

# PRACTICE EXAM 14: RED SEAL CARPENTER INTERPROVINCIAL SIMULATION (100 QUESTIONS)

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1. A carpenter is assembling formwork and must drive nails through 38 mm form panels into 89 mm walers using a framing hammer. After several hours of nailing, the carpenter develops a burning pain in the elbow of the hammering arm. What is the most likely cause of this pain, and how can it be prevented?
- A. The pain is caused by a fractured elbow joint that requires immediate medical imaging and diagnosis
  - B. The pain is likely caused by repetitive strain injury (tennis elbow or lateral epicondylitis) from sustained hammering — prevention includes taking regular breaks, alternating between tasks, using a pneumatic nailer for production work, and selecting a hammer with a shock-absorbing handle
  - C. The pain is caused by an allergic reaction to the treated lumber and requires antihistamine medication
  - D. The pain is caused by cold temperatures affecting the joints and will resolve when the weather warms up
2. A carpenter is preparing to cut a sheet of glass for a window repair. Glass cutting requires a specific technique. Before scoring the glass with a glass cutter, what must the carpenter do to the cutting area?
- A. Heat the glass along the intended cut line with a propane torch to soften it for easier scoring
  - B. Apply masking tape along both sides of the cut line to prevent chipping when the glass is snapped
  - C. Wet the glass surface with water to lubricate the cut and prevent the glass cutter from skipping
  - D. Clean the glass surface thoroughly and apply a thin line of cutting oil along the intended score line to lubricate the cutter wheel for a clean, consistent score

3. A worker on a construction site slips on ice and falls, landing on their outstretched hand. The worker complains of severe pain in the wrist, and the wrist appears deformed. While waiting for emergency medical services, what should the carpenter providing first aid do?

A. Immobilize the wrist in the position found using a splint and padding — do not attempt to straighten the deformed joint, apply ice wrapped in cloth to reduce swelling, and keep the injured arm elevated above the heart level

B. Gently straighten the deformed wrist to its normal position and wrap it tightly with a tensor bandage

C. Submerge the injured wrist in warm water to reduce pain and improve blood circulation to the injured area

D. Have the worker grip a hammer handle with the injured hand to test the wrist's strength before deciding

4. A carpenter is using a router table to shape the edge of a narrow workpiece (150 mm wide × 600 mm long). The workpiece is small enough that the carpenter's hands will pass near the exposed router bit during the feed. What safety device should be used?

A. A dust collection system that removes chips from the cutting area for improved visibility of the bit

B. A featherboard clamped to the table that holds the workpiece against the fence during the routing pass

C. A push block or holding fixture that secures the small workpiece and keeps the carpenter's hands away from the exposed bit throughout the entire feed operation

D. A variable-speed control set to the lowest RPM that reduces the bit rotation for safer operation nearby

5. A construction site has multiple contractors working simultaneously. The general contractor has posted a site-specific safety plan. A subcontractor's employee tells the carpenter that their company has its own safety procedures that differ from the general contractor's site plan. Which safety plan takes precedence on this job site?

A. The subcontractor's safety plan always takes precedence because they employ the worker and are liable

B. The more stringent of the two plans applies — the site-specific safety plan establishes minimum requirements that all workers on site must follow, and any additional requirements from the subcontractor's plan also apply

C. Neither plan takes precedence and each worker decides which safety procedures to follow personally

D. The general contractor's plan applies only to their own employees and does not bind subcontractors

6. A carpenter is using a pneumatic roofing nailer on a steep roof (8/12 pitch). The carpenter is standing on roof brackets (jacks). While reaching to nail a shingle, the carpenter loses balance and begins to slide. What fall protection system should have been in place before the carpenter started work on this roof?

A. A safety net stretched beneath the eaves to catch any worker who slides off the steep roof surface

B. A travel restraint system that limits the worker's movement to the area within reach of the roof jacks

C. No fall protection is required on a roof with jacks installed because the jacks serve as fall protection

D. A personal fall arrest system consisting of a full body harness, shock-absorbing lanyard, and a roof anchor rated for fall arrest, connected before the carpenter accessed the steep roof surface

7. A carpenter is operating a portable planer (thickness planer) to surface rough-sawn lumber. The machine pulls the lumber through rotating cutterheads at high speed. What is the most dangerous action the carpenter can take while operating this machine?

A. Reaching into the infeed or outfeed opening while the machine is running to clear a jam or adjust the lumber — the rotating cutterheads can pull the carpenter's hand into the machine and cause devastating injuries

B. Standing directly behind the outfeed opening during operation because the surfaced board exits at speed

C. Operating the planer without the dust collection system connected to the exhaust port on the machine

D. Running lumber through the planer that is shorter than the minimum length specified by the manufacturer

8. A carpenter discovers that a fire extinguisher on the job site has a broken handle (the squeeze lever is cracked). The gauge shows the extinguisher is fully charged. Is this extinguisher suitable for emergency use?

A. Yes, because the gauge confirms the extinguisher is charged and the cracked handle does not affect output

B. Yes, if the carpenter wraps the cracked handle with duct tape to reinforce it for emergency operation

C. No — a broken handle may prevent the carpenter from properly activating the extinguisher during an emergency, and the extinguisher must be replaced immediately with one that has all components intact and functional

D. No, because the cracked handle allows the pressurized agent to leak slowly, reducing the discharge time

9. A scaffold platform has a trap door (access hatch) that allows workers to climb through from the level below. When the trap door is open, it creates a fall hazard at the platform level. What safety measure must be in place when the trap door is open?

A. A warning sign posted on the scaffold leg indicating that the trap door is open for worker access below

B. The trap door opening must be guarded with a self-closing gate or equivalent protection that prevents a worker from stepping into the opening while still allowing access for climbing through

C. The trap door must remain closed at all times and workers must use the exterior ladder for all access

D. A spotter must stand beside the open trap door and physically block workers from approaching the hole

10. A carpenter is cutting galvanized steel flashing with aviation snips. The cut edges of the galvanized steel are extremely sharp. What specific injury hazard do these sharp edges create, and what PPE prevents it?

- A. The sharp edges reflect sunlight into the carpenter's eyes and safety glasses with tinted lenses prevent this
- B. The sharp metal edges generate static electricity that can shock the carpenter handling the cut pieces
- C. The sharp edges produce zinc oxide fumes when cut that cause metal fume fever in the respiratory system
- D. The sharp metal edges can cause deep lacerations to the hands and arms — heavy-duty work gloves (leather or cut-resistant) must be worn when handling cut galvanized steel

11. A carpenter is working on a scaffold that has been loaded with mortar, bricks, and tools. A coworker asks to add a pallet of additional bricks to the platform using a forklift. The carpenter calculates that the additional weight will exceed the scaffold platform's rated load capacity. What should the carpenter do?

- A. Refuse to allow the additional material on the platform — the scaffold must never be loaded beyond its rated capacity, and the carpenter should inform the coworker that the load must be reduced or the material placed on a different level
- B. Allow the load if the forklift operator agrees to place the pallet gently to minimize the dynamic impact
- C. Distribute the existing materials more evenly across the platform to make room for the additional pallet
- D. Add additional cross-bracing beneath the platform to increase the scaffold's load capacity temporarily

12. A carpenter is demolishing an old wall and encounters a grey, fibrous pipe wrap material on the heating pipes inside the wall cavity. The material is crumbling when touched. What should the carpenter suspect, and what action must be taken?

- A. The material is standard fibreglass pipe insulation that has deteriorated and can be removed with a dust mask
- B. The material is asbestos-free mineral wool that was used in all pipe insulation manufactured after 1950

C. The material may be friable asbestos pipe insulation — the carpenter must stop work immediately, leave the area, restrict access, and report the finding for professional testing and potential abatement before any further disturbance

D. The material is calcium silicate pipe insulation that is non-hazardous and can be removed without testing

13. A carpenter is reading a structural drawing and encounters the notation "W.P." at several locations along the foundation wall. What does "W.P." typically stand for in foundation construction drawings?

A. "Wall Plate" — indicating the location of the sill plate on top of the foundation wall for framing above

B. "Waterproofing" — indicating locations where a waterproofing membrane or coating must be applied to the foundation wall surface

C. "Work Point" — indicating the exact coordinate location for surveying reference during construction

D. "Wind Post" — indicating a reinforced column within the foundation wall for lateral wind resistance

14. A carpenter must calculate the slope of a wheelchair ramp. The Building Code requires a maximum slope of 1:12 for accessibility ramps. The ramp must rise 375 mm from the sidewalk to the building entrance. What is the minimum horizontal length of the ramp?

A. 3,750 mm based on using a 1:10 slope instead of the required 1:12 maximum for accessibility

B. 2,250 mm based on using a 1:6 slope that is steeper than the accessibility code requirement

C. 375 mm based on using a 1:1 ratio that produces a 45-degree ramp angle to the entrance

D. 4,500 mm based on the 1:12 ratio:  $375 \text{ mm rise} \times 12 = 4,500 \text{ mm minimum horizontal run}$

15. A carpenter is estimating the total length of baseboard needed for a house with 12 rooms. Rather than measuring each wall individually, the carpenter uses a rule of thumb for estimating baseboard. Approximately what percentage of waste should be added to the net measurement to account for cuts, joints, and defective material?

- A. 10 to 15% waste allowance is standard for baseboard estimation — this covers mitre waste at corners, cope cut waste, defective or damaged pieces, and measurement rounding across the twelve rooms
- B. 1 to 2% waste because baseboard installation produces very little waste with careful cutting practice
- C. 50% waste because baseboard joints and corners produce large amounts of unusable off-cuts
- D. 30% waste because every inside corner requires a coped cut that wastes the full profile depth

16. A carpenter is calculating the number of sheets of OSB needed to sheath the exterior walls of a rectangular building. The building is 14.0 m × 9.0 m with 2.74 m tall walls. The panels are 1.22 × 2.44 m. What is the gross wall area (before subtracting openings)?

- A. 38.36 square metres based on calculating only two walls instead of all four wall surfaces
- B. 63.02 square metres based on calculating the wall area using half the perimeter by mistake
- C. 126.04 square metres based on the correct formula: perimeter =  $2(14.0 + 9.0) = 46.0$  m × 2.74 m height = 126.04 m<sup>2</sup> gross wall area
- D. 252.08 square metres based on doubling the correct wall area by multiplying the perimeter twice

17. When a carpenter reads "F.O.S." on a drawing next to a dimension arrow pointing to the face of a stud, what does this abbreviation mean?

- A. "Front of Sheathing" — the dimension is measured to the exterior face of the wall sheathing panel
- B. "Face of Stud" — the dimension is measured to the face (the 38 mm wide surface) of the wall stud at that location
- C. "Finished Opening Size" — the dimension represents the clear opening after all finishes are applied
- D. "Foundation of Structure" — the dimension is measured from the top of the foundation wall at that point

18. A carpenter is converting a roof area measurement from square metres to roofing squares for ordering shingles. The total roof area is 167 square metres. One roofing square equals 9.29 m<sup>2</sup>. How many squares of shingles are needed before waste?

- A. 167 squares based on using the area in square metres directly as the number of roofing squares
- B. 9.29 squares based on dividing one square by the total roof area instead of the correct division
- C. 1,551 squares based on multiplying the area by 9.29 instead of dividing by 9.29 for conversion
- D. 18.0 squares based on dividing 167 by 9.29 = 17.98, rounded up to 18 roofing squares

19. A carpenter is laying out stud positions on a wall plate and must account for a beam pocket — a location where a beam end will be recessed into the wall. The beam pocket interrupts the regular stud layout. How does the carpenter frame around the beam pocket?

- A. The regular stud layout is modified at the beam pocket — the studs adjacent to the pocket are positioned as trimmer studs that define the pocket width, with a header above and blocking as needed to create the recessed pocket within the wall frame
- B. The beam pocket location is ignored during layout and the studs are installed through the pocket space
- C. The beam pocket is cut into the studs after the wall is framed and raised into position on the sill plate
- D. A separate pocket frame is built independently and inserted into the wall after the main wall is erected

20. A carpenter needs to determine the total number of treads for a stairway with 15 risers. The upper floor landing serves as the final walking surface. How many treads are required?

- A. 15 treads matching the number of risers in a one-to-one ratio for the complete stairway flight
- B. 16 treads because one additional tread is needed at the bottom for the starting step from the floor
- C. 14 treads because the upper floor serves as the 15th walking surface, replacing the need for a 15th tread
- D. 13 treads because both the upper and lower floors serve as walking surfaces, replacing two treads

21. A carpenter is checking the foundation wall for level before setting the sill plates. Using a builder's level, the carpenter takes rod readings at all four corners. The readings are: NE corner 1.425 m, NW corner 1.440 m, SE corner 1.430 m, SW corner 1.450 m. Which corner is the highest point of the foundation wall?

A. The NE corner is highest because it has the lowest rod reading (1.425 m) — a lower reading means the point is closer to the instrument's line of sight, which means it is at a higher elevation

B. The SW corner is highest because it has the highest rod reading of 1.450 m at that corner point

C. The NW corner is highest because its rod reading of 1.440 m is closest to the average of all readings

D. The SE corner is highest because its rod reading is the median value among the four corner readings

22. A carpenter is estimating the amount of concrete needed for a sidewalk that has a curved section. The curved section is a quarter-circle with an outer radius of 3.0 metres and an inner radius of 1.8 metres. The sidewalk is 100 mm thick. What is the volume of concrete for this curved section only?

A. 0.283 cubic metres based on using only the outer radius without subtracting the inner radius area

B. 0.127 cubic metres based on using only the inner radius for the quarter-circle area calculation

C. 0.453 cubic metres based on calculating the quarter-circle area as  $\pi/4 \times (3.0^2 - 1.8^2) \times 0.1 = 0.785 \times (9.0 - 3.24) \times 0.1 = 0.785 \times 5.76 \times 0.1 = 0.452 \text{ m}^3$

D. 0.576 cubic metres based on using the full circle area minus the inner area without the quarter fraction

23. A carpenter is performing a layout for a multi-storey building and must transfer the building reference grid from the first floor to the second floor. The reference grid consists of column lines labelled A through E and 1 through 5. What method does the carpenter use to transfer these grid points vertically?

A. The grid points are transferred by measuring horizontal distances from the elevator shaft at each floor level

B. A plumb bob, optical plummet, or laser plumb is used at each grid intersection to transfer the exact point vertically from one floor to the floor above with millimetre precision

C. The grid points are estimated by eye from one floor to the next using visible column locations as reference

D. The grid points are transferred by measuring from the exterior wall face inward at the same dimensions

24. A carpenter needs to calculate the quantity of exterior sheathing tape required for a building. The tape is used at all horizontal and vertical panel joints on the exterior sheathing. The building has 48 vertical joints averaging 2.74 m each, and 12 horizontal joints averaging 12.0 m each. What is the approximate total tape length needed before waste?

A. 131.5 metres based on calculating only the vertical joints without including horizontal joint tape

B. 144.0 metres based on calculating only the horizontal joints without including vertical joint tape

C. 131.5 metres based on calculating vertical joints at  $48 \times 2.74$  only and rounding for a partial answer

D. 275.5 metres based on the sum of all joints:  $(48 \times 2.74) + (12 \times 12.0) = 131.5 + 144.0 = 275.5$  metres total

25. A carpenter is reading the specifications for a project and encounters the requirement that all exterior wall sheathing must have a "span rating of 24/16." What do these numbers indicate?

A. The panel is rated to span 24 inches maximum as roof sheathing and 16 inches maximum as wall sheathing or subfloor, with these values representing the maximum support spacing for each application

B. The panel is 24 mm thick on the face and 16 mm thick at the tongue for a stepped cross-section profile

C. The panel supports 24 pounds per square foot as roof sheathing and 16 psf as subfloor in residential use

D. The panel measures 24 inches wide and 16 feet long as its standard sheet dimensions for construction

26. A carpenter is converting a pitch of 6/12 to a slope percentage for a site grading plan that uses percentage grades. What is the slope percentage equivalent of a 6/12 pitch?

- A. 6% based on using only the numerator of the pitch fraction as the percentage value directly
- B. 12% based on using only the denominator of the pitch fraction as the percentage for the conversion
- C. 50% based on dividing the rise by the run and multiplying by 100:  $(6 \div 12) \times 100 = 50\%$
- D. 72% based on multiplying the rise by the run and expressing the product as a percentage of something

27. A carpenter is building forms for a concrete wall that includes a blackout for a future mechanical penetration. The blackout is a rectangular box (200 mm × 300 mm) that will be removed after stripping, leaving a through-wall opening for a duct. How must the blackout be constructed to allow removal after the concrete has cured?

- A. The blackout is made from steel plate that is left permanently embedded in the wall as a sleeve
- B. The blackout is built with a slight taper (wider on one side than the other) so it can be pulled or driven out from the wider side after the concrete sets — if made from wood, the surfaces are coated with release agent
- C. The blackout is made from expanding foam that dissolves when water is applied after the forms are stripped
- D. The blackout is made from cardboard that disintegrates when the forms are removed from each side

28. A concrete specification requires "28-day cylinder break strength of 30 MPa." During the pour, the concrete supplier provides a delivery ticket showing the mix was designed for 30 MPa. If the 28-day test cylinders break at 27 MPa (10% below specification), what typically happens?

- A. The concrete is automatically considered acceptable because a 10% shortfall is within industry tolerance

B. The entire section of concrete is demolished and replaced at the supplier's expense without further testing

C. The concrete is accepted at the reduced strength with a financial credit from the supplier to the contractor

D. The structural engineer evaluates the results — this may involve additional testing (core samples from the structure, additional cylinder tests at 56 days) to determine if the in-place concrete is adequate for the applied loads

29. A carpenter is constructing forms for an elevated concrete walkway (a suspended slab walkway between two buildings). The walkway is 2.0 metres wide and spans 6.0 metres between the buildings. The formwork must support the full weight of the wet concrete, reinforcement, formwork, and construction loads. What is the critical design consideration for this formwork?

A. The formwork shoring must be designed to carry the combined dead load of concrete, reinforcement, and formwork plus construction live loads (workers, equipment, and impact) — with the shoring posts bearing on stable ground or a structural surface capable of supporting the concentrated loads

B. The formwork only needs to support the weight of the plywood deck panels because the concrete is fluid

C. The formwork design is based solely on the concrete weight without including construction live loads

D. The formwork shoring is not needed because the 6-metre span is within the self-supporting range of plywood

30. A carpenter is placing concrete for a retaining wall and the specification calls for the concrete to be placed in lifts not exceeding 450 mm. The vibrator must penetrate each lift and extend into the previous lift. After placing and vibrating the first lift, the crew takes a 45-minute break due to a delivery delay. When the next truck arrives, should the crew proceed normally?

A. Yes, because a 45-minute delay has no effect on the concrete bonding at the lift junction in the wall

B. Yes, but the crew should add water to the surface of the first lift to re-wet it before placing the second

C. The crew must roughen the surface of the first lift if it has begun to stiffen, and may need to apply a bonding agent — the 45-minute delay in warm weather may have allowed the first lift to begin setting, risking a cold joint

D. The crew must strip the forms and start over because any delay longer than 30 minutes voids the pour

31. When a concrete slab is placed on a sunny, hot day, the carpenter applies a curing compound to the surface immediately after finishing. Two days later, the carpenter notices that the slab surface is developing fine cracks in a random pattern. Despite the curing compound, what may have gone wrong?

A. The curing compound was applied in insufficient quantity and did not form a continuous membrane

B. The curing compound reacted chemically with the concrete and caused the surface to crack from expansion

C. The concrete was over-vibrated during placement, bringing too much water to the surface before finishing

D. The slab was not protected from direct sunlight — even with curing compound, the dark surface absorbs solar heat, raising the concrete temperature and increasing the rate of moisture loss through the compound membrane

32. A carpenter is constructing a concrete form for a circular tank wall. The tank is 4.0 metres in diameter and the wall is 200 mm thick. The form consists of two concentric circular forms — an inner form and an outer form. What is the inside diameter of the outer form?

A. 3.6 metres based on subtracting twice the wall thickness from the tank diameter for the inner diameter

B. 4.0 metres based on using the tank diameter as the outer form inside diameter — but this is the specification dimension for the outer face of the finished wall, so the inside of the outer form equals the tank diameter

C. 3.8 metres based on subtracting only one wall thickness from the tank diameter value for the form

D. 4.0 metres — the inside face of the outer form defines the outside face of the concrete wall, so the inside diameter of the outer form equals the specified tank outside diameter of 4.0 metres

33. A carpenter is placing concrete in a deep foundation wall (3.0 metres tall). The specification limits the rate of pour to 1.0 metres per hour. At this rate, how long will the pour take to complete, and why is the rate controlled?

A. Three hours — the controlled rate prevents the formwork from being overloaded by excessive lateral pressure, because concrete that has been in place longer begins to stiffen and exerts less pressure than freshly placed concrete above it

B. One hour — the controlled rate accelerates the cure so the forms can be stripped the same day

C. Six hours — the controlled rate allows the finishing crew to work the top surface between truck deliveries

D. Three hours — but the rate only affects the finishing schedule and has no structural impact on the forms

34. When placing concrete in a wall form, the carpenter notices that the concrete from the latest truck appears to be a darker grey colour than the previous trucks. The slump test result is within specification. Should the carpenter be concerned about the colour difference?

A. No, because colour variations between loads are common and have no effect on concrete strength

B. No, because the slump test confirms the concrete meets all specification requirements for the project

C. Yes — a significant colour difference between loads may indicate a different cement source, different water-cement ratio, or a different admixture content that could affect the concrete performance and appearance on exposed walls

D. Yes, but only if the wall will receive a polished finish because colour differences are invisible on raw walls

35. A carpenter is building formwork for a concrete slab that will have radiant floor heating tubes embedded in it. The tubes are laid out in a serpentine pattern across the slab area and tied to the reinforcement mesh. Before the concrete is placed, what critical test must be performed on the heating tube system?

A. A visual inspection of the tube layout to confirm it matches the mechanical drawing spacing requirements

B. A pressure test of the entire tubing system to verify there are no leaks in the tubes, fittings, or connections before the concrete is placed — a leak discovered after the concrete has cured requires demolishing the slab

C. A flow test that circulates water through the tubes to verify the pump can overcome the friction in the lines

D. A temperature test that heats the tubes to operating temperature to verify they can withstand thermal stress

36. A carpenter strips forms from a wall and notices a horizontal line of discolouration running across the wall at approximately 1.2 metres from the bottom — the exact height of the first pour lift. Above this line, the concrete is lighter in colour than below. What causes this colour difference at the lift line?

A. The upper lift concrete was a different mix design that used a lighter-coloured cement than the lower lift

B. The lower concrete was exposed to form oil longer because it was placed first, staining it a darker shade

C. Moisture migration from the fresh upper lift into the partially set lower lift at the interface changed the curing

D. The two lifts cured under slightly different conditions (the lower lift was confined by the concrete above and retained more moisture, while the upper lift's surface was more exposed) creating a visible colour boundary at the junction

37. A carpenter is constructing forms for a concrete column that will be part of an exposed architectural design. The specification requires board-formed concrete — a rough texture on the column face that shows the wood grain of the form boards. What form material produces this finish?

A. Rough-sawn (unplaned) lumber used as the form lining — the rough wood surface and visible grain pattern imprint onto the concrete during curing, creating a textured finish that shows the natural wood grain and board widths

- B. Smooth-faced plywood coated with a high-gloss release agent for maximum surface detail transfer
- C. Steel form panels sandblasted to create a rough texture that transfers to the concrete during the pour
- D. Plastic form liners with an embossed wood grain pattern that replicates the appearance of board forming

38. When concrete is placed in cold weather (below 5°C ambient), the carpenter covers the placed concrete with insulating blankets. The blankets must remain in place for a minimum period. What is the typical minimum protection period for concrete in cold weather?

- A. 12 hours because the concrete generates enough heat in the first half-day to survive without protection
- B. 24 hours because the concrete reaches initial set within this period and can resist freezing independently
- C. 72 hours (3 days) minimum — this is the typical minimum protection period to allow the concrete to reach the critical 3.5 MPa strength needed to resist freeze-thaw damage
- D. 7 days because the concrete must reach 50% of its 28-day strength before cold protection is removed

39. A carpenter is finishing a concrete garage floor and must create a smooth surface suitable for automotive traffic. The carpenter performs the following sequence: screed, bull float, wait for bleed water to disappear, then begins steel trowelling. During the first trowel pass, the carpenter notices that small ripples form behind the trowel blade. What do these ripples indicate?

- A. The trowel blade is too sharp and is cutting into the surface rather than smoothing the paste layer evenly
- B. The concrete has not stiffened sufficiently for trowelling — the surface is still too soft and the trowel is displacing the paste rather than compacting it; the carpenter must wait longer before the next attempt
- C. The concrete mix has excessive sand content that creates a grainy surface texture behind the trowel blade
- D. The trowel blade is being held at too steep an angle and should be flattened to reduce the leading edge dig

40. A carpenter has completed a large concrete pour (200 m<sup>3</sup>) for a commercial building slab. The concrete supplier sent 20 trucks to deliver the concrete over a six-hour period. The last truck arrived at the site 85 minutes after batching. Is this delivery time acceptable?

A. No, because all concrete must be placed within 60 minutes of batching for commercial applications only

B. No, because 85 minutes is well past the 30-minute maximum delivery time for ready-mix concrete

C. Yes, because there is no time limit on concrete delivery as long as the slump is within specification

D. Yes — the standard maximum delivery time is typically 90 minutes from batching (per CSA A23.1), and 85 minutes is within this limit, but the concrete should be placed immediately upon arrival

41. A carpenter is vibrating concrete in a deep footing with heavy reinforcement. The vibrator head is 50 mm in diameter. The rebar grid spacing is 150 mm × 150 mm. Can the vibrator head fit between the rebar without displacing the reinforcement?

A. No, the 50 mm vibrator cannot fit between 150 mm spaced bars because the clear space between bars is only about 134 mm (150 mm centre-to-centre minus the bar diameter), leaving inadequate clearance for the vibrator

B. No, vibrators must never be inserted between rebar in any configuration because they damage the bars

C. Yes, the clear space between 150 mm spaced bars (approximately 134 mm for 15M bars) is adequate for a 50 mm diameter vibrator head to pass between the bars without contacting or displacing them

D. Yes, but only if the vibrator is inserted at a 45-degree angle to pass through the diagonal of the grid

42. A concrete specification calls for "6% ± 1% air content" for an exterior slab. The concrete arrives and the air content test shows 8%. Should this concrete be accepted?

A. No — 8% air content exceeds the specified maximum of 7% (6% + 1% tolerance); excessive air reduces the concrete's compressive strength and should be rejected

B. Yes, because 8% is close enough to the specification and the extra air provides better freeze-thaw resistance

C. Yes, because air content can only be too low (insufficient freeze-thaw protection), never too high for concrete

D. No, but only because the air content test is known to be inaccurate and a retest will likely show lower results

43. A carpenter is framing a floor system and encounters a condition where a floor joist must pass over a steel beam rather than bearing on top of it. The joist web must be notched to clear the beam flange. The Building Code restricts the depth of notches at the ends of joists. What is the maximum notch depth permitted at the end of a joist bearing on a support?

A. One-half the joist depth because end notches are in the shear zone rather than the bending zone

B. One-quarter the joist depth at the end bearing, consistent with the general notching rule for all locations

C. Two-thirds the joist depth because end notches have less effect on bending strength than mid-span holes

D. One-quarter of the joist depth for notches in the top or bottom at the ends — however, many codes allow up to one-quarter depth at the top only; bottom-edge notches at bearing points may have different restrictions depending on the jurisdiction

44. A carpenter is installing floor joists and must create a floor opening for a set of pull-down attic stairs. The opening measures 600 mm × 1,200 mm. The opening interrupts two joists. The carpenter must frame the opening with headers and trimmers. At a minimum, must the headers and trimmers be doubled for this size opening?

A. Yes, both headers and trimmers must be doubled for any floor opening regardless of the size dimensions

B. No — for openings this size (where the header span is only 600 mm and only two joists are interrupted), single headers and trimmers are typically adequate; doubling is generally required when the header span exceeds 1.2 metres or more than two joists are interrupted

- C. Yes, but only the headers need to be doubled because they carry the tail joist loads across the opening
- D. No, because attic stair openings are classified as non-structural and require no framing reinforcement

45. A carpenter is framing a hip roof and must install a hip jack rafter. The hip jack is shorter than the common rafters and decreases in length progressively along the hip. What is the "common difference" for hip jack rafters?

- A. The common difference is the total rafter length divided by the number of jack rafters in the hip plane
- B. The common difference varies randomly between each pair of adjacent jack rafters and must be calculated individually for each rafter
- C. The common difference is a constant length reduction between successive jack rafters, equal to the joist spacing (in feet) multiplied by the unit line length for a common rafter at the given pitch, divided by 12
- D. The common difference equals the hip rafter length divided by the total number of rafters on both sides

46. A carpenter is framing a wall opening for a window in a load-bearing wall. The Building Code span tables specify the maximum header span for various lumber sizes under different loading conditions. The window opening is 1.8 metres wide. The wall supports one floor and a roof above. Looking up the span table, the carpenter determines that a doubled 38 × 235 mm (2 × 10) header is required. Before installing, what else must the carpenter verify?

- A. That the trimmer studs supporting the header are adequate for the concentrated loads — a wide header carrying significant loads transfers large forces to the trimmers, which must transfer them to the bottom plate and foundation without crushing
- B. That the window manufacturer has confirmed the header size matches their product specifications
- C. That the cripple studs below the rough sill are the same species and grade as the king studs above
- D. That the header lumber has been stored indoors for at least one week before installation in the wall

47. A carpenter is installing manufactured floor trusses and discovers that the truss drawing specifies "NO FIELD CUTTING" on the truss chord and web members. Despite this restriction, the carpenter needs to route a plumbing vent pipe through the floor system. The vent location falls at a web panel point on one truss. What should the carpenter do?

- A. Cut the web member and reinforce both sides with plywood gussets nailed to the chord and web stub
- B. Route the pipe around the truss by offsetting the vent with fittings to pass through an open web space
- C. Drill a hole through the chord member because the "no cutting" restriction only applies to web members
- D. Contact the truss manufacturer or structural engineer for guidance, because cutting any structural member on a manufactured truss without the designer's approval can void the truss rating and cause structural failure

48. When framing a roof, the carpenter must calculate the "overhang" or "tail" of the rafter — the portion that extends beyond the wall plate to form the eave. The overhang is measured horizontally from the outside face of the wall to the end of the rafter tail. If the drawings specify a 400 mm horizontal overhang on a 6/12 pitch roof, what is the rafter tail length along the slope?

- A. 400 mm because the overhang dimension is already the slope distance along the rafter for all pitches
- B. The rafter tail length equals the horizontal overhang multiplied by the secant of the roof angle — for a 6/12 pitch, this is  $400 \times 1.118 = 447$  mm along the slope
- C. 200 mm because the overhang is divided by two to account for the slope reduction on each side of the roof
- D. 600 mm because the unit rise of 6 is added to the horizontal overhang for the total tail along the slope

49. A carpenter is framing a partition wall that will contain back-to-back plumbing fixtures (bathroom sinks on opposite sides of the wall). The drain and supply lines require more space than a standard 38 × 89 mm (2 × 4) stud cavity provides. What framing solution accommodates the plumbing while maintaining a flat wall surface on both sides?

- A. The wall is framed with  $38 \times 89$  mm studs and the plumber routes the pipes through holes drilled in the studs
- B. The wall is framed with a single row of  $38 \times 184$  mm ( $2 \times 8$ ) studs that provide a wider cavity for pipes
- C. A staggered-stud wall or a double-stud wall is built with two rows of studs offset from each other, creating a wide cavity that accommodates the plumbing while providing flat nailing surfaces on both sides
- D. The plumbing is rerouted to run through the floor cavity below the wall instead of through the wall

50. A carpenter has completed framing a bearing wall and is installing the double top plate. At one location, the double top plate must be spliced (two pieces meet end to end). The splice joint must be offset from the top plate joint below. What is the minimum recommended offset distance?

- A. At least 1.2 metres (4 feet) so the double plate bridges across the top plate joint below, maintaining the continuous horizontal load path that the double plate provides
- B. No offset is required because the double plate and top plate are independent structural members
- C. At least 600 mm so the splice clears the nearest stud on each side of the lower plate joint
- D. The double plate splice must fall directly over a stud location for maximum bearing at the joint point

51. A carpenter is framing a shed-style (mono-pitch) roof on a rectangular building. The front wall is taller than the back wall, creating a single slope. The rafters run from the tall front wall plate to the short back wall plate. Unlike a gable roof, there is no opposing rafter to resist the outward thrust. How is the outward thrust at the tall front wall resisted?

- A. The front wall is built with thicker studs to resist the lateral force from the rafter thrust against the plate
- B. Diagonal wind bracing in the front wall resists the rafter thrust by triangulating the wall frame assembly
- C. The ceiling joists spanning from front to back wall act as tension ties that resist the outward rafter thrust

D. The rafter connections at both walls use structural metal connectors that resist both vertical and horizontal forces, and in many shed roof configurations the structural mechanism differs from a gable — ceiling joists or a ridge beam system eliminates the thrust

52. A carpenter is installing wood I-joists and must install web stiffeners at the bearing points. Web stiffeners are vertical pieces of OSB or plywood installed on each side of the I-joist web at the bearing location. What is the function of these web stiffeners?

- A. They provide additional nailing area for the rim joist attachment at the perimeter of the floor system
- B. Web stiffeners reinforce the thin OSB web at the bearing point where the concentrated reaction force is transferred from the joist to the support — without stiffeners, the thin web can buckle or crush under the bearing load
- C. They prevent moisture from wicking up through the web material at the bearing point on the foundation
- D. They provide fire blocking between the joist bays at each bearing location along the length of the floor

53. A carpenter is framing a wall and must install a nailer (backing board) for a future kitchen cabinet installation. The nailer is a horizontal piece of  $38 \times 89$  mm lumber installed between the studs at a height of 1,370 mm (54 inches) above the finished floor. What is the purpose of this nailer?

- A. It provides fire blocking at the cabinet height to prevent horizontal flame spread within the wall cavity
- B. It provides structural support for the wall studs at mid-height to prevent buckling under compressive loads
- C. It provides a continuous solid nailing surface behind the drywall at the cabinet hanging height, ensuring that the cabinet mounting screws penetrate solid wood rather than only drywall
- D. It supports the electrical wiring at the correct height for the countertop outlet receptacles behind the cabinets

54. A carpenter is installing subfloor panels and reaches the last row at the opposite wall. The remaining space is narrower than a full panel — only 400 mm wide. The carpenter must rip the last panel to fit. After ripping, the cut edge faces the wall and the factory edge faces the adjacent panel. What must the carpenter do at the cut edge?

A. Leave the standard expansion gap between the cut edge and the wall (typically 3 mm for OSB), and ensure the cut panel is nailed at the same schedule as the full panels to the joist below

B. Apply construction adhesive along the cut edge to prevent moisture absorption through the exposed core

C. Face-nail the cut panel through the surface because the cut edge cannot accept tongue-and-groove nailing

D. Apply sheathing tape along the cut edge to seal the exposed wood fibres against moisture penetration

55. A carpenter is building a deck and the engineer requires that the deck beam be continuous over three posts (a three-span continuous beam) rather than simply supported between each pair of posts. What advantage does a continuous beam provide over simple-span beams?

A. A continuous beam is lighter than the equivalent simple-span beams because it uses less material overall

B. A continuous beam requires fewer posts because the spans can be wider than simple-span beam tables allow

C. A continuous beam produces a flatter deck surface because each span deflects equally under uniform loads

D. A continuous beam distributes loads more efficiently across multiple spans — the negative moment at the interior supports reduces the positive moment at mid-span, allowing a smaller beam size or wider post spacing than equivalent simple-span beams

56. A carpenter is installing a structural sheathing panel on an exterior wall and must nail it with the specified nail type and schedule. The specification calls for 63 mm (2-1/2 inch) common nails at 150 mm on centre along all panel edges and 300 mm in the field. The carpenter substitutes 57 mm (2-1/4 inch) nails. What is the consequence?

- A. The 57 mm nails provide the same performance because the 6 mm difference is negligible for holding power
- B. The 57 mm nails have less penetration into the framing and each nail provides less shear capacity — the total wall shear resistance is reduced below the design requirement
- C. The 57 mm nails are acceptable if the spacing is reduced from 150 mm to 100 mm along panel edges
- D. The 57 mm nails are only problematic in the field area and are acceptable along the panel edge nailing

57. When framing a hip roof, the carpenter must determine the hip rafter backing angle. Some hip rafters require "backing" — bevelling the top edges of the hip rafter so the roof sheathing lies flat across the hip. Why is backing necessary on a hip rafter?

- A. Backing compensates for the weight of the hip cap shingles that will be installed over the hip line
- B. Backing corrects a manufacturing defect in the hip rafter lumber that causes the top edge to be uneven
- C. The hip rafter top edge is higher at the centre than at the edges due to its position between two roof planes — without backing (bevelling the top edges), the sheathing would not lie flat across the hip, creating a ridge at the hip line
- D. Backing provides additional depth to the hip rafter at the top for better nail penetration from the sheathing

58. A carpenter is framing a floor and must install blocking between the joists at a bearing wall location above. The blocking must be tight-fitting and installed with specific nailing. How many nails are typically required at each end of a piece of solid blocking between floor joists?

- A. A minimum of two nails at each end, driven through the joist into the end grain of the blocking — this is the standard end-nailing pattern for solid blocking between joists
- B. A single nail at each end is sufficient because the tight fit provides the primary load transfer mechanism
- C. Four nails at each end in a square pattern for maximum connection capacity at the bearing location

D. No nails are needed because tight-fitting blocking transfers loads by bearing contact alone without fasteners

59. A carpenter is constructing a truss roof and the truss manufacturer's installation guide requires permanent lateral bracing on the top chords, bottom chords, and web members. The carpenter installs the top chord bracing but considers omitting the web and bottom chord bracing to save time. What is the risk of omitting this bracing?

A. The omitted bracing only affects the ceiling drywall appearance and has no structural consequence

B. The roof sheathing provides all the necessary bracing for the top chords, making all additional bracing optional

C. The omitted bracing would only be needed during a seismic event and is not required in non-seismic zones

D. Without web and bottom chord bracing, individual truss members can buckle laterally under load — the bottom chord is a compression member under certain load combinations and the webs carry alternating tension and compression forces that require lateral restraint to prevent buckling failure

60. A carpenter is installing a ledger board for a deck attachment to an existing house. The ledger is 38 × 235 mm (2 × 10) pressure-treated lumber. The specification calls for 12 mm lag screws at 400 mm on centre in two staggered rows. Before drilling the lag screw holes, the carpenter must drill two different diameter holes. What are these two holes?

A. A clearance hole through the ledger board (slightly larger than the lag screw shank diameter) and a pilot hole into the rim joist (smaller than the lag screw shank to allow the threads to grip)

B. Two identical holes through both the ledger and the rim joist for a bolt-through connection with nuts

C. A large counterbore hole for the lag screw head and a small hole for a finishing nail that holds the ledger

D. A hole for the lag screw and a separate hole for a through-bolt that provides redundant connection

61. A carpenter is installing metal step flashing along a dormer cheek wall where the sloped roof meets the vertical wall. Each step flashing piece must be a minimum size and must be woven into the shingle courses. After the step flashing is installed, the wall cladding will be applied over the vertical leg of the flashing. What must be done before the cladding covers the step flashing wall legs?

A. Each step flashing piece must be sealed to the wall with roofing cement to prevent water from passing behind it

B. The step flashing wall legs must be inspected to verify they extend a minimum of 100 mm up the wall surface

C. A continuous strip of building paper or housewrap must be applied over the step flashing legs before the wall cladding is installed to prevent water from the wall surface from getting behind the step flashing

D. The step flashing must be integrated with the weather-resistive barrier — the housewrap must lap over the top edge of each step flashing piece so water from the wall flows over the flashing onto the roof surface rather than behind it

62. A carpenter is installing a bay window on the exterior of a building. The bay window projects from the wall and has its own small roof (a hip roof above the bay). The junction between the bay window roof and the main wall above requires special flashing. What type of flashing is used at this junction?

A. A single continuous piece of metal flashing that runs the full width of the bay roof-to-wall intersection

B. Step flashing woven into the shingle courses along the sloped sides of the bay roof where it meets the wall, with a headwall (apron) flashing across the top where the bay roof meets the flat wall surface above

C. Valley flashing installed at the intersection of the bay roof and the main wall above the window unit

D. No flashing is required because the bay window unit comes pre-flashed from the factory installation

63. A carpenter installs vinyl siding and reaches a location where a large electrical panel is surface-mounted on the exterior wall. The panel is 600 mm wide and 900 mm tall. The siding must terminate neatly at the panel edges. How does the carpenter detail the siding around this large panel?

A. The siding is cut to fit around the panel with each course butted directly against the panel edges and caulked

B. A vinyl mounting block frame is installed around the panel perimeter before the siding, providing J-channel

C. J-channel trim is installed around all four sides of the panel, and the siding courses terminate into the channels on each side — utility trim is used above and below the panel where the courses are ripped to width

D. The panel is removed, the siding is installed continuously, and the panel is reinstalled over the siding surface

64. A carpenter is installing exterior window shutters on a vinyl-clad wall. The shutters must be mounted without pinning the vinyl siding, which must remain free to expand and contract. How are the shutters attached?

A. The shutters are attached through the siding and into the wall framing with special shutter fasteners that have a standoff that allows the siding to slide behind the shutter — or the shutters are attached with adhesive mounting pads that do not penetrate the siding

B. The shutters are nailed through the siding into the wall studs with standard finish nails at each corner

C. The shutters are screwed through the siding slots into the sheathing using the same nailing technique as siding

D. The shutters are hung from hooks mounted above the window that allow the siding to move beneath them

65. When installing asphalt shingles, the carpenter must ensure that the nails are driven at the correct depth. A properly driven roofing nail has its head flush with the shingle surface — not protruding and not countersunk. Why is a countersunk nail (driven too deep) a problem?

A. A countersunk nail breaks through the shingle mat, reducing the nail's holding power and creating a hole through which water can penetrate beneath the shingle — the damaged mat around the countersunk head provides less pullout resistance in high winds

B. A countersunk nail costs more in compressed air because the nailer uses more pressure to drive it deeper

C. A countersunk nail creates a visible dimple on the shingle surface that is aesthetically unacceptable

D. A countersunk nail prevents the self-seal adhesive strip from bonding because the dimple lifts the shingle

66. A carpenter is installing a continuous metal drip edge along the eave of a roof. The drip edge must extend into the gutter. If the gutter has not been installed yet (it will be installed after the roofing is complete), how should the carpenter position the drip edge?

A. The drip edge lower edge should extend past the fascia face far enough to direct water into the gutter when it is eventually installed — typically extending 25 to 50 mm past the fascia face

B. The drip edge should be installed flush with the fascia face because the gutter will create its own water channel

C. The drip edge should be bent 90 degrees downward at the fascia to direct water along the fascia surface

D. The drip edge installation should be postponed until after the gutter is mounted to verify the correct overlap

67. A carpenter is installing exterior stone veneer on a wood-frame wall. The veneer is adhered to the wall with mortar (adhered veneer, not mechanically attached). Before applying the stone, the carpenter installs metal lath over the weather-resistive barrier. What is the function of the metal lath?

A. The metal lath provides a rigid surface that prevents the stone veneer from cracking during earthquakes

B. The metal lath acts as a moisture barrier that prevents water from the mortar from contacting the housewrap

C. The metal lath provides a mechanical key for the mortar scratch coat — the mortar squeezes through the lath openings and locks behind the mesh when it hardens, creating a strong bond between the mortar and the wall

D. The metal lath provides electrical grounding for the stone veneer cladding system on the building exterior

68. A carpenter finishes installing cedar shingle siding and must apply a finish to protect the wood from weathering. The homeowner requests a natural grey weathered appearance. What finish approach produces this natural weathered look?

A. Leave the cedar unfinished — cedar naturally weathers to a silver-grey colour over one to two years of UV and moisture exposure; if a uniform appearance is desired sooner, a weathering stain can be applied

B. Apply a dark brown stain that will fade to grey within six months of UV exposure on the exterior wall

C. Apply a white primer coat followed by a light grey paint for an immediate weathered appearance

D. Apply a clear polyurethane sealer that preserves the original cedar colour while preventing weathering

69. A carpenter is installing a rain screen wall assembly with a continuous insect screen at the base of the drainage cavity. The screen prevents insects and rodents from entering the cavity. What mesh size is typically specified for this insect screen?

A. 3 mm mesh openings that allow drainage and airflow while blocking most common insects from entering

B. 10 mm mesh openings that block only large rodents while allowing insects to pass freely into the cavity

C. 25 mm mesh openings that block birds only and are not intended to prevent insect entry into the cavity

D. 1 mm mesh openings that block all insects including mosquitoes but significantly restrict airflow and drainage

70. When installing exterior trim around a window, the carpenter must ensure that the trim joints are sealed against water penetration. At the junction between the head casing and each side casing, the joint type must shed water rather than trap it. What joint type is most common at this location?

- A. A mitre joint at each upper corner where the side casing meets the head casing, with the joint sealed with exterior adhesive and fastened with a brad nail to keep it tight
- B. A butt joint where the head casing sits on top of the side casings and the joint is sealed with caulking
- C. A dado joint where the head casing has a groove that receives the top end of each side casing piece
- D. A half-lap joint where the head casing and side casing overlap at the corner for maximum contact area

71. A carpenter is installing a pre-hung exterior door and must verify that the door frame is properly sealed to the weather-resistive barrier before the exterior trim is applied. What flashing and sealing sequence must be completed before the brick mould (exterior casing) is installed?

- A. The brick mould is installed first and then sealant is applied between the brick mould and the housewrap
- B. Only caulking between the door frame and the rough opening is needed before the brick mould covers it
- C. The housewrap must be integrated with the door frame — sill flashing at the bottom, side flashing integrated with the housewrap on each side, and head flashing tucked behind the housewrap above — before the brick mould is installed over the completed flashing assembly
- D. No flashing is needed because the brick mould provides complete weather protection around the door

72. A carpenter is installing soffit panels and encounters a location where a soffit vent must be placed directly above an exterior light fixture. The heat from the light fixture rises directly into the soffit vent opening. Is this a concern?

- A. Yes — the heat from the light fixture may exceed the temperature rating of the soffit vent material, potentially warping vinyl or aluminum vents, and the rising heat draws insects toward the lit vent opening, potentially bringing them into the attic
- B. No, because the heat from a standard exterior light fixture is insufficient to affect the soffit material
- C. Yes, but only if the light fixture is a halogen type that produces significantly more heat than LED fixtures

D. No, because the attic ventilation airflow through the vent cools any heat rising from the light fixture

73. A carpenter is installing a window in a rough opening and discovers that the rough opening width is 20 mm wider than specified. The window is the correct size. What is the consequence of this oversized opening, and how should the carpenter proceed?

A. The oversized opening has no consequence because the wider shim space provides more room for adjustment

B. The oversized opening creates no concern because the brick mould covers any gap between the frame and wall

C. The oversized opening must be reduced to specification by adding framing material before the window is set

D. The wider gap requires more shimming, which can create an unstable installation if shims are not properly positioned — the carpenter should add a furring strip to narrow the opening, or use solid blocking behind the shims, and ensure the window is firmly supported at all shimming points

74. A carpenter is installing a continuous soffit vent strip along a 20-metre eave. The vent strip comes in 2.4-metre lengths. How many pieces are needed, and how should the joints between pieces be handled?

A. 9 pieces ( $20 \div 2.4 = 8.33$ , rounded up to 9) with the joints butted tightly together because the vent strip does not expand significantly with temperature changes due to its perforated construction

B. 9 pieces with a 6 mm expansion gap at each joint for thermal movement, especially for aluminum vent strips that expand and contract more than vinyl products

C. 8 pieces with the 0.8-metre gap at the end filled with a solid soffit panel to complete the run

D. 10 pieces with alternating orientations to create a visually balanced pattern along the eave of the building

75. A carpenter is installing vinyl siding on a building and reaches the soffit-to-wall transition at the eave. The siding courses terminate at the soffit line. What trim piece receives the top edge of the last siding course beneath the soffit?

- A. An F-channel nailed to the wall beneath the soffit that receives the top edge of the last siding course
- B. A drip cap flashing bent at 90 degrees that covers the top edge of the last course and directs water away
- C. A utility trim (undersill trim) installed at the soffit line into which the top edge of the last course locks — the course is ripped to width and snap-lock punched to engage the trim
- D. A starter strip installed upside down at the soffit that locks onto the top edge of the last siding course

76. When installing exterior cladding on a building, the carpenter must ensure that all penetrations through the cladding and weather-resistive barrier are properly sealed. Which penetration type is most commonly overlooked and becomes a source of water intrusion?

- A. Small penetrations — hose bibs, electrical outlets, light fixtures, doorbell wiring, and small vent terminations — are the most commonly overlooked because they appear minor but collectively create numerous pathways for water to enter the wall cavity
- B. Large window openings are most commonly overlooked because their size makes the flashing more complex
- C. The ridge vent at the roof peak is most commonly overlooked because roofers assume it is self-sealing
- D. The foundation-to-wall transition is most commonly overlooked because it is below the cladding line

77. A carpenter is installing drywall on a ceiling and encounters a steel beam that runs across the ceiling plane. The beam is 200 mm deep and projects below the ceiling joists. The drywall must be detailed around this beam. How should the carpenter frame and finish this condition?

- A. The drywall is applied directly to the steel beam using self-tapping screws and the joints are taped normally
- B. The beam is hidden above the ceiling by raising the entire ceiling height to clear the beam bottom flange
- C. The beam is left exposed and painted to match the ceiling for an industrial aesthetic design appearance

D. The beam is boxed out with light-gauge steel or wood framing attached to the ceiling joists on each side of the beam, creating a soffit enclosure that the drywall is applied to for a continuous finished ceiling with a rectangular beam cover

78. A carpenter is installing hardwood strip flooring and encounters a cold-air return grille in the floor. The grille measures 100 mm × 250 mm. The flooring must terminate neatly at the grille opening on all four sides. How does the carpenter create clean edges at this opening?

A. The flooring boards are cut to fit around the grille opening, with the cut edges concealed by the grille frame that sits on top of the flooring and overlaps the cut ends by approximately 10 mm on each side

B. The flooring boards are routed with a decorative edge profile around the grille for a custom border detail

C. The grille is relocated to a wall location so the floor remains uninterrupted across the full room area

D. A separate wood border frame is built around the grille opening and the flooring butts against the frame

79. A carpenter has installed a pre-hung door and the door appears to close properly, but the homeowner reports that the door opens by itself when released in the half-open position. The hinges are tight and the door is not warped. When the carpenter checks the hinge-side jamb with a level, the bubble is off-centre. What does this indicate?

A. The hinge-side jamb is plumb and the door movement is caused by air pressure differential in the house

B. The door slab is slightly heavier on the handle side, creating a weight imbalance that pulls it open

C. The hinge-side jamb is out of plumb — leaning toward the room so gravity pulls the door to the open position

D. The strike-side jamb is twisted, creating a misalignment that forces the door away from the closed position

80. A carpenter is installing a laminate countertop and must make a precise cut for a drop-in cooktop. The cooktop manufacturer provides specific cutout dimensions. The carpenter uses a jigsaw with a fine-tooth blade to make the cut. Before starting the cut, what must the carpenter do at each corner of the rectangular cutout?

- A. Apply masking tape along the cut lines on both the top and bottom surfaces of the laminate countertop
- B. Score the laminate surface along the cut line with a utility knife to prevent the jigsaw from chipping it
- C. Cut the corners at 45 degrees to relieve stress concentration at the sharp 90-degree corner intersection
- D. Drill a relief hole at each corner of the cutout — the hole prevents the jigsaw from over-cutting at the corners and prevents stress cracks from developing at the sharp corner intersections

81. When installing baseboard moulding, the carpenter encounters a section of wall where a heating baseboard radiator is installed. The baseboard trim must transition from the wall surface to the heating unit. What trim piece is used at this transition?

- A. The baseboard moulding is cut to length and butted directly against the end of the heating unit casing
- B. A return piece is installed at the end of the baseboard — the baseboard profile wraps back to the wall surface with a small mitre return, creating a finished end adjacent to the heating unit
- C. The baseboard is continued behind the heating unit because the unit is mounted high enough on the wall
- D. A flexible rubber transition strip is installed between the baseboard end and the heating unit end cap

82. A carpenter is installing a shower enclosure and must seal the joint between the shower door frame and the tile wall. What sealant type is appropriate for this wet-area application?

- A. Latex painter's caulking because it can be painted to match the shower door frame colour for appearance

B. Standard silicone caulking that is formulated specifically for wet areas and contains mildewcide to prevent mould growth at the shower door-to-tile junction

C. Polyurethane exterior caulking because it provides the strongest bond between the metal frame and tile

D. 100% silicone caulking designed for wet areas with mildewcide to resist mould growth — this provides a flexible, waterproof, mould-resistant seal between the door frame and the tile

83. A carpenter is installing crown moulding and encounters a section where the ceiling height changes — one part of the room has an 8-foot ceiling and the adjacent part has a 9-foot ceiling, with a step between them. How does the carpenter handle the crown moulding at this ceiling height transition?

A. The crown moulding runs continuously across the transition by bending the moulding at the step point

B. The crown moulding is installed in both sections independently and a vertical trim piece connects them

C. The crown runs at the lower level only and terminates at the transition with a return, while the higher section receives a separate crown installation that also terminates with a return at the transition — a vertical trim piece covers the step between the two crown levels

D. The crown is omitted in the section with the higher ceiling because the height difference makes it invisible

84. A carpenter is installing a floating laminate floor in a room with a concrete slab substrate. The slab has been tested for moisture and meets the maximum acceptable level. What layer must be installed between the concrete slab and the laminate underlayment?

A. A self-levelling compound that creates a perfectly flat surface before the laminate is installed on top

B. A plywood subfloor panel layer screwed to the concrete to provide a wood substrate for the flooring

C. A 6 mil polyethylene vapour barrier that prevents any residual concrete moisture from reaching the laminate core from below — even when moisture tests pass, the vapour barrier provides long-term protection

D. A rubber acoustic mat that reduces impact sound transmission from the laminate into the concrete below

85. A carpenter is constructing a closed-stringer stairway where the treads and risers are housed in routed grooves in the stringers. The grooves are typically routed 12 mm deep into the stringer face. The treads and risers are glued and wedged into the grooves from the back side. What holds the treads and risers tightly in the grooves?

A. Face nails driven through the stringer into the tread and riser end grain hold all components together

B. Tapered wooden wedges coated with glue are driven into the groove behind each tread and riser from the back side of the stringer, pressing the tread and riser tightly against the groove shoulders

C. The treads and risers are held only by friction fit within the grooves and no mechanical fastening is used

D. Metal angle brackets screwed to the back of each tread and riser connect them to the stringer at each step

86. A carpenter is installing interior window trim in a room with a deep window reveal (the wall is 250 mm thick). The window frame is only 114 mm wide, leaving a 136 mm gap between the frame edge and the finished wall surface. What component fills this gap?

A. Multiple layers of drywall stacked to fill the 136 mm gap between the window frame and the wall face

B. Rigid foam insulation cut to fill the gap between the frame and the wall for thermal performance only

C. A wide piece of caulking applied to bridge the gap between the window frame edge and the drywall edge

D. A jamb extension — a piece of wood the same width as the gap (136 mm) installed between the window frame and the wall finish, creating a continuous surface from the frame to the wall that the casing covers

87. When installing interior door casing, the carpenter notices that one side of the door has the jamb set 3 mm deeper into the wall than the other side. This means the casing on the deep side sits in a slight recess while the casing on the shallow side sits proud of the wall surface. How should the carpenter handle this condition?

A. Install the casing with equal reveals on both sides and shim the casing on the deep side with thin cardboard strips to bring it flush with the drywall surface, then caulk the wall-side gap for a consistent appearance

B. Plane the drywall edge on the shallow side so the jamb and drywall are flush on that side as well

C. Install wider casing on the deep side and narrower casing on the shallow side to compensate visually

D. Remove the door frame and reinstall it centred in the wall to equalize the jamb depth on both sides

88. A carpenter is building a set of stairs and the design calls for an open riser stairway (no riser boards — the space between treads is open). The Building Code has specific restrictions on open riser stairs. What is the Building Code requirement that limits the opening between treads?

A. Open risers are prohibited in all residential buildings by the Building Code regardless of the stair location

B. Open risers must have a maximum opening of 125 mm measured between the bottom of one tread and the top of the next — this prevents a child from passing through the opening

C. Open risers are only permitted if a guard screen is installed behind each opening for fall protection

D. Open risers require the treads to be at least 50 mm thick to compensate for the missing riser's structural role

89. A carpenter is installing a kitchen backsplash using peel-and-stick tile (self-adhesive tile) on painted drywall. The tiles are not adhering well — they peel away from the wall within hours of installation. What is the most likely cause of the adhesion failure?

- A. The wall surface has not been properly prepared — the paint may be glossy (which prevents adhesion), dusty, or greasy, and the surface must be cleaned, deglossed, and dried before peel-and-stick tiles are applied
- B. The tiles have expired and the adhesive backing has degraded beyond its effective bonding period
- C. The room temperature is too warm and the adhesive softens before it can bond to the wall surface properly
- D. The drywall moisture content is too high and the moisture is dissolving the adhesive backing material

90. A carpenter is installing a vanity top in a bathroom and must cut the hole for the lavatory basin. The vanity top is a solid surface material (Corian or similar). When cutting the sink hole with a jigsaw, the carpenter must take a specific precaution to prevent damage to the material. What precaution is required?

- A. The material must be cut from the bottom side only to prevent the jigsaw from chipping the visible surface
- B. The cut must be made in a single continuous pass without stopping because restarting causes stress cracks
- C. The material must be supported on all sides of the cutout — when the waste piece drops, the unsupported cutout area can crack from the shock if not properly supported from below
- D. The jigsaw must be operated at maximum speed because slow speeds cause the blade to overheat the material

91. A carpenter is renovating a house and discovers that the existing bathroom fan exhausts into the attic space rather than through the roof or wall to the exterior. This has been causing moisture problems in the attic for years. What must the carpenter do as part of the renovation?

- A. Extend the existing fan duct to terminate at the exterior of the building — through the roof, a gable wall, or the soffit — so that the warm, moist bathroom exhaust air is discharged outside and does not condense on the cold attic surfaces
- B. Install a larger fan that pushes the moist air further into the attic where it dissipates through the attic vents

C. Add more attic ventilation to compensate for the moisture being exhausted into the attic from the bathroom

D. Insulate the fan duct within the attic to prevent the moisture from condensing before it reaches the attic vent

92. During a renovation, the carpenter opens a wall and finds that the existing electrical wiring is aluminum rather than copper. The house was built in the late 1960s. Why does aluminum wiring require special attention during a renovation?

A. Aluminum wiring is thicker than copper and may not fit in standard electrical boxes during the renovation

B. Aluminum wiring was never approved by the electrical code and must be replaced entirely in every case

C. Aluminum wiring at connections (outlets, switches, splices) can develop high-resistance connections that overheat and cause fires — the carpenter should report this to the homeowner and recommend evaluation by a licensed electrician for proper remediation

D. Aluminum wiring only presents a hazard in exterior walls where moisture causes the aluminum to corrode

93. A carpenter is renovating a kitchen and the homeowner wants to remove a wall between the kitchen and dining room to create an open concept layout. The wall has a beam in the ceiling that appears to carry floor joists from the second storey. Before proceeding, what must the carpenter determine about this wall?

A. Whether the wall contains plumbing that would need to be rerouted if the wall is removed from the layout

B. Whether the wall is load-bearing — the beam and floor joist connection indicate it likely is, and a structural engineer must evaluate the wall and design a replacement beam system before any removal begins

C. Whether the wall was part of the original construction or was added during a previous renovation project

D. Whether the drywall on the wall contains asbestos that requires professional abatement before removal

94. A renovation project involves lowering the basement floor by 200 mm to increase the ceiling height. The existing concrete floor slab is 100 mm thick on a granular base. The carpenter must remove the existing slab and excavate 200 mm of soil beneath it. What structural concern must be addressed before excavating below the existing footing level?

A. The excavation may undermine the existing foundation footings if the new floor level is lower than the bottom of the footings — removing soil from beneath or beside the footings reduces their bearing support and can cause the foundation walls to settle or crack

B. The existing granular base beneath the slab must be replaced with a different type of gravel after excavation

C. The plumbing drain lines beneath the slab must be raised by 200 mm to match the new floor elevation

D. The waterproofing on the exterior of the foundation walls must be extended downward by 200 mm

95. A carpenter is adding blown-in cellulose insulation to the attic of an existing house. Before blowing the insulation, the carpenter must address several preparation items. Which preparation step is most critical for fire safety?

A. Sealing all air leakage paths from the heated space into the attic — including around electrical boxes, plumbing penetrations, duct boots, and the chimney chase — before insulation covers these penetrations and makes them inaccessible

B. Installing wind baffles at the perimeter of the attic to prevent the insulation from being blown by wind

C. Marking the locations of all ceiling joists with flags so workers can walk on the joists after insulation covers them

D. Verifying that the attic access hatch has a weatherstripped cover to prevent insulation from falling through

96. A renovation involves installing a new window in an existing exterior wall that currently has no opening. The wall is a load-bearing exterior wall with 2×6 framing. Before cutting the opening, the carpenter must install temporary shoring to support the loads above the planned opening location. What type of temporary shoring is used?

A. A single adjustable steel post placed inside the wall cavity directly beneath the planned header location

B. An interior temporary wall (built from 2×4 studs and plates) positioned parallel to and approximately 600 mm from the exterior wall, supporting the ceiling joists or floor above while the exterior wall studs are cut and the header is installed

C. Exterior scaffolding that supports the wall from the outside while the interior framing is modified

D. A hydraulic jack placed beneath the ceiling at the centre of the planned opening for concentrated support

97. A carpenter is renovating a bathroom and must install a curbless (zero-threshold) shower for accessibility. The shower floor must slope toward a linear drain at one edge. What is the primary framing modification required for a curbless shower?

A. The floor framing beneath the shower area must be lowered (recessed) to allow the shower floor to slope toward the drain while maintaining a flush transition with the adjacent bathroom floor — this may involve notching or dropping the joists in the shower area

B. The standard floor framing requires no modification because the tile slope creates sufficient drainage

C. Only the subfloor must be lowered by removing one layer of plywood at the shower location for the slope

D. The shower drain is installed above the finished floor level and a ramped tile transition provides the slope

98. A carpenter discovers during a renovation that the existing house has polybutylene (PB) plumbing supply pipes — grey plastic pipes that were commonly installed from the late 1970s through the mid-1990s. Why should the carpenter report this finding to the homeowner?

A. Polybutylene pipes are compatible with all modern plumbing fittings and require no special attention

B. Polybutylene pipes are only a concern in hot water applications and the cold water lines are acceptable

C. Polybutylene pipes contain lead that leaches into the drinking water and requires immediate replacement

D. Polybutylene pipes are prone to premature failure at the fittings and connections — the pipe material degrades when exposed to chlorinated water, and failures can cause sudden, extensive water damage; the homeowner should consult a plumber about replacement

99. A carpenter is performing a renovation that converts a covered porch into an enclosed three-season room. The existing porch has a concrete slab floor, a roof, and open sides with only columns. The carpenter will frame walls between the columns and install windows. What Building Code considerations apply to this conversion?

A. No building permit is required because the existing roof and slab are already in place from the original

B. Only a window permit is required because the structural elements (roof, columns, slab) already exist

C. The conversion may trigger permit requirements for a change of occupancy type or an addition

D. The enclosed room must meet current Building Code requirements for structural loads (the walls and windows must resist wind loads), thermal performance (insulation if the room will be heated), egress (operable windows for emergency exit), and electrical (outlets and lighting) — a building permit is typically required

100. A carpenter completes a renovation and the homeowner notices a small crack forming in the drywall above a door opening approximately one month after the renovation was finished. The crack runs diagonally from the upper corner of the door frame toward the ceiling. What is the most likely cause of this crack?

A. The crack is caused by a structural failure in the header above the door that requires immediate engineering

B. The crack is caused by the house foundation settling unevenly and indicates a serious structural problem

C. The crack is most likely caused by normal building movement — seasonal wood shrinkage, minor settling, or thermal movement in the framing creates stress at the corner of the door opening (a natural

stress concentration point), and the drywall cracks at this weakest location; this is a common cosmetic issue that is repaired during the one-year warranty touch-up

D. The crack is caused by defective drywall that must be replaced with a new panel at the door header area

## Practice Exam 14: Answer Key and Explanations

1. B — Sustained repetitive hammering causes repetitive strain injury to the tendons and muscles of the forearm at the elbow — commonly known as lateral epicondylitis (tennis elbow). Prevention includes taking regular breaks, alternating between hammering and other tasks, using pneumatic nailers for production work, and selecting ergonomic hammer handles with shock-absorbing grips.

2. D — The glass surface must be cleaned thoroughly to remove dust, oils, and debris that interfere with the cutter wheel. A thin line of cutting oil (or kerosene) along the intended score line lubricates the cutter wheel for a consistent, continuous score. A clean surface and proper lubrication produce a clean score that snaps evenly along the line.

3. A — A deformed wrist suggests a possible fracture or dislocation. The first aider must immobilize the wrist in the position found using a splint and padding — never attempt to straighten a deformed joint. Ice wrapped in cloth reduces swelling, and elevating the arm above heart level slows blood flow to the injury site.

4. C — A push block or holding fixture secures the small workpiece and keeps the carpenter's hands at a safe distance from the exposed router bit throughout the entire feed. Small workpieces bring the operator's fingers dangerously close to the spinning bit. The fixture provides controlled feed while maintaining a physical barrier between hands and cutter.

5. B — The more stringent requirements of either plan apply. The general contractor's site-specific safety plan establishes minimum requirements that all workers on site must follow. If the subcontractor's plan has additional requirements (more restrictive PPE, additional procedures), those also apply to the subcontractor's workers.

6. D — An 8/12 pitch roof is steep enough that a worker who loses balance will slide uncontrollably to the edge. A personal fall arrest system — full body harness, shock-absorbing lanyard, and a rated roof

anchor — must be in place before the carpenter accesses the steep roof. Roof jacks provide a work platform but are not fall protection.

7. A — Reaching into the infeed or outfeed opening of a running planer to clear a jam or adjust lumber is the most dangerous action. The rotating cutterheads spin at high speed and can instantly pull a hand into the machine, causing catastrophic injury. The machine must be completely shut off and unplugged before any clearing or adjustment.

8. C — A broken squeeze handle may not compress fully when activated, preventing the agent from discharging or producing only a partial discharge. In a fire emergency, a malfunctioning extinguisher can cost the critical seconds needed to suppress a small fire before it grows. All extinguisher components must be intact and functional.

9. B — An open trap door at the platform level is a fall-through hazard. The opening must be protected by a self-closing gate or equivalent barrier that prevents workers from accidentally stepping into the hole while still allowing controlled access for climbing through. An unguarded opening is equivalent to an unguarded platform edge.

10. D — Cut galvanized steel edges are razor-sharp and can cause deep lacerations with minimal contact. Heavy-duty work gloves (leather or cut-resistant material) must be worn whenever handling cut sheet metal. Even brief unprotected contact with a sharp metal edge can sever tendons, nerves, and blood vessels.

11. A — The scaffold must never be loaded beyond its rated capacity. Overloading risks progressive collapse that endangers everyone on and around the scaffold. The carpenter must refuse the additional load and inform the coworker that the materials must be staged differently or placed on a separate, adequately rated platform.

12. C — Grey, fibrous, crumbling pipe insulation on heating pipes in older buildings is highly likely to be friable asbestos. Friable asbestos releases airborne fibres when touched, which cause fatal diseases when inhaled. The carpenter must stop work immediately, leave the area, restrict access, and arrange for professional testing before any further disturbance.

13. B — "W.P." stands for "Waterproofing" — indicating locations where a waterproofing membrane or coating must be applied to the foundation wall. These notations typically appear at below-grade wall sections where the foundation is exposed to soil moisture or hydrostatic water pressure.

14. D — Ramp length = rise  $\times$  slope factor =  $375 \times 12 = 4,500$  mm (4.5 metres). The 1:12 ratio means 12 units of horizontal run for every 1 unit of rise. This is the maximum slope permitted by the Building Code for accessible ramps. Landings are required at the top and bottom of the ramp.

15. A — A 10 to 15% waste allowance is standard for baseboard installation. Waste is generated by mitre cuts at outside corners, cope cuts at inside corners, pieces cut from each room that are too short for the next room, and occasional defective or damaged pieces. Twelve rooms with varying wall lengths produce significant cumulative cutting waste.

16. C — Perimeter =  $2(14.0 + 9.0) = 46.0$  m. Gross wall area = perimeter  $\times$  wall height =  $46.0 \times 2.74 = 126.04$  m<sup>2</sup>. This is the total area of all four wall faces before subtracting window and door openings. The carpenter divides this gross area by the panel area ( $1.22 \times 2.44 = 2.977$  m<sup>2</sup> per sheet) and adds waste allowance to determine the total number of sheathing panels needed for the order

17. B — "F.O.S." stands for "Face of Stud" — the dimension is measured to the 38 mm wide face of the stud at that specific location. This reference point is critical for positioning walls, openings, and intersections accurately because the stud face defines where the sheathing and drywall attach.

18. D — Roofing squares = total area  $\div$  area per square =  $167 \div 9.29 = 17.98$ , rounded up to 18 squares. One roofing square covers 100 square feet (9.29 m<sup>2</sup>). Each square typically requires three bundles of standard three-tab shingles, so 18 squares = 54 bundles before adding waste allowance.

19. A — The beam pocket is framed within the wall like an opening — trimmer studs define the pocket width, a header above transfers loads around the pocket, and blocking as needed creates the recessed space. The pocket must be precisely sized and positioned to receive the beam end with adequate clearance and bearing.

20. C — With 15 risers, the upper floor serves as the 15th walking surface (the surface you step onto after the 15th rise). Therefore, only 14 physical treads are needed — the last "tread" is the upper floor itself. The formula is always: treads = risers - 1.

21. A — The NE corner has the lowest rod reading (1.425 m). A lower rod reading means less distance between the point and the instrument's level line of sight, which means the point is at a higher elevation. The highest foundation corner is found at the lowest rod reading — this is the starting point for setting the sill plates level.

22. C — Quarter-circle area =  $\pi/4 \times (R^2 - r^2) = 0.785 \times (3.0^2 - 1.8^2) = 0.785 \times (9.0 - 3.24) = 0.785 \times 5.76 = 4.52 \text{ m}^2$ . Volume =  $4.52 \times 0.1 = 0.452 \text{ m}^3$ . The annular (ring) area formula subtracts the inner circle from the outer circle, and the quarter fraction accounts for only one quadrant.

23. B — Plumb bobs, optical plummets, or laser plumbs transfer grid intersection points vertically from one floor to the next with millimetre precision. The instrument is centred over the known point on the lower floor and projects (or hangs) the point directly upward to the floor above. This method maintains the building grid alignment between storeys.

24. D — Vertical joints:  $48 \times 2.74 = 131.52 \text{ m}$ . Horizontal joints:  $12 \times 12.0 = 144.0 \text{ m}$ . Total =  $131.52 + 144.0 = 275.52 \text{ m} \approx 275.5 \text{ metres}$ . A waste allowance of 10% should be added to this total when ordering tape to account for overlaps at intersections and trimming waste.

25. A — The "24/16" span rating means the panel can span 24 inches (610 mm) maximum between supports when used as roof sheathing, and 16 inches (406 mm) maximum when used as subfloor or wall sheathing. These numbers represent the maximum allowable support spacing for each application.

26. C — A 6/12 pitch means the roof rises 6 units per 12 units of run. Slope percentage =  $(\text{rise} \div \text{run}) \times 100 = (6 \div 12) \times 100 = 50\%$ . This conversion is essential when comparing roof slopes with site grading plans, which typically express slopes as percentages.

27. B — Blockouts for future penetrations must be built with a slight taper (draft angle) so they can be pulled or driven out of the cured concrete from the wider side. Without the taper, the blockout is locked in the concrete by friction and cannot be removed without damaging the wall. A release agent on the blockout surfaces further aids removal.

28. D — Below-specification cylinder breaks require the structural engineer's evaluation. The engineer may order core samples drilled from the actual structure (which often test higher than cylinders due to different curing conditions), additional cylinder tests at 56 days, or load tests. The engineer determines whether the in-place concrete is adequate.

29. A — The formwork shoring must carry the full combined dead load (concrete, reinforcement, formwork weight) plus construction live loads (workers, equipment, material staging, and impact loads). The shoring posts must bear on stable ground or a structural surface. A 6-metre suspended walkway at 2.0 metres wide contains approximately  $3.5 \text{ m}^3$  of concrete weighing over 8,000 kg.

30. C — A 45-minute delay in warm weather may allow the first lift to begin stiffening. If the surface has started to set, placing fresh concrete on top creates a cold joint. The crew must roughen the surface (by raking or brooming), dampen it, and may need to apply a bonding agent. The vibrator must penetrate into the first lift to knit the two together.

31. A — Even with curing compound applied, the compound may have been applied too thinly, leaving gaps in the membrane coverage. Any uncovered area allows moisture to escape. The cure is that curing compound must be applied at the manufacturer's recommended coverage rate (typically 4 to 5 m<sup>2</sup> per litre) to form a continuous, unbroken membrane.

32. D — The tank diameter of 4.0 metres is measured to the outside face of the wall. The outer form defines the outside face of the wall, so the inside diameter of the outer form equals the tank diameter of 4.0 metres. The inner form has a diameter of  $4.0 - (2 \times 0.2) = 3.6$  metres.

33. A — At a pour rate of 1.0 metre per hour, the 3.0-metre wall takes three hours to fill. The controlled rate allows concrete at the bottom to begin stiffening before the full height of liquid concrete is in the form. Stiffened concrete exerts less lateral pressure than liquid concrete, reducing the maximum pressure on the formwork. A faster rate would overload the forms.

34. C — A significant colour difference between concrete loads may indicate a change in cement source, water-cement ratio, admixture dosage, or aggregate type. While the slump test confirms consistency, it does not verify all material properties. On exposed architectural walls, colour variations are permanently visible and unacceptable.

35. B — A pressure test verifies that the entire heating tube system — every tube, fitting, connection, and manifold — is leak-free before concrete encapsulates it permanently. A leak discovered after the concrete is placed requires demolishing the slab to access the damaged tube. The pressure test typically uses air or water at 1.5 to 2 times the operating pressure.

36. D — The two lifts cured under different conditions — the lower lift retained more moisture (covered by the concrete above and protected from evaporation) while the upper lift's surface was more exposed to air and evaporation. Different curing moisture levels produce different surface colours. This colour boundary is a common and typically cosmetic condition.

37. A — Rough-sawn (unplaned) lumber used as form lining imprints its natural wood grain texture, saw marks, and board width pattern into the wet concrete surface during curing. When the forms are

stripped, the concrete bears a permanent, detailed impression of the wood surface. This is a deliberate architectural technique for decorative exposed concrete.

38. C — The typical minimum cold weather protection period is 72 hours (3 days). During this time, the concrete must be maintained above 10°C to allow sufficient hydration to reach the critical 3.5 MPa strength that resists freeze-thaw damage. Removing protection before this strength is reached risks permanent damage.

39. B — Ripples behind the trowel indicate the concrete surface is still too soft to support the trowel pressure. The trowel displaces the paste rather than compacting it. The carpenter must wait until the concrete stiffens further — when a finger pressed into the surface leaves only a slight indentation, the concrete is ready for trowelling.

40. D — The standard maximum delivery time is typically 90 minutes from batching (per CSA A23.1) or 300 drum revolutions, whichever comes first. At 85 minutes, this load is within the limit but at the margin. The concrete should be placed immediately without further delay to ensure full workability.

41. C — For 15M rebar (16 mm diameter) at 150 mm spacing: clear space =  $150 - 16 = 134$  mm between bars. A 50 mm vibrator head has ample clearance ( $134 \text{ mm} - 50 \text{ mm} = 84$  mm on each side) to pass between the bars without contacting or displacing them. The vibrator should be inserted vertically between the bars, not at an angle.

42. A — The specification allows  $6\% \pm 1\%$ , meaning the acceptable range is 5% to 7%. At 8%, the air content exceeds the maximum by 1%. Excessive air reduces compressive strength — each 1% of additional air reduces strength by approximately 5%. The concrete should be rejected and the supplier notified.

43. D — End notches are in the shear zone where vertical forces are concentrated at the support. The Building Code allows notches up to one-quarter of the joist depth at the top edge at the bearing point. However, bottom-edge notches at bearing points may have different and often more restrictive limitations because the bottom edge is in the tension zone.

44. B — For a small opening ( $600 \times 1,200$  mm) that interrupts only two joists, single headers and trimmers are typically adequate. Doubling is generally required when the header span exceeds approximately 1.2 metres or when more than two joists are interrupted. The carpenter should verify with the Building Code span tables for the specific loading conditions.

45. C — The common difference is a constant length reduction between successive jack rafters. It equals the jack rafter spacing (converted to feet) multiplied by the unit line length for a common rafter at the given pitch, divided by 12 to convert inches to feet. This constant allows the carpenter to calculate each jack rafter length by simply subtracting the common difference from the previous one.

46. A — A wide header under significant loads transfers large concentrated forces to the trimmer studs. The trimmers must be adequate to carry these forces without crushing at the bearing point and must transfer them to the bottom plate and foundation. For wide openings with heavy loads, doubled or tripled trimmers may be required.

47. D — Manufactured trusses are engineered systems where every member is sized for specific forces. Cutting any chord or web member without the designer's approval changes the force distribution, potentially overstressing adjacent members and connections. The "NO FIELD CUTTING" restriction is absolute — the pipe must be routed through existing open web spaces or the manufacturer must be consulted.

48. B — The rafter tail length along the slope equals the horizontal overhang multiplied by the secant of the roof angle. For a 6/12 pitch (26.57 degrees), the secant is  $1/\cos(26.57^\circ) = 1.118$ . Tail length =  $400 \times 1.118 = 447$  mm along the slope. The horizontal overhang is always less than the slope distance on any pitched roof.

49. C — A staggered-stud wall or double-stud wall creates a wide cavity by using two offset rows of studs. The plumbing runs through the wide central cavity without penetrating any studs, while each row of studs provides a flat nailing surface on its respective wall face. This is the standard framing solution for plumbing walls.

50. A — The double top plate splice must be offset at least 1.2 metres (4 feet) from the top plate joint below. This offset ensures the double plate bridges across the top plate joint, maintaining the continuous horizontal load path. Stacked joints eliminate this bridging and create a structural weakness.

51. D — Shed roofs handle thrust differently from gable roofs because there is no opposing rafter. The structural mechanism depends on the connection details — metal connectors that resist both vertical and horizontal forces at the rafter-to-plate connections, or a ridge beam system that eliminates thrust entirely by carrying the vertical loads through posts.

52. B — Web stiffeners reinforce the thin OSB web at bearing points where the concentrated joist reaction force transfers to the support below. Without stiffeners, the thin web can buckle or crush under the concentrated bearing stress. The stiffeners are typically OSB or plywood cut to fit snugly between the top and bottom flanges on each side of the web.

53. C — The horizontal nailer provides a continuous solid nailing surface at the cabinet hanging height (typically 1,370 mm or 54 inches above the floor). Cabinet mounting screws driven through the drywall into this solid wood have dramatically better pull-out resistance than screws driven into drywall alone or into studs that may not align with cabinet mounting holes.

54. A — The cut edge of the last panel is treated the same as any panel edge — the standard expansion gap is maintained between the cut edge and the wall, and the panel is nailed at the same schedule. The factory tongue-and-groove edge faces the adjacent panel for a proper interlocking joint.

55. D — A continuous beam distributes loads more efficiently than simple-span beams because the negative bending moment at the interior supports reduces the positive bending moment at mid-span. This redistribution allows either a smaller beam cross-section or wider post spacing than equivalent simple-span beams under the same loading.

56. B — The 57 mm nails provide 6 mm less penetration into each framing member than the specified 63 mm nails. This reduced penetration decreases each nail's shear capacity. Multiplied across hundreds of nails in a shear wall, the total lateral resistance is significantly reduced below the design requirement, potentially making the wall inadequate for wind and seismic forces.

57. C — The hip rafter sits between two intersecting roof planes. Its top edge is at the intersection of these two slopes, which means the centre of the top edge is higher than the edges. Without backing (beveling the top edges to match the adjoining roof planes), the sheathing cannot lie flat across the hip and creates a visible ridge.

58. A — A minimum of two nails at each end of solid blocking is the standard end-nailing pattern. The nails are driven through the face of the joist into the end grain of the blocking. For bearing wall locations where significant loads are transferred, the nailing must be adequate to prevent the blocking from displacing under the concentrated forces.

59. D — Without web and bottom chord bracing, these truss members can buckle laterally under load. The bottom chord acts as a compression member under certain load combinations (such as wind uplift),

and web members carry alternating tension and compression. Lateral bracing restrains each member against buckling in its weak axis direction.

60. A — The lag screw connection requires two different holes: a clearance hole through the ledger (slightly larger than the lag screw shank so the screw passes through without threading into the ledger) and a pilot hole into the rim joist (smaller than the shank so the threads engage the wood for holding). This two-hole technique ensures proper clamping.

61. D — The housewrap must be properly integrated with the step flashing — the housewrap laps over the top edge of each step flashing piece on the wall. This ensures water running down the housewrap flows over the flashing and onto the roof surface rather than behind the flashing and into the wall cavity. The cladding is then installed over this integrated assembly.

62. B — Step flashing is woven into the shingle courses along the sloped sides of the bay roof where it meets the wall. At the top, a headwall (apron) flashing spans across the full width where the bay roof meets the flat wall surface above. This combination of step flashing and headwall flashing provides complete coverage at the bay-to-wall junction.

63. C — J-channel trim is installed around all four sides of the electrical panel. The siding courses terminate into the side channels. Above and below the panel, the courses must be ripped to width and locked into utility trim (undersill trim) where the nailing flange is removed. This creates a neat, weathertight frame around the large panel.

64. A — Vinyl siding must remain free to expand and contract. Special shutter fasteners with a standoff sleeve allow the siding to slide behind the shutter without being pinned. Alternatively, adhesive mounting pads bond the shutter to the siding surface without penetrating it. Standard nails or screws through the siding would pin it and cause buckling.

65. A — A countersunk nail breaks through the shingle reinforcement mat (fibreglass or organic), reducing the nail's resistance to wind uplift pull-out. The broken mat around the overdriven head also creates a hole that allows water to penetrate beneath the shingle. Properly driven nails sit flush with the shingle surface.

66. A — The drip edge lower edge should extend past the fascia face by 25 to 50 mm so that when the gutter is eventually installed, the drip edge overhangs into the gutter trough. This ensures water flowing off the roof edge falls into the gutter rather than behind it or onto the fascia.

67. C — Metal lath provides a mechanical key for the mortar scratch coat. The mortar is trowelled through the lath openings and mushrooms behind the mesh. When the mortar hardens, it locks around the wire mesh, creating a strong mechanical bond between the mortar layer and the wall substrate. The stone veneer is then adhered to the scratch coat.

68. A — Cedar naturally weathers to a silver-grey colour through UV exposure and moisture cycling over one to two seasons. Leaving the cedar unfinished allows this natural process. If the homeowner wants uniform grey sooner, a weathering stain accelerates the appearance. Clear sealers prevent weathering and maintain the original colour.

69. A — A 3 mm mesh opening blocks most common insects (wasps, bees, flies, beetles) while allowing adequate drainage and airflow through the openings. Smaller mesh (1 mm) restricts airflow excessively, while larger mesh (10 mm or 25 mm) allows insects to enter the drainage cavity freely.

70. A — A mitre joint at each upper corner where the side casing meets the head casing is the most common detail for exterior window trim. The joint is sealed with exterior adhesive and fastened with a brad nail. The mitred joint sheds water because the angled surfaces direct water outward rather than trapping it.

71. C — Before the brick mould covers the frame, the complete flashing sequence must be installed: sill flashing at the bottom, side flashing integrated with the housewrap on each side, and head flashing tucked behind the housewrap above. This sequence ensures water at any point around the frame is directed outward.

72. A — Heat rising from a light fixture directly into a soffit vent can warp vinyl or aluminum vent material and attracts insects toward the illuminated, warm vent opening. If practical, the vent should be offset from directly above heat-producing fixtures, or the fixture should be relocated.

73. D — A 20 mm oversized rough opening requires wider shim gaps that can create an unstable installation. The carpenter should add a furring strip or solid blocking to narrow the opening to specification, or use solid blocking behind the shims. All shimming points must provide firm, non-compressible support for the window frame.

74. B — Nine pieces are needed ( $20 \div 2.4 = 8.33$ , rounded up to 9). Aluminum vent strips expand and contract with temperature, so a 6 mm expansion gap should be left at each joint between pieces. This gap prevents the strips from buckling when they expand in hot weather.

75. C — A utility trim (undersill trim) is installed at the soffit line. The last siding course is ripped to the required width, and the top cut edge is punched with a snap-lock punch to create tabs that lock into the utility trim. This secures the panel without visible fasteners at the top course.

76. A — Small penetrations — hose bibs, electrical outlets, light fixtures, doorbells, dryer vents, and small vent terminations — are most commonly overlooked during cladding installation. Each creates a pathway for water. Collectively, these numerous small penetrations contribute more to water intrusion than any single large penetration.

77. D — The beam is enclosed with light-gauge steel or wood framing attached to the ceiling joists on each side, creating a rectangular soffit around the beam. Drywall is applied to this frame, producing a finished ceiling with a visible rectangular beam cover. The framing must accommodate the beam depth and any required clearance.

78. B — The flooring boards are cut to fit around the cold-air return opening, and the grille frame sits on top of the installed flooring. The frame overlaps the cut edges by approximately 10 mm on all sides, concealing the raw cuts. The flooring must be installed before the grille is set in place.

79. C — A door that swings open on its own (with tight hinges and no warp) indicates the hinge-side jamb is out of plumb — leaning toward the room. This tilt creates a gravitational force on the door that pulls it toward the open position. Shimmed the hinge-side jamb to perfect plumb eliminates this gravity-driven swing.

80. D — Relief holes drilled at each corner of a rectangular cutout prevent the jigsaw blade from over-cutting at the corners (which damages the countertop) and relieve stress concentration at the sharp 90-degree intersections. Without relief holes, stress cracks can propagate from the sharp corners over time.

81. B — A return piece wraps the baseboard profile back to the wall surface at the transition to the heating unit. This creates a finished, profiled end rather than an exposed raw cut end. The return is a small mitre piece glued and pinned to the baseboard end.

82. D — 100% silicone caulking with mildewcide is the correct choice for sealing shower door frames to tile. Silicone provides permanent flexibility, excellent water resistance, and mould-resistant properties in the sustained wet environment of a shower enclosure. Standard latex caulking and polyurethane are not formulated for this application.

83. C — Each ceiling section receives its own independent crown installation. The crown in each section terminates at the ceiling height transition with a mitre return that wraps back to the wall. A vertical trim piece covers the step between the two crown levels, creating a clean, finished transition at the height change.

84. C — A 6 mil polyethylene vapour barrier prevents residual concrete moisture from migrating upward into the laminate core. Even when moisture tests pass at the time of installation, concrete continues to release moisture over time. The vapour barrier provides permanent long-term protection against this ongoing moisture source.

85. B — Tapered wooden wedges coated with glue are driven into each groove behind the tread and riser from the back side of the stringer. The wedges press the tread and riser tightly against the groove shoulders on the visible side, creating tight joints. The glue bonds the wedge, tread, and stringer permanently.

86. D — A jamb extension fills the gap between the narrow window frame and the wider wall finish. The extension is a piece of wood (or MDF) cut to the exact gap width, installed between the frame edge and the drywall. The casing then covers the joint between the extension and the wall.

87. A — The carpenter installs casing with equal reveals on both sides and shims the casing on the deeper side with thin cardboard strips to bring it flush with the drywall surface. The wall-side gap created by the shimming is sealed with caulking. This produces a consistent appearance from both sides.

88. B — The Building Code typically limits the opening in open riser stairs to a maximum of 100 to 125 mm (varies by jurisdiction). This dimension prevents a child's body from passing through the opening between treads. Some jurisdictions restrict or prohibit open risers entirely in residential construction.

89. A — Peel-and-stick tiles require a clean, dry, dust-free, and deglossed surface for proper adhesion. Glossy paint, dust, grease, or soap film prevents the adhesive from making full contact with the wall. The surface must be cleaned with a deglossing solution, rinsed, and dried completely before tile application.

90. C — Solid surface materials can crack from the shock of the waste piece dropping when the cut is completed. The cutout must be supported from below throughout the entire cutting process. When the last section of the cut is completed, the waste piece should be lifted out gently rather than allowed to fall.

91. A — The bathroom fan duct must be extended to terminate at the building exterior — through the roof with a proper roof cap, through a gable wall with a wall cap, or through the soffit with a soffit vent. Exhausting into the attic deposits warm, moisture-laden air onto cold surfaces, causing condensation, mould, and wood rot.

92. C — Aluminum wiring connections can develop oxidation and loosening over time that creates high electrical resistance at the junction. High-resistance connections generate heat during current flow, which can ignite surrounding materials. The carpenter should report the aluminum wiring to the homeowner for evaluation by a licensed electrician.

93. B — The beam carrying floor joists strongly indicates a load-bearing wall. A structural engineer must evaluate the wall and the loads it carries before any removal. The engineer designs a replacement beam and post system that carries the same loads through an alternative path. Removing a bearing wall without engineering causes structural failure.

94. A — Excavating below the existing footing level removes the soil supporting the footing from beneath. Without this soil bearing, the foundation wall above can settle, crack, or collapse. If the new floor level will be near or below the footing bottom, underpinning (deepening the footings) may be required.

95. A — Sealing air leakage paths is the most critical fire safety preparation. Unsealed penetrations around electrical boxes, plumbing pipes, duct boots, and chimney chases allow fire to bypass the ceiling assembly and enter the attic. Once these penetrations are covered by insulation, they become inaccessible for future sealing.

96. B — An interior temporary support wall is built parallel to and approximately 600 mm from the exterior wall. This temporary wall bears on the floor below and supports the ceiling joists or floor system above, carrying the loads while the exterior wall studs are cut and the permanent header is installed.

97. A — A curbless shower requires the floor framing to be lowered (recessed) at the shower location so the shower floor can slope toward the drain while remaining flush with the adjacent bathroom floor. This may involve notching the joists, installing lower joists in the shower area, or building a recessed platform.

98. D — Polybutylene plumbing pipes are known to fail prematurely — the pipe material degrades when exposed to chlorine in municipal water supplies. Failures typically occur at fittings and connections, causing sudden water release that can cause extensive damage. The homeowner should consult a plumber about proactive replacement.

99. D — Enclosing a porch changes its use and triggers current Building Code requirements for structural loads (walls and windows must resist wind), thermal performance (insulation if heated), egress (operable windows for emergency exit), electrical (outlets and lighting), and potentially fire separation. A building permit is typically required.

100. C — Diagonal cracks above door corners are one of the most common cosmetic drywall defects in new construction and renovations. The door corner is a natural stress concentration point where seasonal wood shrinkage, minor settling, and thermal movement create stress that the drywall relieves by cracking. This is typically repaired during the one-year warranty touch-up.