessary information
- C. BIM clash detection identifies conflicts between building systems in the virtual model before they are built in the field, preventing costly rework, delays, and coordination failures during construction
- D. BIM models are required only for LEED-certified buildings and provide no practical benefit for standard commercial construction

72. A contractor is managing a residential project and the building inspector performs the final inspection. The inspector notes that the house numbers are not visible from the street. Under Oregon building codes, why is house number visibility required?

- A. House numbers are required only for aesthetic purposes and to comply with the homeowners' association design guidelines
- B. Visible house numbers allow emergency responders to quickly locate the property during medical, fire, or police emergencies, which can be the difference between life and death when seconds matter
- C. House numbers are required only for mail delivery purposes and the post office enforces the requirement through delivery refusal
- D. Visible house numbers are optional in Oregon and the building inspector cannot require them as a condition of final approval

73. Under Oregon law, a contractor completes a residential construction project. The homeowner files a CCB complaint alleging that the contractor failed to complete the work per the contract specifications. The CCB investigates and finds the complaint valid. The

contractor's surety bond is accessed to compensate the homeowner. What happens to the contractor's bond after a claim is paid?

- A. The contractor must replenish the bond to its full face amount because the surety company requires the bond to be maintained at the original value, and the contractor owes the surety company the full amount paid on the claim
- B. The bond is permanently canceled and the contractor must obtain a new bond from a different surety company for future licensing
- C. The bond amount is automatically reduced by the claim payment and the contractor continues operating with the reduced bond value
- D. The surety company absorbs the claim payment as a cost of doing business and the contractor's bond remains at the full amount

74. A contractor is building a commercial structure and the fire code requires the installation of emergency lighting along all exit routes. The emergency lighting must provide a minimum of one foot-candle of illumination at the floor level along the means of egress. The contractor installs emergency lighting that provides only zero-point-five foot-candles. What is the life safety concern?

- A. The reduced illumination meets the minimum code requirement because the one-foot-candle standard applies only to exterior exit pathways
- B. Zero-point-five foot-candles provides adequate visibility for evacuating occupants because human eyes adjust quickly to low light levels
- C. The half-foot-candle illumination may not provide adequate visibility for building occupants to safely navigate corridors, stairways, and exits during a power failure, increasing the risk of trips, falls, and inability to locate exits
- D. The emergency lighting level affects only the building's insurance rating and has no practical impact on occupant safety during evacuation

75. A contractor is managing a commercial project and the owner requests that the contractor explain the concept of integrated project delivery. How does integrated project delivery differ from traditional design-bid-build?

- A. Integrated project delivery uses the same contractual framework as design-bid-build but with a shorter project schedule requirement
- B. Integrated project delivery eliminates the architect's role and assigns all design responsibility to the general contractor exclusively
- C. Integrated project delivery brings the owner, architect, and contractor together early in the design process under a multi-party agreement that aligns financial incentives, shares risk and reward, and promotes collaborative decision-making throughout the project
- D. Integrated project delivery is identical to construction management at risk with the only difference being the payment structure

76. A contractor is building a residential home and the plans show a structural steel beam supporting the second floor over a large open living area. The beam requires fireproofing to achieve the specified fire-resistance rating. The contractor installs the beam but does not apply the required fireproofing material. During a fire, what is the consequence of the unprotected steel beam?

- A. Structural steel maintains its full strength at all temperatures and fireproofing is applied only to protect the surface finish
- B. The unprotected steel beam will not be affected by residential fire temperatures because homes do not generate enough heat
- C. Fireproofing is required only on commercial buildings and residential steel beams are exempt from fire protection requirements
- D. The unprotected steel beam will lose strength rapidly when exposed to fire temperatures, potentially causing the beam to deflect, buckle, or collapse as the steel approaches its critical temperature

77. A contractor is performing a residential renovation and the existing home has outdated knob-and-tube wiring in the attic and walls. The homeowner asks whether the renovation triggers a requirement to upgrade the existing wiring. Under Oregon building codes, when does an existing electrical system require upgrading during a renovation?

- A. The existing wiring must be upgraded whenever any renovation work is performed in the building regardless of the renovation scope
- B. The existing wiring never requires upgrading because it was code-compliant when originally installed and is permanently grandfathered
- C. The extent of required electrical upgrades depends on the scope of the renovation, and the building official determines whether the existing wiring must be brought into compliance based on the applicable code provisions
- D. Only the wiring in the rooms being renovated must be upgraded and all other existing wiring throughout the home is exempt

78. A contractor is managing a commercial project and the specifications require the contractor to install a complete building commissioning system including permanent monitoring points for ongoing energy performance tracking. What is the purpose of permanent monitoring points?

- A. The monitoring points allow the building inspector to verify code compliance remotely without visiting the building for inspections
- B. The monitoring points track the building's occupancy levels for security system integration and emergency evacuation planning

- C. The permanent monitoring points enable ongoing verification that the building systems continue to operate at their designed efficiency levels throughout the building's operational life, supporting continuous commissioning
- D. The monitoring points are required only during the first year of operation and are deactivated after the warranty period expires

79. A contractor is building a residential home and the homeowner asks whether the home needs arc-fault circuit interrupter protection on the kitchen circuits. Under the most recent National Electrical Code editions adopted in Oregon, which circuits require AFCI protection?

- A. Only bedroom circuits require AFCI protection and kitchen circuits are specifically exempt from the AFCI requirement
- B. Current NEC editions require AFCI protection on most habitable room branch circuits including kitchens, bedrooms, living rooms, dining rooms, and other dwelling spaces as specified by the applicable code edition
- C. AFCI protection is required only on circuits serving electronic equipment such as computers and entertainment systems
- D. AFCI protection has been eliminated from the NEC and is no longer required in any residential circuit application

80. A contractor completes the final practice exam — the twenty-fifth exam in this study guide series — bringing the total to two thousand practice questions covering every aspect of Oregon's CCB examination. A test-taker who has worked through all twenty-five exams and reviewed every answer explanation has been exposed to the full scope of topics tested on the Oregon CCB exam. What is the most effective strategy for using this study guide during the final week before the exam?

- A. Read through all two thousand questions one final time without reviewing the answer explanations to build speed
- B. Focus only on the questions answered incorrectly during the first pass through each exam and skip all correctly answered items
- C. Take a break from studying during the final week to allow the information to consolidate naturally without further review
- D. Review the answer explanations for any questions that were missed or uncertain, focus on the recurring themes across all twenty-five exams, and take at least two full practice exams under timed conditions to build test-day confidence and pacing

## Practice Exam 25: Answer Key and Explanations

- 1. A** — A mixed-use building with commercial retail, residential apartments, and parking requires a commercial general contractor endorsement because the commercial components classify the project as commercial construction. The commercial endorsement authorizes work on projects that include both commercial and residential elements within the same building. A residential-only endorsement would not cover the retail and parking components.
- 2. C** — Trending capability records and graphs historical data from building control points such as temperatures, pressures, valve positions, and equipment run status over time. The commissioning agent analyzes this trended data to verify that the mechanical systems respond correctly to changing conditions and operate according to the engineer's design intent. Without trending, system performance verification relies solely on snapshot observations.
- 3. B** — The contractor has a duty to protect the homeowner's existing property during construction, including items in the work area. The satellite dish should have been identified during the pre-construction survey and either protected in place or temporarily relocated before the tear-off began. Damage caused by the contractor's failure to protect existing property is the contractor's financial responsibility.
- 4. A** — Welded wire reinforcement must be positioned in the upper portion of a slab on grade to effectively control surface cracking from shrinkage and applied loads. Reinforcement at the bottom of the slab is in the compression zone where concrete already performs well, and cannot resist the tensile stresses that develop at the top surface. Proper positioning requires the crew to pull the WWR up during or after concrete placement.
- 5. B** — Expansive clay soils exert significantly higher lateral pressure on retaining walls than granular soils because the clay swells when wet, generating additional forces the original design did not anticipate. The structural engineer must evaluate the actual soil conditions and determine whether the wall design needs modification to resist the higher lateral pressures. Proceeding with the original design may result in wall failure.
- 6. D** — Public works contracting in Oregon involves significant additional requirements beyond private construction, including prevailing wage compliance with BOLI-established rates, certified payroll reporting, competitive bidding procedures, and specific bonding and insurance provisions. These requirements protect public funds and ensure fair labor standards on taxpayer-funded projects. Contractors must understand these obligations before entering the public works market.
- 7. A** — A sealed combustion furnace draws combustion air directly from outdoors through a dedicated pipe, eliminating the consumption of indoor air for combustion. This prevents the furnace from depressurizing the living space, which in a tight, energy-efficient home could cause other fuel-burning appliances to backdraft and release carbon monoxide into the living space. Sealed combustion also improves indoor air quality by isolating combustion gases from the living environment.
- 8. C** — A steady pressure drop during the hydrostatic test indicates one or more leaks exist at pipe joints, fittings, or connections in the sprinkler piping system. Every leak must be identified

and repaired before the system can pass the test and be placed in service. A properly installed system holds the test pressure for the full duration without any measurable pressure loss.

**9. B** — Oregon law requires overtime to be calculated at one and one-half times the employee's regular rate of pay, not a blended or averaged rate. Using a blended rate typically results in underpayment of overtime wages. The contractor may owe back wages for all underpaid overtime periods plus penalties and interest assessed by the Bureau of Labor and Industries.

**10. C** — A thermal break is an insulating barrier, typically made of polyamide or polyurethane, placed within the aluminum curtain wall frame to interrupt the thermal conductivity of the metal. Without the thermal break, the highly conductive aluminum transfers heat directly through the frame, increasing energy loss and causing condensation on the interior frame surface during cold weather. The thermal break significantly improves the frame's thermal performance.

**11. D** — Lead solder was banned from use in potable water systems by the Safe Drinking Water Act amendments because lead leaches into drinking water and poses serious health risks including neurological damage, particularly in children. The contractor should inform the homeowner of the potential hazard and recommend that the lead-soldered joints be replaced with lead-free connections by a licensed plumber.

**12. B** — The economizer malfunction is likely caused by a defective or miscalibrated outdoor air temperature sensor or a malfunctioning damper actuator. When the economizer fails to open during favorable outdoor conditions, the system misses the opportunity to use free outdoor air for cooling and instead runs the mechanical refrigeration system unnecessarily, wasting significant energy and increasing operating costs.

**13. D** — A bond beam without the specified horizontal reinforcement cannot resist the lateral forces from soil pressure acting on the foundation wall or the vertical forces transmitted from the structure above. The horizontal rebar provides tensile capacity that the grout alone cannot deliver, tying the wall together as a structural system. Without reinforcement, the bond beam is simply a course of grouted block with no enhanced structural capacity.

**14. B** — A full-section wall mock-up verifies that the assembly can be constructed as designed, demonstrates the expected quality and workmanship standards, confirms the appearance of materials and finishes, and serves as the reference standard for the remainder of the work. Once approved by the architect, the mock-up establishes the minimum acceptable quality that the contractor must maintain throughout production.

**15. D** — High-piled combustible storage creates an elevated fire hazard due to the large fuel load concentrated in a relatively small area. The sprinkler system must deliver higher water density to overcome the intensity of a fire in high-piled storage, may require in-rack sprinklers between storage tiers, and must have a larger water supply to sustain the higher flow rates. Specific storage arrangement controls also apply.

**16. C** — The contractor should stop work and obtain a new survey to determine the actual creek location relative to the planned house position. If the creek is twenty feet closer than shown on the original survey, the house may violate the required setback from the waterway. Building within the setback violates local zoning ordinances and environmental regulations and could require demolition of non-conforming construction.

**17. B** — A fire-rated door label contains the fire-resistance rating in hours, the name of the independent testing laboratory that certified the door, and the applicable test standard such as UL ten-C or NFPA 252. The inspector uses this information to verify that the installed door assembly meets the fire-resistance rating required by the specifications and the building code for that specific opening.

**18. D** — Connecting the addition's ductwork to the existing system without evaluating the system's capacity may result in an undersized system that cannot adequately heat both the existing house and the addition. The system will run longer, consume more energy, and may fail prematurely from overwork. A load calculation should verify whether the existing equipment has sufficient capacity for the increased conditioned area.

**19. D** — While concrete placement methods are generally considered the contractor's means and methods, the specification explicitly requires pump placement. Deviating from a specified method should be documented through an RFI or request for approval to ensure the alternative method does not affect the concrete quality, placement sequence, or structural performance. This documentation protects both the contractor and the owner.

**20. A** — The plans specified an eighty-CFM fan based on the bathroom's size and ventilation requirements. A fifty-CFM fan may not meet the minimum code requirement or provide adequate moisture removal for the specific bathroom configuration. Inadequate exhaust ventilation allows moisture to accumulate on surfaces, promoting mold growth, paint deterioration, and structural damage from prolonged moisture exposure.

**21. A** — A bid bond guarantees the owner that the contractor will enter into the contract at the bid price if awarded the project. A performance bond, issued after the contract is executed, guarantees the contractor will complete the work per the contract terms. The bid bond protects the bidding process while the performance bond protects the construction phase — two fundamentally different risk exposures at different project stages.

**22. D** — The Ceiling Attenuation Class measures how much sound the ceiling system blocks from transmitting through the plenum between adjacent rooms. A CAC of twenty-five allows significantly more sound to pass between rooms than the specified thirty-five, reducing speech privacy in offices, examination rooms, and conference spaces where confidential conversations require adequate sound isolation.

**23. A** — The failure to include the required Information Notice to Owner may serve as grounds for a CCB complaint against the contractor because it is a mandatory disclosure under Oregon law. The omission may also affect the enforceability of certain contract provisions because the homeowner was not properly informed of their statutory rights. This consumer protection requirement cannot be waived or overlooked.

**24. D** — Silica fume particles are approximately one hundred times smaller than cement particles and fill the microscopic voids between cement grains, producing an extremely dense concrete matrix. This density reduces permeability, increases compressive strength, and improves resistance to chloride penetration and chemical attack. Silica fume concrete is specified for applications requiring superior durability and reduced permeability.

**25. D** — The NEC requires electrical panels to be installed in readily accessible locations with adequate working clearance in front of the panel. A bedroom closet may not provide the

required thirty-inch-wide by thirty-six-inch-deep clear working space, and clothing and stored items may obstruct access to the panel. The specific acceptability depends on the closet dimensions and whether the required clearances are maintained.

**26. C** — Every penetration through a fire-rated floor assembly must be firestopped regardless of the type of penetration. Cable tray penetrations create large openings that allow fire and smoke to spread rapidly between floors if left unsealed. The firestopping system must be tested and listed for the specific penetration type and must maintain the full fire-resistance rating of the floor assembly.

**27. A** — The reduced bearing length concentrates the truss's reaction force on a smaller area of the top plate, which can crush the wood fibers and allow the truss to slip off the bearing. The manufacturer's minimum bearing specification ensures adequate surface area to distribute the reaction force and prevent bearing failure. Inadequate bearing is a common cause of floor system failure that is easily prevented.

**28. B** — Standard AIA contract terms typically allow the contractor to request a retainage reduction after the project reaches a specified completion percentage, often fifty percent. The request is subject to the owner's approval and the architect's assessment of the work quality. Retainage reduction improves the contractor's cash flow while the owner retains adequate financial security through the reduced retainage amount.

**29. D** — An unlined masonry chimney does not meet current building code requirements for fireplace inserts because the liner provides the proper flue sizing for the insert's combustion requirements, maintains adequate draft, and protects the masonry from the corrosive effects of combustion gases. Installing an insert without a properly sized liner creates fire and carbon monoxide hazards.

**30. B** — Bolts that are not tightened to the specified minimum tension cannot develop the clamping force needed to create the friction and bearing connections required by the structural design. The contractor must retighten all deficient bolts using the approved tightening method and have the connections reinspected to verify compliance. Under-tensioned bolts can allow joint slippage under design loads.

**31. C** — Heat pump water heaters extract heat from the surrounding air, cooling and dehumidifying it in the process. A small enclosed closet does not provide adequate air volume for the heat pump to extract heat from effectively. The unit rapidly cools the limited air volume in the closet, reducing its efficiency and potentially causing the evaporator coil to frost up from operating below design conditions.

**32. D** — Including dispute resolution information in the contract ensures the homeowner understands the available options for resolving disputes before problems arise. This includes information about the CCB complaint process and any contractual provisions for mediation or arbitration. Clear disclosure of these options at the time of contract signing prevents confusion and promotes efficient dispute resolution.

**33. A** — Drilling dust and debris on the hole walls create a weak boundary layer that prevents the adhesive from bonding to the concrete substrate. The anchor's pullout capacity can be reduced to a fraction of its rated load when installed in an uncleaned hole. Proper hole cleaning using a brush and compressed air is the single most critical step in adhesive anchor installation.

**34. A** — Septic system capacity is based on the number of bedrooms in the dwelling because bedrooms determine the potential number of occupants and the corresponding wastewater generation. Adding two bedrooms increases the design flow, and the existing system may not have adequate capacity for the additional load. The county health department must verify the system's capacity before the addition is approved.

**35. B** — The most common sources of air leakage in commercial building envelopes occur at the transitions between different materials and components. Joints at the roof-to-wall junction, construction joints at floor lines, penetrations for mechanical and electrical systems, and transitions between different cladding materials create discontinuities in the air barrier that allow uncontrolled air movement.

**36. A** — Attic trusses have concentrated loads at specific bearing points that differ from standard truss bearing because the habitable room within the truss creates unique load paths. The bearing walls and floor system below must be designed to support these concentrated loads, which may be significantly higher than standard uniformly distributed truss reactions. The contractor must verify structural adequacy before installation.

**37. A** — Buildings constructed in nineteen sixty commonly contain asbestos in insulation, flooring, joint compound, and roofing materials, as well as lead-based paint on interior and exterior surfaces. Both materials require specialized survey, handling, and disposal procedures during demolition. Failure to identify and properly manage these hazardous materials exposes workers and the public to serious health hazards.

**38. B** — Removing shoring before the post-tensioned slab achieves the required strength eliminates the temporary support that carries the slab's weight during the early curing period. The slab may not yet have sufficient strength to support its own dead weight plus any construction loads, potentially causing excessive deflection, cracking, or catastrophic collapse. Shoring removal timing must follow the engineer's specifications.

**39. D** — Oregon building codes typically require new homes in designated high-radon zones to include a passive radon mitigation system installed during construction. The passive system includes a sub-slab gas-permeable layer, sealed slab penetrations, and a vent pipe routed through the building to above the roofline. If post-construction testing shows elevated radon levels, a fan can be added to convert the system to active operation.

**40. B** — A dedicated outdoor air system separates the ventilation function from the space conditioning function, ensuring each occupied space receives the code-required volume of fresh outdoor air regardless of the zone's heating or cooling demand. In conventional mixed-air systems, the outdoor air volume varies with the supply air volume, potentially under-ventilating spaces during low-demand conditions.

**41. B** — Horizontal cracks at the midheight of a basement wall with inward displacement are classic indicators of lateral soil pressure exceeding the wall's capacity. The soil pushes the wall inward, creating a hinge point at midheight where the bending stress is highest. If the condition progresses, the wall can fail catastrophically, potentially causing foundation collapse and structural damage to the building above.

**42. D** — When VAV boxes remain at maximum airflow regardless of thermostat demand, every zone receives full conditioning whether it needs it or not. This defeats the energy-saving

purpose of the variable air volume system, which is designed to reduce airflow and fan energy during partial-load conditions. The constant maximum airflow wastes significant fan energy and overconditions spaces throughout the building.

**43. D** — If the contractor can demonstrate through documentation that the owner caused the delay by taking excessive time to make a change order decision, the contractor may be entitled to a time extension for the owner-caused delay days. A valid time extension shifts the contractual completion date forward, eliminating or reducing the liquidated damages for the delay days attributable to the owner's actions.

**44. C** — Without the specified dehumidifier, indoor humidity may exceed recommended levels during humid seasons, creating conditions that promote mold growth on surfaces and within wall cavities, dust mite proliferation, condensation on cold surfaces such as windows and pipes, and deterioration of wood and other moisture-sensitive building materials. The dehumidifier was specified to prevent these moisture-related problems.

**45. D** — Elevator recall automatically returns all elevators to the designated recall floor, typically the ground level, opens the doors, and takes the elevators out of normal service. This ensures elevators are available for fire department use during emergency operations and prevents building occupants from using elevators during a fire, which could expose them to smoke-filled elevator shafts.

**46. C** — The piers must extend to the stable bearing stratum specified by the structural engineer to support the building loads without settlement. Shallow piers that do not reach stable soil cannot provide the required bearing capacity, and the foundation will settle when the building loads are applied. The grade beam spans between piers and depends entirely on the piers reaching competent bearing material.

**47. C** — UV-C germicidal irradiation at the two-hundred-fifty-four-nanometer wavelength destroys the DNA of microbial organisms including mold, bacteria, and viruses that grow on the cooling coils and circulate through the air distribution system. This improves indoor air quality by reducing biological contaminants that would otherwise be distributed throughout the building every time the air handler operates.

**48. A** — Converting an unfinished attic to a habitable bedroom requires compliance with minimum ceiling height requirements, egress window specifications for emergency escape, adequate electrical outlets, smoke alarm installation, heating system provision, and ventilation. The existing attic floor joists must also be verified for habitable live load capacity because they may have been designed only for light storage loads.

**49. B** — The stormwater quality monitoring system verifies that the treatment measures installed on the site are effectively removing pollutants from the runoff before it is discharged to the receiving water body or storm drain system. This monitoring data demonstrates compliance with the project's stormwater management permit and protects water quality in downstream waterways.

**50. D** — Oregon generally recognizes the S-corporation federal election, allowing the corporate income to pass through to the shareholders' personal Oregon tax returns where it is taxed at their individual rates. However, the S-corporation entity may also be subject to a

minimum tax at the entity level in Oregon. Contractors should consult with a tax professional for the specific requirements applicable to their situation.

**51. C** — Once the drainage layer, filter fabric, growing medium, and vegetation are installed over the waterproof membrane, locating the source of a leak becomes extremely difficult and expensive because all overburden layers must be removed to access the membrane. Pre-overburden leak testing is the only practical opportunity to verify membrane integrity while repairs are straightforward and cost-effective.

**52. A** — Two tankless electric water heaters drawing a combined two hundred forty amperes would exceed the two-hundred-ampere service capacity before any other household electrical loads are considered. The total electrical demand including lighting, HVAC, appliances, and both water heaters would far exceed the available service capacity. The contractor must evaluate whether a service upgrade to three hundred or four hundred amperes is needed.

**53. C** — The air barrier's effectiveness depends entirely on its continuity across the entire building envelope. Any gap, discontinuity, or unsealed transition creates an air leakage path that undermines the system's performance. Transitions between different materials, junctions at roof-to-wall connections, penetrations for pipes and conduits, and construction joints require meticulous detailing and sealing.

**54. D** — A surge protection device that has absorbed a significant voltage spike may have its metal oxide varistors degraded beyond their protective threshold. The compromised indicator light signals that the device can no longer clamp voltage spikes effectively. The device should be replaced promptly to restore protection for the home's electrical system and connected equipment.

**55. B** — The eleven-month inspection allows the owner to identify any defects, deficiencies, or warranty items before the one-year warranty period expires. This gives the contractor the opportunity to address all items while the warranty obligation is still in effect. Discovering defects after the warranty expires may leave the owner without recourse for repairs.

**56. C** — A three-inch slab is twenty-five percent thinner than the specified four inches, significantly reducing its capacity to resist the concentrated wheel loads from vehicles. The thinner slab has less structural depth to distribute the point loads from tire contact, resulting in higher bending stresses that cause cracking and premature failure. The four-inch specification was selected specifically for vehicle traffic.

**57. A** — Oregon law requires a written contract for residential construction projects, and the contractor should not begin work without the required written agreement regardless of the perceived urgency. The written contract protects both parties by documenting the scope, price, timeline, payment schedule, and all required disclosures. Starting work without a contract violates Oregon contractor regulations and creates significant legal risk.

**58. A** — Structural sealant applied below the manufacturer's minimum temperature may not cure properly because the chemical reaction that creates the bond is temperature-dependent. Poor curing results in reduced adhesion, diminished flexibility, and eventual joint failure that allows water infiltration through the curtain wall system. The contractor must protect the work area and maintain minimum temperatures during sealant application.

**59. C** — A filled soaking tub with an occupant creates approximately seventy pounds per square foot of concentrated load, which significantly exceeds the standard forty-pound residential live load design. The contractor must verify with the structural engineer that the floor framing can support this concentrated load without excessive deflection or failure. Additional blocking, sistered joists, or engineered support may be required.

**60. B** — The certificate of substantial completion is one of the most significant documents in the construction process because it triggers the start of the warranty period, authorizes the owner to occupy and use the building, may transfer certain risk and insurance responsibilities from the contractor to the owner, and commences the time period for retainage release and final payment processing.

**61. C** — Bottom chord bearing trusses are designed to be supported only at the endpoints of the bottom chord. Introducing a bearing point along the bottom chord creates forces the truss was not designed to resist, potentially causing the chord to buckle in compression at the intermediate bearing or overstressing the web members adjacent to the unplanned support. The truss engineer must evaluate any non-standard bearing condition.

**62. A** — A pattern of not paying subcontractors can trigger CCB disciplinary action based on complaints from unpaid parties, potentially resulting in license suspension or revocation. Additionally, the contractor's surety company may reduce bonding capacity or decline to issue future bonds when payment complaints indicate financial instability. The cumulative effect can severely damage the contractor's ability to operate.

**63. B** — While the primary concern with painted sprinkler heads is that paint can insulate the thermal element and delay activation, NFPA standards prohibit field-applied paint on sprinkler heads. Painted heads must be replaced with new heads because the paint may affect the temperature rating, response time, and spray pattern. The contractor's painting crew must mask or bag all sprinkler heads before painting adjacent surfaces.

**64. B** — The shaded north-side location receives no direct solar radiation to assist with melting frost that accumulates on the outdoor heat exchanger coil during heating operation. The cooler microclimate on the north side increases the frequency and duration of defrost cycles, during which the system reverses to cooling mode to melt the frost. Each defrost cycle temporarily reduces heating output and consumes additional energy.

**65. A** — When the clean agent system discharges, the agent must achieve and maintain a specific design concentration to suppress the fire. A ventilation supply register that remains open during discharge introduces fresh air that dilutes the agent below the effective concentration. An automatic damper that closes upon system activation prevents this dilution and ensures the agent reaches and maintains the required concentration.

**66. B** — All duct seams and joints must be sealed with either mastic sealant or UL 181-listed duct tape specifically manufactured for HVAC duct sealing applications. Standard cloth duct tape adhesive fails over time from temperature cycling and airflow exposure, causing joints to open and leak conditioned air. UL 181-listed tape is tested and certified to maintain its seal under HVAC operating conditions.

**67. B** — An emergency generator that fails to start cannot provide backup power during a utility outage, leaving the building without emergency lighting, fire alarm power, elevator

recall capability, and other life safety systems. The battery charger must be repaired immediately, the batteries recharged or replaced, and the generator tested to verify reliable starting. The fire code requires the emergency power system to be maintained in a ready condition.

**68. C** — Safety glazing is required in locations where human impact with the glass is foreseeable, including glass in doors, sidelights within twenty-four inches of doors, glass adjacent to bathtubs and showers, glass near stairways and landings, and glass within specified distances of walking surfaces where people could fall into it. These locations are identified based on the likelihood of accidental impact.

**69. D** — Running both chillers simultaneously when only one is needed wastes significant energy because the second chiller's compressor, condenser water pump, and cooling tower fan all consume energy to provide cooling capacity that is not required. The lead-lag staging sequence is designed to match the cooling output to the actual demand, bringing the second chiller online only when the first reaches its capacity limit.

**70. D** — The contractor's liability exposure depends on the specific circumstances including whether the recommendation was adequately documented, whether the homeowner's refusal was recorded in writing, and the degree to which the contractor's knowledge of a known safety hazard creates a duty to act. Having documented knowledge of a defective panel and proceeding without resolution may create exposure despite the homeowner's refusal.

**71. C** — BIM clash detection identifies conflicts between structural, mechanical, electrical, and plumbing systems in the three-dimensional virtual model before they are encountered in the field. Discovering a duct running through a beam in the model costs nothing to fix compared to discovering the same conflict during construction, which requires expensive rework, change orders, and schedule delays.

**72. B** — Visible house numbers allow emergency responders including paramedics, firefighters, and police to quickly locate the correct property during emergencies. When seconds matter in a medical emergency, fire response, or law enforcement situation, clearly visible house numbers from the street can be the difference between timely and delayed response. This is a life safety requirement, not merely an aesthetic preference.

**73. A** — After a surety bond claim is paid, the contractor must replenish the bond to its full face amount to maintain their CCB license. Additionally, the contractor owes the surety company the full amount paid on the claim because the surety bond is not insurance — it is a guarantee backed by the contractor's personal indemnity agreement. The surety has the right to recover from the contractor every dollar paid on the claim.

**74. C** — Emergency lighting that provides only zero-point-five foot-candles at the floor level is half the minimum one-foot-candle requirement specified by the building code. During a power failure, this reduced illumination may not provide adequate visibility for building occupants to safely identify exit signs, navigate corridors, descend stairways, and locate exit doors, increasing the risk of falls and delayed evacuation.

**75. C** — Integrated project delivery brings the owner, architect, and contractor together at the earliest stages of design under a multi-party agreement that aligns financial incentives through shared risk and reward provisions. This collaborative framework promotes joint decision-

making, early involvement of construction expertise during design, and a unified team approach that reduces adversarial relationships and promotes project success.

**76. A** — Structural steel loses approximately fifty percent of its yield strength at temperatures around eleven hundred degrees Fahrenheit, which can be reached within minutes during a building fire. Without fireproofing, the exposed steel beam rapidly loses its load-carrying capacity and can deflect, buckle, or collapse, causing the floor system above to fail. Fireproofing insulates the steel to slow the temperature rise and maintain structural capacity.

**77. A** — The extent of required electrical upgrades during a renovation depends on the scope of the work and the building official's interpretation of the applicable code. Some jurisdictions require existing wiring to be updated when walls are opened, while others require upgrades only when the renovation triggers specific thresholds. The building official makes the final determination based on the project's specific circumstances and the applicable code provisions.

**78. C** — Permanent monitoring points enable ongoing verification that building systems continue to operate at their designed efficiency levels throughout the building's operational life. This continuous commissioning approach identifies performance degradation, calibration drift, and operational changes that reduce energy efficiency. Ongoing monitoring ensures the building maintains its designed performance rather than gradually losing efficiency after initial commissioning.

**79. B** — Current NEC editions have expanded AFCI protection requirements to include most habitable room branch circuits in dwelling units, including kitchens, bedrooms, living rooms, dining rooms, family rooms, and other habitable spaces. AFCI breakers detect dangerous arcing conditions in wiring that could cause fires and disconnect the circuit before ignition occurs. The specific requirements depend on the NEC edition adopted by the local jurisdiction.

**80. D** — The most effective final-week strategy combines targeted review of missed questions with full-length timed practice exams. Reviewing answer explanations for incorrect or uncertain questions reinforces the knowledge gaps, while identifying recurring themes across all twenty-five exams reveals the high-frequency topics most likely to appear on the actual exam. Timed practice builds the pacing discipline and test-day confidence needed to perform at peak level.

