PRACTICE EXAM 19: OREGON CCB SIMULATION (80 QUESTIONS)

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

1. A contractor receives a complaint from a homeowner alleging that the new roof leaks during heavy rain. The contractor inspects the roof and determines that the leak originates from improper step flashing installation at a chimney-to-roof intersection. The contractor installed the roof six months ago. Under Oregon's implied warranty of workmanlike construction, what is the contractor's obligation?

A. No obligation exists because the homeowner should have inspected the flashing before making the final payment on the project
B. The contractor is obligated to repair the defective flashing at no cost to the homeowner because the work does not meet the standard of a reasonably competent contractor
C. The contractor must repair the flashing only if the homeowner agrees to pay for the labor cost while the contractor provides materials free
D. The contractor's obligation is limited to providing the homeowner with written instructions on how to repair the flashing themselves

2. A contractor is estimating a commercial tenant improvement project. The owner provides a set of preliminary drawings and asks for a guaranteed maximum price before the design is complete. What risk does the contractor face by providing a GMP based on incomplete design documents?

A. No risk exists because a guaranteed maximum price can be adjusted upward without limitation as the design develops further
B. The risk is limited to the ten percent contingency that is standard in all guaranteed maximum price contracts in Oregon
C. The contractor risks absorbing costs for scope items not anticipated in the preliminary drawings that emerge as the design is completed, because the GMP caps the owner's financial exposure
D. The guaranteed maximum price automatically converts to a cost-plus contract if design changes exceed five percent of the original GMP

3. Under Oregon law, a contractor performing work on a residential project must ensure that all subcontractors maintain active CCB licenses. The general contractor hires a framing subcontractor who allows their CCB license to lapse during the project. What is the general contractor's potential liability?

A. The general contractor may face CCB disciplinary action for knowingly or negligently allowing an unlicensed subcontractor to perform construction work on the project
B. No liability exists because each subcontractor is independently responsible for maintaining their own CCB license status
C. The general contractor's liability is limited to a written warning from the CCB for the first occurrence of hiring an unlicensed subcontractor
D. The general contractor must terminate the framing subcontractor but faces no additional penalties beyond the subcontractor's removal

4. A contractor is scheduling a commercial project and identifies that the critical path runs through the structural steel erection, metal deck installation, and concrete topping slab activities. The steel erection is delayed by two weeks due to fabrication shop errors. What is the impact on the project completion date?

A. No impact because the two-week delay is absorbed by the float available on the steel erection activity path
B. The project is delayed by one week because the concrete topping slab can begin before the metal deck is fully installed
C. The project completion date is delayed by two weeks because any delay on a critical path activity directly extends the overall project duration by the same amount
D. The project is delayed by four weeks because the delay doubles as it cascades through two subsequent critical path activities

5. A contractor is building a residential home and the building code requires smoke alarms in specific locations throughout the dwelling. Under the Oregon Residential Specialty Code, which locations require smoke alarms?

A. Only in the kitchen and living room areas where cooking and heating appliances are present during normal occupancy
B. Only in bedrooms and hallways on floors that contain sleeping rooms within the residential dwelling unit
C. Only in the garage and utility room where combustible materials and mechanical equipment are located within the home
D. Inside each bedroom, outside each sleeping area, and on every level of the dwelling including the basement as required by the applicable code

6. A contractor operates a construction business and needs to determine the appropriate insurance coverage for a fleet of company vehicles used to transport workers and materials to jobsites. Which type of insurance provides coverage for bodily injury and property damage caused by accidents involving the contractor's vehicles?

A. Builder's risk insurance provides coverage for vehicle accidents occurring during construction-related transportation activities
B. Workers' compensation insurance covers all injuries to employees including those occurring in vehicle accidents on the job
C. Commercial auto liability insurance provides coverage for bodily injury and property damage claims arising from accidents involving the contractor's owned, leased, or hired vehicles
D. General liability insurance automatically extends to cover all vehicle-related accidents involving the contractor's employees

7. A contractor is hired to install a new concrete driveway for a residential property. The homeowner requests that the driveway be poured in a decorative stamped pattern with integral color. After the pour, the homeowner complains that the color is inconsistent across the surface of the driveway. What is the most likely cause of the color inconsistency?

A. The concrete supplier delivered a different mix design than what was specified on the original order for the driveway pour
B. The stamped pattern depth varied across the surface, causing visual distortion that makes the uniform color appear inconsistent
C. Inconsistent application of the integral color, variations in the finishing technique, or differences in curing conditions across the slab surface caused the color variation
D. The underlying soil composition caused chemical reactions that altered the concrete color during the initial curing period

8. A general contractor on a commercial project issues a subcontractor default notice after the subcontractor fails to maintain the required schedule progress for three consecutive weeks. Under standard subcontract terms, what rights does this notice typically provide to the general contractor?

A. The right to immediately terminate the subcontract without providing the subcontractor any opportunity to cure the default
B. The right to provide the subcontractor with a specified cure period, and if the subcontractor fails to cure the default, the right to terminate the subcontract and hire a replacement
C. The right to reduce the subcontract price by twenty-five percent as a penalty for each week of schedule non-compliance

D. The right to file a CCB complaint against the subcontractor but no right to terminate the subcontract under any circumstances

9. Under Oregon law, a homeowner hires a contractor to build a custom home. The contract price is four hundred fifty thousand dollars. The homeowner finances the project through a construction loan. The lender requires the contractor to sign a lender's consent and subordination agreement. What does this agreement typically require of the contractor?

A. The contractor agrees to subordinate their construction lien rights to the lender's deed of trust, meaning the lender's interest takes priority over the contractor's lien in the event of foreclosure
B. The contractor agrees to repay the construction loan directly if the homeowner defaults on the loan payments during the project
C. The contractor guarantees that the project will appraise at a value equal to or greater than the construction loan amount
D. The contractor agrees to complete the project at no additional cost if the construction loan funds are exhausted before completion

10. A contractor is reviewing OSHA's scaffolding regulations for a commercial project. The project requires the erection of a supported scaffold system that will be used by workers at heights of forty feet above the ground. Under OSHA regulations, who must design the scaffold system?

A. A qualified person must design the scaffold, and when the scaffold exceeds a height-to-base-width ratio of four to one, a registered professional engineer must design the scaffold and its guy wires or tie-ins
B. Any worker with more than three years of scaffolding experience may design the system without engineering calculations
C. The scaffold rental company designs all scaffolding systems and assumes full responsibility for the structural adequacy
D. The building inspector must review and approve the scaffold design before any scaffold erection begins on the project

11. A contractor is building a commercial kitchen and the health department requires the floor to be a seamless, nonporous surface that slopes to floor drains for proper cleaning and sanitation. The specifications call for epoxy-coated concrete flooring. During installation, the contractor notices that the concrete substrate has excessive moisture vapor emissions. What should the contractor do before applying the epoxy coating?

A. Apply the epoxy coating immediately because epoxy is impervious to moisture and creates a moisture barrier on the concrete surface
B. Roughen the concrete surface with a grinder to improve adhesion and proceed with the epoxy application on the same day
C. Test the concrete moisture vapor emission rate, and if it exceeds the epoxy manufacturer's maximum limit, install a moisture mitigation system before applying the epoxy to prevent coating failure
D. Apply a primer coat of standard latex paint to seal the concrete surface before applying the epoxy finish coating over the primer

12. A contractor is hired to perform a commercial roof replacement. The project specifications require the contractor to obtain a roof warranty from the roofing material manufacturer. The manufacturer's warranty requires that the roof system be installed by a manufacturer-certified applicator. The contractor is not manufacturer-certified. What is the most appropriate course of action?

A. Subcontract the roof installation to a manufacturer-certified applicator who can ensure the warranty requirements are met and the roofing system is properly installed
B. Install the roof system and apply for manufacturer certification after the project is complete to obtain the warranty retroactively
C. Provide a contractor warranty in lieu of the manufacturer warranty because contractor warranties provide equivalent coverage and protection
D. Request the owner to waive the manufacturer warranty requirement and accept a contractor warranty covering materials and labor

13. A contractor is managing a residential project and the homeowner requests a detailed breakdown of all costs including the contractor's overhead and profit percentages. Under Oregon law, is the contractor required to disclose the overhead and profit breakdown to the homeowner?

A. No, the contractor is not required to disclose overhead and profit margins on a fixed-price residential contract because the agreed-upon contract price represents the total obligation regardless of the internal cost breakdown
B. Yes, Oregon law requires full financial disclosure including overhead, profit, and all subcontractor markups on every residential contract
C. Yes, but only on contracts exceeding one hundred thousand dollars where detailed cost disclosure is mandatory under Oregon statute
D. No, but the contractor must disclose the breakdown if the homeowner files a formal written request with the CCB within thirty days

14. A contractor is installing a commercial HVAC system and discovers that the rooftop unit specified in the mechanical plans is no longer manufactured. The mechanical engineer selects a replacement unit with different dimensions and weight. What must the contractor verify before installing the replacement unit on the roof?

A. Only the electrical connection configuration to ensure the replacement unit is compatible with the existing electrical service panel
B. Only the refrigerant type to ensure the replacement unit uses the same refrigerant as the original specified equipment
C. The structural capacity of the roof to support the new unit's weight, the adequacy of the existing curb and ductwork connections, and the electrical service compatibility
D. Only the warranty terms to ensure the replacement unit carries the same warranty duration as the originally specified equipment

15. Under Oregon employment law, an employer must maintain a workplace free from discrimination and harassment. A contractor's employee reports that a coworker has been making discriminatory comments on the jobsite. What is the employer's legal obligation upon receiving this report?

A. The employer must transfer the complaining employee to a different jobsite to separate the two individuals immediately
B. The employer has no obligation because construction jobsite culture is exempt from workplace discrimination laws in Oregon
C. The employer must wait until multiple employees report the same behavior before initiating any investigation or action
D. The employer must promptly investigate the complaint, take appropriate corrective action to stop the discriminatory behavior, and ensure the reporting employee is protected from retaliation

16. A contractor is building a residential home and the plans call for a tankless water heater. The manufacturer's installation manual requires a dedicated gas line with a minimum three-quarter-inch diameter to supply adequate gas volume to the unit. The existing half-inch gas line from the meter is inadequate. What must the contractor do?

A. Install the tankless water heater on the existing half-inch gas line because the water heater's internal regulator compensates for reduced flow
B. Install a new gas supply line with a minimum three-quarter-inch diameter from the meter to the water heater as specified by the manufacturer, and obtain the required plumbing and gas permit
C. Add a gas booster pump to the existing half-inch line to increase the gas volume delivered to the tankless water heater

D. Install a reduced-capacity tankless water heater that operates on the existing half-inch gas line without modification

17. A contractor is performing a commercial building envelope inspection and discovers that the window sealant joints between the curtain wall frames and the adjacent precast concrete panels are cracked and deteriorating. The building is ten years old and the original sealant has reached the end of its service life. What type of maintenance is this sealant replacement classified as?

A. Emergency repair work that must be completed within twenty-four hours of discovery to prevent immediate structural failure
B. Cosmetic maintenance that affects only the building's appearance and has no impact on the building's weather resistance
C. Preventive maintenance that addresses a weatherproofing component before it fails completely, preventing water infiltration and potential damage to interior finishes and structural elements
D. Capital improvement work that increases the building's value above its original construction cost and must be capitalized

18. A contractor is managing a commercial project and the specifications require the contractor to submit shop drawings for all structural steel connections. The steel fabricator submits shop drawings showing connections that differ from the structural engineer's design. Under standard contract procedures, who reviews and approves the shop drawings?

A. The general contractor's project manager reviews and approves all shop drawings as part of the contractor's quality control process
B. The building inspector reviews and approves shop drawings during the plan review phase before the building permit is issued
C. The steel fabricator self-certifies the shop drawings because the fabricator is responsible for all connection design and detailing
D. The structural engineer of record reviews the shop drawings to verify the connections comply with the structural design intent and applicable codes

19. A contractor discovers that an employee has been working without the required fall protection while performing roofing work at a height of twenty-two feet. The contractor's safety manager was not present at the time. Under OSHA enforcement, what is the employer's potential liability?

A. No liability because the safety manager's absence means the employer was unaware of the violation at the time it occurred

B. Limited liability because the employee is personally responsible for wearing the fall protection equipment provided by the employer
C. Liability only if the employee files a formal complaint with OSHA within seventy-two hours of the observed safety violation
D. The employer is liable for the violation because OSHA holds the employer responsible for ensuring employees comply with safety standards, regardless of whether a supervisor was present at the time

20. A contractor is hired to install a residential swimming pool. Under Oregon building codes, what safety feature is required for all residential swimming pools?

A. A barrier such as a fence or wall with a self-closing, self-latching gate that prevents unsupervised access to the pool area by young children as required by the applicable code
B. An alarm system installed on all exterior doors of the house that provides audible notification when a door is opened toward the pool
C. A pool cover that is permanently installed over the pool surface and can support the weight of an adult walking across it
D. A minimum setback of twenty-five feet between the pool edge and any property line or habitable structure on the lot

21. A contractor is building a commercial warehouse and the structural plans specify concrete tilt-up wall panels. The panels will be cast on the warehouse floor slab and tilted into position using a crane. What is the most critical structural concern during the tilt-up operation?

A. The temporary bracing of each panel after it is set in place, because the panels are unstable until permanently connected to the roof structure and adjacent panels
B. The color consistency of the concrete panels as they are lifted from the casting slab to the final wall position
C. The curing time of the floor slab sealant that prevents the tilt-up panels from bonding permanently to the casting surface
D. The aesthetic alignment of the panel joints to ensure uniform spacing between all panels along the warehouse perimeter

22. A contractor is reviewing the project specifications for a commercial building and finds that the specifications reference Division 01 general requirements. What type of information is typically found in Division 01 of the construction specifications?

A. Detailed material specifications for concrete including mix design, reinforcement requirements, and placement procedures

B. Mechanical system specifications including HVAC equipment schedules, piping materials, and insulation requirements
C. Electrical system specifications including panel schedules, wire sizing, and conduit routing requirements for the building
D. Administrative and procedural requirements including submittal procedures, payment applications, quality control, project meetings, temporary facilities, and closeout requirements

23. A contractor is performing excavation work near an existing natural gas pipeline. The one-call utility locating service has marked the approximate location of the gas line with yellow paint on the ground surface. The contractor's excavation will come within eighteen inches of the marked utility location. Under Oregon law, what excavation method is required within the tolerance zone of the marked utility?

A. Machine excavation with a standard backhoe is permitted within the tolerance zone if the operator proceeds at a reduced speed
B. Hand digging or other non-destructive methods such as vacuum excavation are required within the tolerance zone to prevent damage to the underground utility
C. The contractor must obtain written permission from the gas utility company before any excavation begins within ten feet of the line
D. The contractor must relocate the planned excavation at least five feet from the marked utility location before any digging begins

24. A contractor is building a residential home and the structural plans specify hold-down hardware at specific locations on the foundation and framing to resist wind uplift and seismic overturning forces. The contractor installs the foundation bolts for the hold-downs but forgets to install the hold-down straps connecting the framing to the foundation hardware. What is the structural consequence?

A. The lateral force resisting system is incomplete because the load path from the roof framing through the walls to the foundation is broken at the connection point, leaving the structure vulnerable to uplift and overturning failure
B. The foundation bolts alone provide adequate uplift resistance without the connecting straps because the bolt capacity exceeds the design forces
C. The hold-down straps are a secondary backup system and the structure maintains its full design capacity through the anchor bolts alone
D. The missing straps affect only the second-floor walls and the first-floor connections remain adequate for the calculated design loads

25. Under Oregon law, a contractor is hired to perform a residential remodel. The contract includes a provision requiring the homeowner to pay interest on any late payments at a rate of eighteen percent per year. Is this interest rate enforceable?

A. Yes, because there is no legal limit on the interest rate that can be charged in a private construction contract between parties
B. The enforceability depends on whether the rate complies with Oregon's usury laws and whether the contract terms were clearly disclosed and agreed upon by both parties
C. No, because Oregon law prohibits charging any interest on residential construction contracts regardless of the agreed rate
D. Yes, but only if the contractor files a copy of the interest provision with the CCB within ten days of signing the contract

26. A contractor is installing a commercial fire suppression system and the plans require a fire department connection on the exterior of the building. What is the purpose of the fire department connection in a fire suppression system?

A. To allow the building's sprinkler system to supply water to fire department pumper trucks during firefighting operations
B. To provide a backup drain for the sprinkler system when the water pressure exceeds the maximum rated system pressure
C. To allow the fire department to supplement the building's sprinkler system with additional water supply from their pumper trucks, boosting pressure and volume during firefighting operations
D. To monitor the fire sprinkler system remotely and notify the fire department when the system activates during a fire event

27. A contractor is building a residential deck and discovers that the soil beneath the deck footings is fill material that was placed without compaction documentation. The deck will support a hot tub weighing approximately four thousand pounds when filled with water. What should the contractor do?

A. Pour the footings on the fill material because the weight of the concrete will compact the fill sufficiently to support the deck loads
B. Add six inches of gravel on top of the fill material as a drainage layer and pour the footings directly on the gravel surface
C. Increase the footing size by twenty-five percent to distribute the load over a larger area of the uncompacted fill material
D. Recommend a geotechnical evaluation of the fill material's bearing capacity before pouring footings, because uncompacted fill may settle under the concentrated loads and cause structural failure

28. A contractor is managing a commercial project and the owner requests that the contractor provide a list of all material substitutions made during construction. The contractor has substituted several products without submitting formal substitution requests. Under standard contract terms, what obligation did the contractor violate?

A. The contractor violated the warranty provision because substituted materials carry a shorter warranty than the specified products
B. The contractor violated the submittal requirements by installing substitute materials without obtaining the architect's written approval through the formal substitution request process
C. The contractor violated the payment terms because substituted materials require a separate invoice for the cost difference
D. The contractor violated the insurance requirements because substitute materials may not be covered under the builder's risk policy

29. A contractor is hired to install a residential geothermal heat pump system with horizontal ground loops. The ground loop field requires trenches four feet deep across the backyard. During trenching, the contractor encounters a buried septic drain field that was not disclosed by the homeowner or shown on the property records. What should the contractor do?

A. Route the ground loop trenches through the drain field because the geothermal piping will not interfere with the septic system
B. Abandon the horizontal ground loop design and install a vertical bore hole system without consulting the homeowner or engineer
C. Stop trenching in the affected area, notify the homeowner and the geothermal system designer, and determine an alternative ground loop layout that avoids the existing drain field
D. Remove the septic drain field and install the ground loop in its place because the geothermal system takes priority over the older system

30. A contractor is building a commercial structure and the specifications require all exterior concrete to have a minimum air entrainment of five to seven percent for freeze-thaw durability. The concrete batch ticket shows an air content of three percent. What should the contractor do?

A. Accept the load because three percent air content is within acceptable tolerance for all commercial concrete applications
B. Add air-entraining admixture at the jobsite and remix the concrete in the truck until the air content reaches the specified range
C. Pour the concrete as delivered because air content decreases naturally during placement and the final in-place air will be correct
D. Reject the load because the air content does not meet the specification, and request a replacement load that meets the five to seven percent air entrainment requirement

31. A contractor is managing a residential project and the building inspector discovers that the electrical panel has been installed in a bathroom. Under the National Electrical Code as adopted in Oregon, is this installation location acceptable?

A. Yes, because modern electrical panels are designed for installation in any location within a residential dwelling including bathrooms
B. Yes, but only if the panel is installed at least four feet from any water source including the bathtub, shower, and sink fixtures
C. Yes, if the panel is equipped with a weatherproof enclosure rated for damp locations and is installed above the countertop height
D. No, electrical panels generally cannot be installed in bathrooms because the NEC prohibits panels in locations where they would be exposed to moisture and where the required working clearances may be compromised

32. A contractor is estimating a commercial project and needs to calculate the labor productivity for concrete block wall construction. Historical data shows that a two-person masonry crew can install one hundred twenty standard eight-by-eight-by-sixteen-inch concrete blocks per eight-hour day. What is the productivity rate per mason per hour?

A. Sixty blocks per mason per hour based on dividing the daily total by the number of masons without accounting for hours
B. Fifteen blocks per mason per hour based on dividing the total by the crew size and then by a reduced six-hour productive day
C. Seven-point-five blocks per mason per hour based on dividing the daily total of one hundred twenty blocks by two masons and then by eight hours per day
D. Twelve blocks per mason per hour based on dividing the total only by the number of productive hours without the crew size

33. Under Oregon construction lien law, a homeowner receives a preliminary notice of right to a lien from a plumbing subcontractor working on a residential project. The homeowner has never heard of this subcontractor and did not hire them. Why did the homeowner receive this notice?

A. Oregon law requires subcontractors who do not have a direct contract with the property owner to deliver a preliminary notice to preserve their right to file a construction lien against the property if they are not paid
B. The notice indicates that the plumbing subcontractor has already filed a lien against the homeowner's property for unpaid work

C. The subcontractor sent the notice in error and the homeowner should discard it because only the general contractor can file liens
D. The notice is a marketing solicitation from the plumbing subcontractor offering additional plumbing services for the project

34. A contractor is performing a commercial renovation and the specifications require all new interior walls to achieve a minimum Sound Transmission Class rating of fifty. The contractor installs standard single-layer gypsum board on both sides of metal studs with fiberglass batt insulation in the cavity. Testing reveals the wall achieves only an STC rating of forty-two. What modification would most effectively improve the STC rating?

A. Replace the fiberglass insulation with rigid foam board insulation to increase the wall's sound-deadening mass and stiffness
B. Add a second layer of gypsum board to one side of the wall only, using the same thickness as the first layer installed
C. Add a layer of mass-loaded vinyl barrier, use resilient channel on one side to decouple the gypsum board from the studs, and add a second layer of gypsum board to improve the wall's sound isolation performance
D. Increase the stud spacing from sixteen inches to twenty-four inches on center to reduce the number of sound transmission paths

35. A contractor is building a residential addition and the energy code requires continuous insulation on the exterior walls. The contractor installs rigid foam insulation on the exterior sheathing but does not tape the seams between the insulation boards. What is the consequence of not taping the seams?

A. The untaped seams have no impact because the house wrap installed over the rigid foam provides the primary air barrier for the wall
B. The untaped seams allow air infiltration at the joints between insulation boards, reducing the thermal performance of the wall assembly and potentially creating condensation points within the wall cavity
C. The insulation installation passes inspection because taping rigid foam seams is a manufacturer recommendation and not a code requirement
D. The untaped seams affect only the vapor barrier performance and have no impact on the thermal resistance of the wall system

36. A contractor discovers during a residential renovation that the existing two-by-four wall studs in a bathroom are spaced at twenty-four inches on center. The renovation plans call for installing heavy stone tile on the bathroom walls. What structural concern does this combination present?

A. Twenty-four-inch stud spacing is adequate for all wall tile applications because the tile adhesive bonds directly to the studs
B. The wider stud spacing may not provide adequate backing support for the heavy stone tile, potentially causing the wall substrate to deflect between studs, leading to cracked grout joints and tile debonding
C. The stud spacing is only a concern if the stone tile weighs more than twenty pounds per square foot including the mortar bed
D. The stud spacing has no impact on tile performance because the cement backer board spans between studs regardless of spacing

37. A contractor is managing a commercial project and the specifications require the contractor to provide a construction waste management plan. The plan requires diverting a minimum of seventy-five percent of construction waste from the landfill through recycling and reuse. What is the primary purpose of this requirement?

A. To reduce the contractor's project cost by selling recyclable materials to offset the total disposal expense for the project
B. To satisfy the building owner's corporate social responsibility goals without any regulatory or code-based requirement
C. To qualify the project for a specific tax credit available only to contractors who recycle more than fifty percent of waste
D. To reduce the environmental impact of the construction project by diverting recyclable and reusable materials from landfills, often as required by local ordinances or green building certification standards

38. A contractor is installing residential plumbing and the building code requires all drain, waste, and vent piping to be tested before concealment behind walls and ceilings. What test is typically required for DWV piping under the Oregon plumbing code?

A. A vacuum test that verifies the piping system can maintain negative pressure for a minimum of fifteen minutes without loss
B. A water test or air test at the pressure and duration specified by the applicable plumbing code to verify that all joints and connections are watertight
C. A visual inspection only, with no pressure testing required for DWV piping in residential construction applications
D. A smoke test that introduces visible smoke into the piping system to identify leaks at joints visible from the interior spaces

39. A contractor is building a commercial structure and the plans specify a green roof system over the occupied office space below. The green roof includes waterproof membrane, root barrier, drainage layer, filter fabric, growing medium, and vegetation. What is the most critical element in the green roof assembly for protecting the occupied space below?

A. The growing medium because it provides the weight needed to hold the membrane in place during wind events on the roof
B. The vegetation because the plant root system creates a natural waterproof barrier over the roof membrane beneath the soil
C. The waterproof membrane because any failure in the membrane will allow water to penetrate into the occupied space below, and the growing medium and vegetation above make leak detection and repair extremely difficult
D. The drainage layer because it prevents the growing medium from becoming saturated and collapsing under its own weight

40. Under Oregon tax law, a contractor performs construction work and purchases materials for installation in a customer's property. The contractor purchases the materials from an out-of-state supplier who does not collect Oregon taxes. Does the contractor owe any tax on these materials?

A. No tax is owed because Oregon does not have a general sales tax and the out-of-state purchase is exempt from all Oregon taxation
B. The contractor may owe Oregon use tax on materials purchased from out-of-state suppliers when the supplier did not collect the applicable tax, because use tax applies to items used or consumed in Oregon
C. The contractor owes only federal excise tax on out-of-state purchases exceeding ten thousand dollars in total annual material cost
D. The out-of-state supplier bears sole responsibility for collecting and remitting any applicable taxes to the state of Oregon

41. A contractor is hired to install a residential standby generator. The generator will be connected to the home's electrical panel through an automatic transfer switch. Under the National Electrical Code, what is the purpose of the transfer switch in this installation?

A. To boost the generator's output voltage to match the utility power voltage during periods of high electrical demand in the home
B. To prevent the generator from back-feeding electricity into the utility power lines, which could electrocute utility workers repairing the downed power lines
C. To regulate the frequency of the generator's electrical output to match the sixty-hertz frequency of the utility power supply
D. To monitor the generator's fuel consumption and automatically shut down the unit when the fuel tank reaches ten percent capacity

42. A contractor is reviewing a commercial project's geotechnical report and discovers that the report recommends a specific foundation type based on the soil conditions. The structural engineer designs the foundation per the geotechnical recommendation. During construction, the contractor encounters soil conditions that differ significantly from the geotechnical report. What is the contractor's obligation?

A. Stop work in the affected area, document the differing conditions, notify the owner and the engineer immediately, and request direction before proceeding with the foundation work
B. Proceed with the designed foundation because the geotechnical engineer and structural engineer share all responsibility for soil conditions
C. Modify the foundation design independently based on the contractor's experience with similar soil conditions on past projects
D. Continue with the original foundation design because changing the design after permits are issued requires a new permit application

43. A contractor is managing a residential project and the homeowner asks whether the contractor's general liability insurance covers damage to the homeowner's existing property caused by the contractor's work. For example, a contractor's equipment damages the homeowner's existing landscaping during construction access. Does the contractor's CGL policy typically cover this type of damage?

A. No, the contractor's CGL policy excludes all damage to the property on which the contractor is performing work without exception
B. Yes, a contractor's CGL policy typically covers damage to the homeowner's existing property that is caused by the contractor's operations, as this is considered property damage to a third party's property
C. No, the homeowner's homeowner's insurance policy is the sole coverage for all damage occurring on the homeowner's property
D. Yes, but only if the damage exceeds the policy's deductible amount and the contractor reported the damage within twenty-four hours

44. Under Oregon construction law, a material supplier delivers roofing materials to a residential project. The supplier was not paid by the general contractor. The supplier wants to file a construction lien against the homeowner's property. What preliminary step must the supplier have completed to preserve their lien rights?

A. The supplier must have delivered a notice of right to a lien to the property owner within eight business days of first furnishing materials to the project

B. The supplier must have obtained the homeowner's written permission before delivering materials to the residential project site
C. The supplier must have filed a preliminary lien notice with the county recorder within fourteen days of the first material delivery
D. The supplier must have registered with the CCB as an approved material supplier before delivering any materials to the project

45. A contractor is building a commercial structure and the fire protection engineer requires a rated fire wall to divide the building into separate fire areas. The fire wall must extend from the foundation through the roof and be structurally independent so that the collapse of one side does not cause the wall to fail. What is the distinguishing characteristic of a fire wall compared to a fire barrier or fire partition?

A. Fire walls are required only in residential construction and are not applicable to commercial building construction projects
B. Fire walls are identical to fire barriers but carry a different name based on the geographic region where the building is located
C. Fire walls have a higher fire-resistance rating but do not require structural independence from the adjacent building sections
D. Fire walls are structurally independent, designed to maintain their integrity even if the construction on either side collapses, and they create separate buildings for code purposes

46. A contractor is managing a project and the owner requests that the contractor prepare a value engineering proposal to reduce the project cost. The contractor proposes substituting precast concrete panels for the specified cast-in-place concrete walls. What must the contractor include in the value engineering proposal?

A. Only the cost savings amount because the owner's primary concern is reducing the total project budget for the construction work
B. Only the schedule impact because precast concrete panels are manufactured off site and delivered on a different timeline than cast-in-place
C. Only a comparison of the aesthetic appearance of precast versus cast-in-place concrete to determine the owner's visual preference
D. The cost savings, schedule impact, performance comparison, quality implications, and any design modifications required, along with structural engineering review and approval

47. A contractor is installing a commercial elevator and the elevator code requires a dedicated machine room for the hydraulic elevator equipment. The architect's plans show the machine room adjacent to the elevator shaft. What requirements must the machine room meet?

A. The machine room must be climate-controlled to maintain an ambient temperature below fifty degrees Fahrenheit at all times
B. The machine room must be properly sized, ventilated, accessible only to authorized personnel, and separated from adjacent spaces as required by the applicable elevator code
C. The machine room may be shared with other mechanical equipment such as boilers and electrical panels to maximize floor space
D. The machine room must be located on the ground floor only and cannot be positioned on upper floors or in basement locations

48. A contractor is building a residential home and the plans require a structural ridge beam instead of a conventional ridge board with opposing rafters. What is the structural difference between a ridge beam and a conventional ridge board?

A. A ridge beam and a conventional ridge board serve identical structural purposes and the terms are interchangeable in all applications
B. A ridge board is a structural element that carries the full roof load while the ridge beam serves only as a nailing surface for rafters
C. A ridge beam is used only in hip roof designs while a conventional ridge board is used exclusively in gable roof configurations
D. A ridge beam is a structural member that supports the roof loads and transfers them to posts or bearing walls below, while a conventional ridge board serves primarily as a nailing surface with the opposing rafters providing the structural support through thrust resistance at the plate

49. A contractor discovers during a commercial renovation that the existing building has no fire-rated separation between the commercial space and an adjacent residential apartment. The building code requires a minimum two-hour fire separation between these occupancies. Whose responsibility is it to bring the existing condition into compliance during the renovation?

A. The building inspector determines compliance requirements based solely on the original building permit and has no authority during renovation
B. The responsibility depends on the scope of the renovation and the applicable code requirements, but the building official may require the fire separation to be brought into compliance as a condition of the renovation permit
C. The residential tenant bears sole responsibility for fire separation because the tenant's occupancy classification triggered the requirement
D. No compliance is required because existing buildings are exempt from current fire separation requirements regardless of renovation scope

50. A contractor is reviewing a construction contract and finds a retainage clause specifying that the owner will withhold ten percent of each progress payment. At what point during the project does the retained amount typically become payable to the contractor?

A. Retainage typically becomes payable after the project reaches substantial completion, all punch list work is finished, and the conditions specified in the contract for retainage release are satisfied
B. Retainage is automatically released on a monthly basis starting at the project's fifty percent completion milestone regardless of conditions
C. Retainage is never returned to the contractor and is forfeited as the owner's guarantee against future construction defects and warranty claims
D. Retainage is released only after the contractor's one-year warranty period expires with no outstanding defect claims from the owner

51. A contractor is hired to install a commercial cooling tower on the roof of an office building. The structural engineer determines that the roof structure requires reinforcement to support the cooling tower's operating weight including the water volume. The contractor installs the cooling tower without the structural reinforcement. What is the potential consequence?

A. The cooling tower operates normally because the manufacturer accounts for standard roof load capacity in the equipment design
B. The building inspector issues a conditional approval allowing the cooling tower to operate while the reinforcement is scheduled
C. The roof structure deflects slightly but stabilizes over time as the building settles under the new load without further movement
D. The roof structure may fail under the combined dead load and operating load of the cooling tower, potentially causing structural collapse, equipment damage, and injury to building occupants

52. A contractor is performing a residential renovation and discovers that the existing kitchen wiring consists of two-conductor wiring without a ground wire. The renovation plans call for new kitchen receptacles that require grounding. What must the contractor do to provide properly grounded receptacles?

A. Install new receptacles on the existing ungrounded wiring and attach the ground wire to the metal electrical box as a substitute
B. Install new grounded wiring for the kitchen receptacles because the existing ungrounded wiring cannot safely provide the equipment grounding required by the NEC for modern kitchen circuits
C. Install three-prong receptacles on the ungrounded wiring because the receptacle configuration determines whether the circuit is grounded

D. Leave the existing wiring in place and install GFCI receptacles as the only modification because GFCI protection eliminates the need for grounding

53. A contractor is building a commercial parking garage and the specifications require the concrete floor slabs to receive a hard trowel finish with a broom texture for slip resistance. The contractor applies the broom texture before the concrete surface has been properly troweled to a hard finish. What is the consequence of this premature texturing?

A. The premature texturing produces a deeper broom pattern that provides superior slip resistance compared to the specified finish
B. The surface finish meets the specification because the broom texture is the only finishing operation required for parking garage slabs
C. The premature texturing improves the concrete's freeze-thaw resistance by creating channels for water drainage on the slab surface
D. The surface may be too soft and porous because the concrete was not properly densified by the hard trowel operation before texturing, resulting in a surface that wears prematurely and does not meet the specification

54. A contractor is managing a commercial project and the roofing subcontractor requests an early start to take advantage of favorable weather conditions. The roofing work is scheduled to begin in three weeks per the project schedule. However, the underlying roof deck is only seventy percent complete. What should the contractor decide?

A. Allow the roofing to begin immediately on the completed seventy percent of the deck to take advantage of the favorable weather
B. Approve the early start because roofing can begin on any portion of the deck that is complete without affecting other trades
C. Allow the early start but require the roofing subcontractor to sign a waiver accepting responsibility for any coordination issues
D. Deny the early start because beginning roofing on an incomplete deck creates safety hazards, coordination conflicts with the deck installers, and potential quality issues at the transition between completed and incomplete sections

55. Under Oregon law, a contractor who operates as a limited liability company has two members. One member manages the daily operations while the other member is a passive investor who does not participate in construction activities. Under Oregon workers' compensation law, which member must be covered by workers' compensation insurance?

A. Both members must be covered regardless of their level of participation in the daily construction operations of the company

B. Only the passive investor member must be covered because they have no control over workplace safety conditions on the jobsite
C. The managing member who performs construction work should be covered unless they file a valid exemption, while the passive investor member who does not perform construction activities may not need coverage
D. Neither member needs coverage because LLC members are automatically classified as independent contractors under Oregon law

56. A contractor is installing a commercial kitchen hood and the mechanical code requires a makeup air system to replace the air exhausted by the hood. The contractor installs the hood exhaust system but does not install the makeup air unit. What is the consequence of this omission?

A. The kitchen operates normally because the building's HVAC system provides sufficient makeup air through the return air ducts
B. The missing makeup air has no effect because commercial kitchen hoods are designed to operate with natural infiltration air only
C. The building inspector approves the installation if the contractor demonstrates that opening a window provides adequate makeup air
D. The kitchen experiences negative pressure that can cause back-drafting of combustion appliances, difficulty opening exterior doors, and inadequate hood capture performance

57. A contractor is reviewing the specifications for a commercial project and finds that the specifications require all concrete masonry units to comply with ASTM C ninety. What does this standard specify?

A. The compressive strength, moisture absorption, and dimensional tolerance requirements for cast-in-place concrete walls only
B. The fire-resistance rating requirements for concrete masonry walls used in fire-rated assemblies in commercial construction
C. The physical properties including compressive strength, absorption, and dimensional requirements for load-bearing concrete masonry units used in construction
D. The installation procedures and mortar joint requirements for concrete masonry walls in commercial building construction

58. A contractor is managing a residential project and the local jurisdiction requires a final grading inspection to verify that the finished grade directs surface water away from the foundation. The inspector discovers that the grade slopes toward the foundation on the north side of the house. What must the contractor do?

A. Install a French drain along the north foundation wall to collect water before it reaches the foundation and redirect it away
B. Apply a waterproof coating to the north foundation wall to prevent water infiltration from the improperly graded surface
C. Regrade the north side of the property so the finished grade slopes away from the foundation at a minimum slope of six inches within the first ten feet as required by the applicable code
D. Plant vegetation along the north foundation wall because root systems absorb surface water before it reaches the foundation

59. A contractor is building a commercial structure and the specifications require the contractor to submit a project closeout package at the completion of the project. What documents are typically included in a construction project closeout package?

A. Only the contractor's final pay application and the architect's certificate of substantial completion for the building project
B. Only the building permit and certificate of occupancy issued by the local building department for the completed structure
C. Only the contractor's warranty letter and the manufacturer warranties for all installed equipment and building materials
D. As-built drawings, operation and maintenance manuals, equipment warranties, spare parts lists, training documentation, final inspection reports, and lien waivers from all subcontractors and suppliers

60. A contractor is installing a residential septic system and the county health department requires a minimum horizontal setback distance between the septic drain field and any drinking water well on the property. What is the primary reason for this setback requirement?

A. To prevent the noise from the septic pump from interfering with the well pump's electrical controls during normal operation
B. To prevent contamination of the drinking water supply by pathogens and nutrients that may migrate through the soil from the drain field effluent to the well
C. To provide adequate space for future expansion of the septic system if the home is enlarged with additional bedrooms later
D. To prevent the septic drain field piping from physically interfering with the well casing during routine maintenance operations

61. A contractor is managing a commercial project and discovers that the steel fabricator has delivered structural steel members with mill certificates showing a different steel grade than specified in the structural drawings. The delivered grade has a lower yield strength than specified. What must the contractor do?

A. Accept the delivery because the difference in steel grade is within acceptable manufacturing tolerances for structural steel work
B. Install the lower-grade steel and file a claim against the steel supplier's insurance for the cost difference between the two grades
C. Reject the delivery, notify the structural engineer and the steel fabricator, and require replacement steel that meets the specified grade
D. Blend the lower-grade steel with the specified grade by installing them in alternating positions throughout the structure

62. Under Oregon law, what is the maximum number of days a contractor has to pay a subcontractor after the contractor receives payment from the project owner on a private commercial construction project?

A. Five business days after receipt of payment from the owner as specified by Oregon's prompt payment statute for private projects
B. Thirty calendar days after the contractor's receipt of payment from the owner regardless of the contract payment terms
C. Forty-five calendar days after the subcontractor submits a complete and accurate pay application to the general contractor
D. The payment terms are governed by the subcontract agreement, subject to any applicable Oregon prompt payment requirements

63. A contractor is building a residential home and the plans require a whole-house ventilation system to meet the energy code's indoor air quality requirements. The contractor installs the required ventilation equipment but does not balance the system airflows. What is the consequence of an unbalanced whole-house ventilation system?

A. The unbalanced system may create excessive positive or negative pressure in the house, leading to moisture problems, poor indoor air quality, increased energy consumption, and potential back-drafting of combustion appliances
B. The system functions identically whether balanced or unbalanced because residential ventilation systems are self-regulating
C. The only consequence is slightly increased fan noise that the homeowner will notice during quiet periods in the house
D. The unbalanced system affects only the HVAC system's efficiency and has no impact on indoor air quality or moisture control

64. A contractor is performing a commercial building renovation and the architect specifies a specific proprietary waterproofing membrane for the below-grade foundation walls. The

contractor wants to use an alternative product that costs less. Under standard contract terms, what must the contractor do to propose this substitution?

A. Install the alternative product and notify the architect after the installation is complete and has been inspected by the contractor
B. Obtain verbal approval from the architect's office assistant before ordering the alternative waterproofing membrane product
C. Install the alternative product because the contractor has the right to choose materials that are equal in quality and performance
D. Submit a formal substitution request to the architect with documentation demonstrating that the proposed product meets or exceeds the specified product's performance requirements

65. A contractor is building a residential addition and discovers that the existing home's electrical service panel is fully loaded with no available breaker spaces for the addition's new circuits. What must the contractor do to provide electrical service for the addition?

A. Install tandem breakers in every available slot to double the number of circuits available in the existing electrical panel
B. Upgrade the electrical service panel to a larger panel with additional breaker spaces, or install a sub-panel to accommodate the new circuits required for the addition
C. Connect the addition's circuits to the existing panel by sharing breakers with the existing house circuits to avoid adding new breakers
D. Install the addition's circuits without connecting them to a panel and route them directly to the meter base for temporary power

66. A contractor is reviewing a project schedule and identifies that twenty percent of the planned activities for the past month were not completed as scheduled. Using the last planner system methodology, what metric does this represent?

A. The plan percent complete, which measures the reliability of the weekly work planning process by tracking the percentage of planned activities that were actually completed as committed
B. The earned value percentage, which measures the financial progress of the project against the baseline budget amount
C. The resource utilization rate, which measures the percentage of available labor hours that were productively used during the period
D. The schedule performance index, which measures the ratio of earned value to planned value for all project activities

67. A contractor is installing a commercial roof-mounted photovoltaic solar array. The building code requires the solar panels to be installed with specific setbacks from the roof edges to provide pathways for firefighter access. The contractor installs the panels without the required setbacks. What is the fire safety concern?

A. Without the required setbacks, firefighters cannot access the roof safely for ventilation operations during a fire, and the solar panels present electrical shock hazards that the access pathways are designed to mitigate
B. The solar panels without setbacks increase the building's wind resistance and may cause the panels to become airborne during storms
C. The setbacks are required only for aesthetic reasons to maintain uniform roof appearance in the surrounding neighborhood
D. The panels without setbacks block roof drainage and cause water ponding that increases the risk of roof structural failure

68. A contractor is managing a commercial project and the owner is considering converting the project delivery method from design-bid-build to construction management at risk midway through the design phase. What is the primary advantage of construction management at risk compared to design-bid-build?

A. The owner maintains complete control over all subcontractor selection and direct contracts, eliminating the general contractor's role
B. The construction manager provides preconstruction services including cost estimating and constructability review during the design phase, offers a guaranteed maximum price, and manages the construction, reducing the owner's cost and schedule risk
C. The design-bid-build method is always less expensive because it eliminates the construction manager's preconstruction fee entirely
D. Construction management at risk eliminates the need for an architect because the construction manager assumes all design responsibility

69. A contractor is building a residential home and the energy code requires a duct leakage test to verify that the HVAC ductwork is properly sealed. The test reveals that the duct leakage exceeds the maximum allowable rate. What must the contractor do?

A. Identify and seal the leaking duct joints, connections, and penetrations using mastic sealant or approved tape, and retest the system until the leakage rate meets the code requirement
B. Increase the HVAC system's fan speed to compensate for the air loss from the leaking ductwork and avoid the retest requirement
C. Replace all ductwork with a different material that has inherently lower leakage rates without performing any additional testing
D. Submit a variance request to the building department because duct leakage testing is a new requirement with limited enforcement

70. A contractor is hired to construct a commercial cold storage facility. The specifications require a continuous vapor barrier on the warm side of the insulated walls and ceiling to prevent moisture migration into the insulated assembly. Why is the vapor barrier placement critical in cold storage construction?

A. The vapor barrier prevents the refrigeration equipment from operating inefficiently by maintaining a consistent temperature differential
B. The vapor barrier is placed to prevent air infiltration from the exterior, which would increase the refrigeration system's energy usage
C. Moisture-laden warm air migrating into the cold insulated assembly condenses and freezes within the wall cavity, causing ice accumulation that degrades the insulation, corrodes the structural steel, and eventually causes structural damage
D. The vapor barrier prevents the cold air from escaping the storage facility and affecting the temperature of adjacent occupied spaces

71. A contractor is reviewing a commercial project's payment bond claim filed by an unpaid second-tier subcontractor. The payment bond was provided by the general contractor. Under Oregon law, does the second-tier subcontractor have a right to make a claim against the general contractor's payment bond?

A. Yes, payment bonds on commercial projects typically protect subcontractors at all tiers and material suppliers who have not been paid for work or materials furnished to the project
B. No, payment bond claims are limited to first-tier subcontractors who have a direct contract with the bonded general contractor
C. Yes, but only if the second-tier subcontractor's unpaid amount exceeds fifty thousand dollars on the commercial project
D. No, second-tier subcontractors must pursue payment claims exclusively through the first-tier subcontractor who hired them

72. A contractor is building a commercial structure and the fire code requires the building to have a fire command center. Under the fire code, what is the purpose of a fire command center?

A. To provide a secure storage room for the building's fire extinguisher inventory and replacement sprinkler heads on site
B. To serve as a break room for fire department personnel during extended firefighting operations at the commercial building
C. To provide a centralized location from which fire department personnel can monitor and control the building's fire protection systems, communications, and elevators during an emergency

D. To house the building's fire insurance policy documents and inspection records for review by the fire marshal during annual visits

73. A contractor is managing a residential project and the homeowner refuses to pay for a completed change order claiming that the work was not authorized. The contractor has a written change order signed by the homeowner authorizing the work and the price. What is the contractor's legal position?

A. The contractor must waive the charges because homeowner disputes automatically void signed change order authorizations
B. The contractor must renegotiate the change order price to a lower amount acceptable to the homeowner before pursuing payment
C. The contractor must file a CCB complaint before they are legally permitted to pursue any payment for the disputed change order work
D. The contractor has a strong legal position because the signed written change order constitutes a binding agreement between the parties and serves as documentation of the homeowner's authorization

74. A contractor is installing commercial ductwork and the specifications require all supply ducts in unconditioned spaces to be insulated with a minimum R-eight insulation with a vapor barrier jacket. The contractor installs the insulation but tears the vapor barrier jacket in several locations during installation. What is the consequence of the damaged vapor barrier?

A. Moisture can migrate through the tears and condense on the cold duct surface, potentially causing mold growth, insulation degradation, and water damage to the ceiling below
B. The torn vapor barrier has no practical impact because the insulation's R-value is determined only by the insulation thickness
C. The damaged vapor barrier improves duct performance by allowing the duct surface to breathe and dissipate condensation naturally
D. The insulation manufacturer's warranty is voided but the damaged vapor barrier does not affect the duct system's performance

75. A contractor is building a residential home and the local fire marshal requires the contractor to install a residential fire sprinkler system. The homeowner asks the contractor to explain the typical water supply requirements for a residential sprinkler system. What is the standard water supply arrangement for most residential fire sprinkler systems?

A. The residential fire sprinkler system is typically supplied by the same domestic water service that supplies the household plumbing, and the system design must verify adequate pressure and flow from the municipal water main

B. A dedicated fire service water main must be installed from the street to the house, separate from the domestic water service line
C. A minimum one-thousand-gallon water storage tank must be installed on the property to serve as the sole water supply for the sprinkler system
D. The sprinkler system must be connected to the municipal fire hydrant nearest the property through a dedicated underground supply line

76. A contractor is managing a commercial project and the owner's representative issues a stop-work directive for a specific area of the building due to a design error discovered by the architect. The directive halts work in that area for three weeks while the architect prepares revised drawings. What is the contractor's right regarding costs incurred during the three-week delay?

A. The contractor has no right to additional compensation because design errors are a normal part of the construction process
B. The contractor may be entitled to additional compensation for idle labor, extended equipment rental, and extended general conditions costs if the delay was not caused by the contractor and the contract permits recovery
C. The contractor must absorb all delay costs but may file a claim against the architect's professional liability insurance directly
D. The contractor may recover only the cost of idle equipment rental and has no right to compensation for idle labor during the delay

77. Under Oregon law, a contractor who is also a real estate developer builds a speculative home for sale. The contractor does not disclose known material defects to the buyer before the sale. What legal liability does the contractor-developer face?

A. The contractor-developer may face liability for fraud or violation of Oregon's property disclosure requirements because sellers of residential property must disclose known material defects to prospective buyers
B. No liability exists because speculative homes are sold as-is and buyers assume all risk for undisclosed defects in the property
C. Liability is limited to the cost of repairs only if the buyer discovers the defects within ninety days of the closing date of the sale
D. The contractor-developer is protected from liability because the buyer's home inspection should have identified all material defects

78. A contractor is performing a commercial renovation and the building code requires the contractor to maintain a clear means of egress throughout the building during construction.

Workers have blocked an exit corridor with construction materials. What is the fire and life safety violation?

A. No violation exists because construction workers are trained to evacuate through alternative routes and do not need clear corridors
B. The violation affects only the building's insurance coverage and does not create an actual fire or life safety hazard for occupants
C. Blocking a means of egress prevents building occupants and construction workers from safely evacuating during an emergency, violating fire and life safety codes
D. The violation applies only during occupied business hours and materials may be stored in exit corridors after the building closes

79. A contractor is installing a commercial building's plumbing system and the specifications require all hot water supply piping to be insulated. The contractor insulates the hot water piping in the mechanical room but leaves the hot water piping in the ceiling plenum spaces uninsulated. What is the consequence of not insulating the hot water piping in the plenum spaces?

A. The uninsulated piping passes inspection because insulation is only required in mechanical rooms and not in ceiling plenum spaces
B. The uninsulated piping has no energy impact because the heat loss from the piping warms the plenum space and reduces heating costs
C. Heat loss from the uninsulated piping reduces hot water temperature at the fixtures, increases energy consumption, and fails to meet the specification and applicable energy code requirements
D. The uninsulated piping affects only the hot water delivery time to fixtures and has no impact on the building's overall energy usage

80. A contractor is reviewing the project closeout requirements for a commercial building. The specifications require the contractor to provide training to the building's maintenance staff on the operation and maintenance of all installed mechanical and electrical systems. What is the purpose of this training requirement?

A. To transfer all warranty obligations from the contractor to the building maintenance staff after the training is completed
B. To ensure the building's maintenance staff can properly operate, maintain, and troubleshoot the installed systems, maximizing equipment life and efficiency and reducing the likelihood of premature equipment failure
C. To satisfy the architect's requirement for a formal project completion ceremony before the certificate of occupancy is issued
D. To provide the maintenance staff with the contractor's proprietary installation methods so they can perform future modifications

Practice Exam 19: Answer Key and Explanations

1. B — Oregon's implied warranty of workmanlike construction requires contractors to perform work with the skill and care of a reasonably competent contractor. Improper step flashing that causes leaks within six months clearly fails this standard. The contractor must repair the defective flashing at no cost because the workmanship did not meet the implied warranty obligation.

2. C — A guaranteed maximum price caps the owner's financial exposure, meaning the contractor absorbs costs for any scope items that emerge as the design is completed but were not anticipated in the preliminary documents. Incomplete design documents create significant risk that critical scope elements are undefined or missing from the GMP estimate. The contractor should include adequate contingency or clearly define allowances and exclusions to manage this risk.

3. A — Oregon law holds general contractors responsible for ensuring that subcontractors working on their projects maintain active CCB licenses. Knowingly or negligently allowing an unlicensed subcontractor to perform work exposes the general contractor to CCB disciplinary action including fines. The general contractor should verify subcontractor license status before work begins and periodically throughout the project.

4. C — Critical path activities have zero float, meaning any delay to a critical path activity directly extends the project completion date by the same duration. The two-week steel fabrication delay cascades through the subsequent critical path activities without any schedule buffer to absorb the impact. The contractor must either accelerate subsequent activities or accept the two-week project extension.

5. D — The Oregon Residential Specialty Code requires smoke alarms inside each bedroom, outside each sleeping area in the immediate vicinity of the bedrooms, and on every level of the dwelling including the basement. This placement ensures early warning of fire regardless of where the fire originates or where occupants are sleeping. Interconnected alarms that sound simultaneously throughout the dwelling provide the most effective notification.

6. C — Commercial auto liability insurance specifically covers bodily injury and property damage claims arising from accidents involving the contractor's owned, leased, or hired vehicles. General liability policies typically exclude auto-related claims, and workers' compensation covers only employee injuries rather than property damage. Commercial auto coverage is required for any business that operates vehicles for company purposes.

7. C — Color inconsistency in decorative stamped concrete is most commonly caused by uneven application of integral color during mixing, variations in the finishing technique across the slab surface, or differences in curing conditions that affect how the color develops. Shaded areas cure differently than sun-exposed sections, and inconsistent water application during finishing can alter the surface color. Proper technique and uniform curing procedures minimize color variation.

8. B — Standard subcontract terms typically require the general contractor to provide the defaulting subcontractor with written notice of the default and a specified cure period to correct the deficiency. If the subcontractor fails to cure the default within the allowed period, the general contractor has the right to terminate the subcontract and engage a replacement. This process protects both parties by providing a reasonable opportunity to resolve the issue before termination.

9. A — A lender's consent and subordination agreement typically requires the contractor to agree that the lender's deed of trust takes priority over the contractor's construction lien rights. This protects the lender's security interest in the property by ensuring the mortgage has first position. Contractors should carefully review these agreements and understand the impact on their lien position before signing.

10. A — OSHA requires scaffolds to be designed by a qualified person, and when the scaffold exceeds a height-to-base-width ratio of four to one, the design of guy wires, ties, and bracing must be performed by a registered professional engineer. This engineering requirement ensures the scaffold system is structurally adequate for the specific height and loading conditions. A competent person must also inspect the scaffold before each work shift.

11. C — Excessive concrete moisture vapor emissions can cause epoxy coating failure through blistering, delamination, and loss of adhesion. The contractor must test the moisture vapor emission rate using an approved method such as ASTM F1869 or ASTM F2170 before applying the coating. If the rate exceeds the manufacturer's maximum limit, a moisture mitigation system must be installed to reduce emissions before the epoxy is applied.

12. A — When the project specifications require a manufacturer's warranty that can only be obtained through installation by a certified applicator, the contractor must subcontract the work to a qualified installer. A contractor warranty does not satisfy the specification requirement for a manufacturer's warranty. Ensuring the proper certification protects the owner's investment and delivers the warranty coverage specified in the contract.

13. A — On a fixed-price residential contract, the contractor is not required to disclose the internal breakdown of overhead and profit margins to the homeowner. The contract price represents the total agreed-upon cost for the defined scope of work, and the contractor's internal cost structure is proprietary business information. The homeowner agreed to the total price, which is the contractor's complete obligation under the contract.

14. C — When a replacement HVAC unit has different dimensions and weight than the originally specified equipment, the contractor must verify that the roof structure can support the new unit's weight, that the existing roof curb accommodates the new dimensions, that the ductwork connections are compatible, and that the electrical service is adequate. Failure to verify these factors can result in structural overload, improper duct connections, and electrical incompatibility.

15. D — Oregon employment law requires employers to promptly investigate complaints of workplace discrimination and harassment, take appropriate corrective action to stop the behavior, and protect the reporting employee from retaliation. Failure to address discriminatory conduct exposes the employer to liability under state and federal anti-discrimination laws. The employer must document the investigation and the corrective actions taken.

16. B — The manufacturer's requirement for a three-quarter-inch gas line exists because tankless water heaters require a higher gas volume than traditional tank water heaters to fire the high-output burners. Installing the unit on an undersized gas line causes insufficient gas flow, resulting in poor performance, error codes, and potential safety hazards. A permit and inspection are required for all new gas line installations.

17. C — Replacing deteriorating sealant joints before they fail completely is classified as preventive maintenance because it addresses a weatherproofing component before water infiltration causes damage. Proactive sealant replacement costs significantly less than repairing the interior water damage, mold remediation, and structural repairs that result from failed sealant joints. Most commercial sealants have a finite service life and require periodic replacement.

18. D — The structural engineer of record reviews shop drawings to verify that the fabricator's detailed connection designs comply with the structural design intent, load paths, and applicable codes. The engineer's review ensures that the shop drawing details translate the design documents into fabrication-ready drawings without compromising the structural integrity. Shop drawing review is a critical quality assurance step before fabrication begins.

19. D — OSHA holds employers responsible for ensuring employees comply with safety standards, regardless of whether a supervisor was physically present when the violation occurred. The employer is obligated to establish safety rules, train employees, provide required equipment, and enforce compliance through monitoring and disciplinary action. The absence of a supervisor does not relieve the employer of this fundamental obligation.

20. A — Oregon building codes require a barrier such as a fence or wall with a self-closing, self-latching gate around residential swimming pools to prevent unsupervised access by young children. The barrier must meet specific height requirements and the gate hardware must be positioned to prevent small children from operating the latch. Pool barrier requirements exist because drowning is a leading cause of accidental death in young children.

21. A — Tilt-up wall panels are inherently unstable until they are permanently connected to the roof structure, adjacent panels, and the foundation. Temporary bracing must be installed immediately after each panel is set in place and must remain until all permanent connections are made. Premature removal of temporary bracing has caused panel collapses resulting in construction fatalities.

22. D — Division 01 of the construction specifications contains administrative and procedural requirements that apply to the entire project. These include submittal procedures, payment application processes, quality control requirements, project meeting schedules, temporary facilities, construction waste management, and project closeout requirements. Division 01 establishes the administrative framework within which all technical specifications are executed.

23. B — Oregon law requires hand digging or other non-destructive excavation methods such as vacuum excavation within the tolerance zone of marked underground utilities. The tolerance zone typically extends a specified distance on each side of the marked utility location. Machine excavation within this zone creates an unacceptable risk of striking and damaging the utility, which can cause service interruptions, environmental damage, or serious injury.

24. A — Hold-down straps are critical components of the lateral force resisting system that create a continuous load path from the roof through the walls to the foundation. Without the straps connecting the framing to the foundation hardware, the load path is broken at the most critical connection point. This gap leaves the structure vulnerable to uplift and overturning failure during high winds or seismic events.

25. B — The enforceability of an eighteen percent interest rate on late payments depends on whether the rate complies with Oregon's usury laws and contract disclosure requirements. Oregon has specific statutes governing maximum allowable interest rates in various types of contracts. The terms must be clearly disclosed and voluntarily agreed upon by both parties for the provision to be enforceable.

26. C — The fire department connection allows firefighters to pump additional water from their apparatus into the building's sprinkler system, boosting both pressure and volume during firefighting operations. This supplemental water supply is critical when the building's domestic water service cannot provide sufficient pressure or flow to control a large fire. The FDC is a code-required component of most commercial fire suppression systems.

27. D — Uncompacted fill material may not have adequate bearing capacity to support the concentrated loads from deck footings, especially with the added weight of a four-thousand-pound hot tub. Without compaction documentation, the fill's density and bearing capacity are unknown and may be inadequate. A geotechnical evaluation determines whether the fill can support the design loads or whether remediation such as deep footings or soil improvement is needed.

28. B — Standard contract terms require the contractor to submit formal substitution requests to the architect for review and written approval before installing any product that differs from the specifications. The architect evaluates whether the substitute product meets the design intent and performance requirements. Installing substitutes without approval violates the submittal requirements and may result in removal and replacement at the contractor's expense.

29. C — The contractor must stop trenching when an undisclosed septic drain field is encountered because the geothermal ground loops and the septic system cannot occupy the same subsurface area. Damaging the drain field creates environmental and health hazards from sewage contamination. The contractor should notify the homeowner and system designer to develop an alternative ground loop layout that avoids the existing septic infrastructure.

30. D — Concrete with three percent air entrainment does not meet the specified five to seven percent range required for freeze-thaw durability. Insufficient air entrainment leaves the concrete vulnerable to freeze-thaw damage that causes scaling, cracking, and deterioration of the surface. The contractor must reject the non-conforming load and request a replacement batch that meets the specified air content before placement.

31. D — The National Electrical Code generally prohibits installing electrical panels in bathrooms because the moisture-laden environment creates safety hazards and the required working clearances may be compromised by bathroom fixtures. Electrical panels must be installed in dry locations with adequate clear space for safe access and maintenance. The contractor must relocate the panel to a code-compliant location before the electrical inspection.

32. C — One hundred twenty blocks divided by two masons equals sixty blocks per mason per day. Sixty blocks divided by eight hours equals seven-point-five blocks per mason per hour. This unit productivity rate is the standard metric used in construction estimating to calculate labor costs for masonry wall construction based on crew size and production rates.

33. A — Oregon lien law requires subcontractors and suppliers who do not have a direct contract with the property owner to deliver a preliminary notice within eight business days of first furnishing labor or materials. This notice informs the homeowner that these parties are working on their property and may have lien rights if not paid. The notice is a legal requirement for preserving lien rights, not an indication that a lien has been filed.

34. C — Achieving STC fifty typically requires multiple sound isolation strategies working together. Adding mass-loaded vinyl barrier increases the wall's mass, resilient channel decouples the gypsum board from the studs to reduce sound transmission through the framing, and a second layer of gypsum adds mass and damping. These combined modifications address the primary sound transmission paths through the wall assembly.

35. B — Untaped seams between rigid foam insulation boards create pathways for air infiltration that bypass the insulation's thermal resistance. Air moving through these gaps carries heat directly through the wall assembly, reducing the effective R-value of the continuous insulation system. Taping the seams maintains the continuity of the insulation layer and prevents the thermal bridging that occurs at unsealed joints.

36. B — Twenty-four-inch stud spacing creates longer unsupported spans for the wall substrate, which may deflect under the weight of heavy stone tile. This deflection causes stress in the grout joints and the bond between the tile and substrate, leading to cracked grout and tile debonding. Heavy tile applications typically require studs at sixteen inches on center or closer to provide adequate support for the substrate.

37. D — Construction waste management plans reduce the environmental impact of construction by diverting recyclable and reusable materials from landfills. Many local jurisdictions require construction waste diversion plans, and green building certification programs such as LEED award credits for achieving high diversion rates. Effective waste management also reduces disposal costs and supports sustainable construction practices.

38. B — The Oregon plumbing code requires DWV piping to be tested using a water test or air test at the specified pressure and duration before the piping is concealed behind walls and ceilings. The test verifies that all joints, connections, and fittings are watertight and that the system will function properly when placed in service. The inspector witnesses the test and verifies that the system holds pressure without loss.

39. C — The waterproof membrane is the most critical element in a green roof system because it is the last line of defense preventing water from entering the occupied space below. Once the growing medium, drainage layers, and vegetation are installed over the membrane, accessing and repairing membrane failures becomes extremely difficult and expensive. Proper membrane installation, protection, and testing are essential before the subsequent green roof layers are placed.

40. B — Although Oregon does not have a general sales tax, use tax may apply to items purchased from out-of-state suppliers who do not collect Oregon taxes. Use tax is designed to

complement the absence of sales tax by capturing tax revenue on goods used or consumed within the state. Contractors should consult with a tax professional to determine their specific use tax obligations on out-of-state material purchases.

41. B — The transfer switch prevents the generator from back-feeding electricity into the utility power lines when the generator is operating during a power outage. Back-feeding creates lethal voltage on power lines that utility workers assume are de-energized while making repairs. The automatic transfer switch isolates the generator from the utility lines and connects the home circuits to the generator output only.

42. A — When actual soil conditions differ significantly from the geotechnical report, the contractor must stop work, document the conditions, and notify the owner and engineer immediately. Proceeding with a foundation designed for different soil conditions can result in structural failure, excessive settlement, or other foundation problems. The engineer must evaluate the actual conditions and determine whether the foundation design requires modification.

43. B — A contractor's CGL policy typically covers damage to the homeowner's existing property caused by the contractor's operations because this damage is classified as property damage to a third party's property. The homeowner's landscaping, driveway, or other existing improvements damaged during construction access are covered under the contractor's liability policy. This coverage does not extend to defects in the contractor's own work product.

44. A — Oregon construction lien law requires material suppliers on residential projects to deliver a notice of right to a lien to the property owner within eight business days of first furnishing materials. This preliminary notice is mandatory for preserving the supplier's right to file a construction lien if they are not paid. Without timely delivery of this notice, the supplier may lose their lien rights entirely.

45. D — Fire walls are distinguished from fire barriers and fire partitions by their requirement for structural independence, meaning the fire wall must remain standing even if the construction on either side collapses during a fire. Fire walls effectively create separate buildings for code purposes, allowing each side to be treated independently for height, area, and construction type calculations. This structural independence is the defining characteristic.

46. D — A comprehensive value engineering proposal must address all aspects of the proposed change including cost savings, schedule impact, performance comparison between the original and proposed systems, quality implications, and any design modifications required. The structural engineer must review and approve any changes that affect the building's structural system. A proposal that addresses only cost savings without evaluating performance and quality is incomplete.

47. B — Elevator machine rooms must be properly sized to accommodate the equipment with adequate working clearance, ventilated to maintain acceptable operating temperatures for the hydraulic fluid, accessible only to authorized service personnel for safety, and separated from adjacent spaces as required by the elevator code. These requirements ensure safe operation and maintenance of the elevator equipment throughout the building's life.

48. D — A ridge beam is a structural member that carries the roof loads and transfers them through posts or bearing walls to the foundation below, allowing the roof to be constructed

without ceiling joists or rafter ties. A conventional ridge board is primarily a nailing surface that the opposing rafters bear against, with the structural support provided by the rafter-to-plate connections and ceiling joists that resist the outward thrust. This structural distinction determines the support requirements at the ridge.

49. B — The responsibility for bringing existing conditions into compliance during a renovation depends on the scope of the renovation and the building official's interpretation of the applicable codes. Building officials may require existing non-compliant conditions to be corrected as a condition of the renovation permit, particularly for life safety issues such as fire separations between different occupancy types. The specific requirements vary by jurisdiction and renovation scope.

50. A — Retainage typically becomes payable after the project reaches substantial completion, all punch list work is completed, required closeout documentation is submitted, and any other conditions specified in the contract for retainage release are satisfied. The retainage provides the owner with financial security during construction to ensure the contractor completes all work. Release terms should be clearly defined in the contract.

51. D — Installing heavy mechanical equipment on a roof without the required structural reinforcement can overload the roof structure beyond its design capacity. The combined dead load of the equipment plus the operating load of the water can cause structural deflection, distress, or collapse. The structural engineer's reinforcement design must be completed and installed before the equipment is placed on the roof.

52. B — Existing two-conductor wiring without a ground wire cannot provide the equipment grounding required by the NEC for modern kitchen circuits. The contractor must install new grounded wiring for the kitchen receptacles to ensure proper ground fault protection for the appliances and equipment used in the kitchen. While GFCI receptacles provide shock protection, they do not provide the equipment grounding required for new circuit installations.

53. D — Applying broom texture before the concrete surface is properly densified through hard troweling leaves the surface soft and porous. A hard trowel finish closes the surface pores and creates a dense, durable wearing surface before the broom texture is applied. Premature texturing skips this critical densification step, resulting in a surface that wears prematurely, dusts, and does not meet the specification's durability requirements.

54. D — Beginning roofing on an incomplete deck creates safety hazards for workers on the unfinished deck areas, coordination conflicts between the roofing crew and the deck installers, and potential quality issues at the transition between completed and incomplete sections. The contractor should maintain the planned sequence to ensure safety, quality, and proper coordination between the trades working in the same area.

55. C — Oregon workers' compensation law requires coverage for individuals who perform construction work, but allows LLC members to elect an exemption by filing appropriate documentation. The managing member who actively performs construction work should be covered unless a valid exemption is filed. The passive investor who does not perform construction activities may not require coverage depending on the specific circumstances and exemption criteria.

56. D — Without makeup air to replace the exhausted air volume, the kitchen operates under negative pressure that can cause dangerous back-drafting of gas-fired cooking equipment and water heaters. Negative pressure also makes exterior doors difficult to open and reduces the hood's ability to capture grease-laden cooking vapors. The makeup air system is a critical component of the commercial kitchen ventilation design.

57. C — ASTM C90 specifies the physical property requirements for load-bearing concrete masonry units including minimum compressive strength, maximum water absorption, and dimensional tolerances. This standard ensures that CMU blocks meet minimum structural and durability requirements for use in load-bearing wall construction. Compliance with ASTM C90 is verified through manufacturer testing and certification.

58. C — The building code requires finished grade to slope away from the foundation at a minimum of six inches within the first ten feet to direct surface water away from the building. Grade that slopes toward the foundation channels water against the foundation walls, increasing hydrostatic pressure and the risk of water infiltration into the basement or crawl space. Regrading corrects the drainage deficiency at the source.

59. D — A comprehensive project closeout package includes as-built drawings, operation and maintenance manuals, equipment warranties, spare parts lists, training documentation, final inspection reports, and lien waivers from all subcontractors and suppliers. These documents provide the owner with everything needed to operate, maintain, and service the building after the contractor demobilizes. Incomplete closeout packages can delay final payment and create long-term operational problems.

60. B — The setback between the septic drain field and the drinking water well prevents contamination of the groundwater supply by pathogens, bacteria, viruses, and nutrients that migrate through the soil from the drain field effluent. The setback distance provides adequate soil treatment and travel time to attenuate contaminants before they reach the well's capture zone. This protection is essential for safeguarding public health.

61. C — Steel with a lower yield strength than specified cannot safely resist the design forces calculated by the structural engineer. Installing non-conforming steel creates a structural deficiency that could lead to member failure under design loads. The contractor must reject the delivery, notify the engineer and fabricator, and require replacement material that meets the specified grade before proceeding.

62. D — Payment terms between the general contractor and subcontractor on private commercial projects are primarily governed by the subcontract agreement, subject to any applicable Oregon prompt payment requirements. Oregon's prompt payment statutes may establish minimum standards, but the specific payment terms including timing and conditions are typically defined in the subcontract. Contractors and subcontractors should clearly define payment terms in their agreements.

63. A — An unbalanced ventilation system creates either positive or negative pressure in the house, which can cause moisture problems in wall cavities, poor indoor air quality from inadequate fresh air distribution, increased energy consumption from uncontrolled air leakage, and potential back-drafting of combustion appliances. Proper balancing ensures the ventilation system delivers the designed airflow rates to all areas of the home.

64. D — Standard contract terms require the contractor to submit a formal written substitution request with documentation demonstrating that the proposed product meets or exceeds the specified product's performance characteristics. The architect reviews the request and determines whether the substitute provides equivalent performance, quality, and warranty coverage. Installing substitutes without formal approval violates the contract and may require removal at the contractor's expense.

65. B — When the existing electrical panel cannot accommodate additional circuits, the contractor must either upgrade to a larger panel or install a sub-panel fed from the existing service to provide the required breaker spaces. Tandem breakers may be an option in some panels but have limitations on quantity and placement. The solution must comply with the NEC and provide adequate capacity for the addition's electrical loads.

66. A — The plan percent complete metric, central to the last planner system, measures the reliability of weekly work planning by tracking what percentage of committed tasks were actually completed as planned. A rate of eighty percent (with twenty percent not completed) indicates planning reliability issues that need to be addressed. The goal is to continuously improve the PPC rate by identifying and removing constraints before they impact committed work.

67. A — Rooftop solar panel setback requirements provide firefighters with safe access pathways to reach the roof for ventilation and firefighting operations. Solar panels also present electrical shock hazards because they generate voltage whenever exposed to light and cannot be simply turned off. The required setbacks and access pathways ensure firefighter safety during emergency operations on roofs with photovoltaic installations.

68. B — Construction management at risk provides the owner with preconstruction services including early cost estimating, constructability review, and value engineering during the design phase. The CM at risk then offers a guaranteed maximum price and manages the construction, reducing the owner's cost and schedule risk. This collaborative approach addresses design and construction issues before they become expensive field problems.

69. A — When duct leakage testing reveals excessive air loss, the contractor must identify and seal the leaking joints, connections, and penetrations using mastic sealant or approved tape. The system must then be retested to verify the leakage rate meets the energy code requirement. Unsealed ductwork wastes energy by delivering conditioned air to unconditioned spaces and reducing the system's effective capacity.

70. C — In cold storage facilities, warm moist air from the exterior migrates toward the cold interior through the wall assembly. When this moisture-laden air reaches the dew point temperature within the insulated wall cavity, it condenses and freezes. Over time, this ice accumulation degrades the insulation's thermal performance, corrodes structural steel members, and can cause significant structural damage.

71. A — Payment bonds on commercial projects typically protect subcontractors at all tiers and material suppliers who furnish labor or materials to the bonded project. This protection exists because lower-tier subcontractors often have no direct contractual relationship with the general contractor and limited ability to pursue payment through other means. The payment bond provides a financial remedy for unpaid parties throughout the contracting chain.

72. C — A fire command center provides a centralized location where fire department personnel can monitor and control the building's fire protection systems, communications equipment, elevator recall functions, and HVAC smoke control systems during an emergency. This centralized control capability allows firefighters to manage a building emergency efficiently from a single secure location. The fire command center is required by the fire code in certain building types.

73. D — A signed written change order constitutes a binding contractual agreement between the contractor and the homeowner that documents the authorized scope, price, and terms of the additional work. The contractor has strong legal standing to pursue payment because the written authorization satisfies Oregon's requirement for written change orders on residential projects. The homeowner's post-completion dispute does not void the signed authorization.

74. A — Tears in the vapor barrier jacket allow warm, humid air to contact the cold duct surface, causing condensation that promotes mold growth, degrades insulation R-value, and can cause water damage to ceiling materials below. The vapor barrier is a critical component of the insulation system that prevents moisture migration to the cold duct surface. All tears must be repaired with compatible vapor barrier tape before the installation is concealed.

75. A — Most residential fire sprinkler systems are designed to operate from the same domestic water service that supplies the household plumbing. The system design must verify that the municipal water main provides adequate pressure and flow to meet the sprinkler system's hydraulic demand. This approach is the most cost-effective for residential applications and eliminates the need for a dedicated fire service connection.

76. B — When the owner directs a work stoppage caused by a design error, the contractor may be entitled to compensation for delay-related costs including idle labor, extended equipment rental, and extended general conditions. The delay was not caused by the contractor, and the contract may provide for recovery of these costs through a change order. The contractor must document all delay-related costs to support the claim.

77. A — Oregon's property disclosure requirements mandate that sellers of residential property disclose known material defects to prospective buyers. A contractor-developer who conceals known defects may face liability for fraud, violation of disclosure requirements, and breach of the implied warranty of workmanlike construction. The buyer's home inspection does not relieve the seller of the obligation to disclose known material defects.

78. C — Blocking a means of egress with construction materials prevents building occupants and workers from safely evacuating during a fire or other emergency, directly violating fire and life safety codes. Exit corridors, stairways, and doors must remain clear and accessible at all times during construction in occupied buildings. The contractor must implement alternative egress routes or remove the obstruction immediately.

79. C — Uninsulated hot water piping in ceiling plenum spaces loses heat to the surrounding air, reducing the water temperature at the fixtures and increasing the energy required to heat the water. This energy waste violates the specification and the applicable energy code, which requires insulation on all hot water supply piping. The contractor must insulate all hot water piping throughout the building, not just in the mechanical room.

80. B — Training the building maintenance staff ensures they can properly operate, maintain, and troubleshoot the installed mechanical and electrical systems. Proper operation maximizes equipment life, maintains energy efficiency, and reduces the likelihood of premature equipment failure. The training requirement is a standard project closeout obligation that transfers operational knowledge from the installing contractor to the people who will maintain the systems daily.