PRACTICE EXAM 17: RED SEAL CARPENTER INTERPROVINCIAL SIMULATION (100 QUESTIONS)

1. A carpenter is using a reciprocating saw to cut through a nail-embedded piece of old framing during demolition. The blade catches on a hidden nail, the saw bucks violently, and the carpenter's wrist is jarred. Which blade type reduces the likelihood of this catching hazard when cutting nail-embedded wood?

A. A fine-tooth metal-cutting blade that slices through nails without catching on the embedded fastener

B. A bi-metal demolition blade designed for cutting wood with embedded nails — the hardened teeth cut through both the wood and nails without stalling or grabbing

C. A carbide-grit blade designed for cutting masonry and tile that would grind through nails by abrasion

D. A narrow scrolling blade that flexes around the nails rather than attempting to cut through them directly

2. A carpenter is setting up a workstation on an outdoor construction site during summer. The temperature is 34°C with high humidity. A coworker shows symptoms of heat exhaustion — heavy sweating, pale skin, rapid pulse, and dizziness. What first aid should the carpenter provide immediately?

A. Give the worker a caffeine drink to raise their blood pressure and restore alertness on the job site

B. Have the worker continue light duties in the shade until the symptoms resolve on their own naturally

C. Submerge the worker in cold water immediately to lower the core body temperature as quickly as possible

D. Move the worker to a cool, shaded area, have them lie down with legs elevated, loosen their clothing, apply cool wet cloths to the skin, and provide small sips of cool water if the worker is conscious

3. A carpenter is loading material onto a pickup truck for transport to a job site. Several 3.6-metre lengths of lumber extend 1.5 metres past the tailgate. What marking is required on the protruding lumber during daytime transport?

A. A red or orange flag (at least 300 × 300 mm) must be attached to the end of the protruding load to make it visible to following traffic — this is a legal requirement for any load extending more than 1.2 metres past the vehicle's rear

B. No marking is required during daytime because the lumber is visible in natural sunlight conditions

C. A flashing amber light must be attached to the end of the protruding load for visibility from all directions

D. Reflective tape wrapped around each protruding board at 300 mm intervals from the tailgate to the end

4. A carpenter discovers that the ground fault circuit interrupter (GFCI) on an outdoor receptacle has tripped. The carpenter resets it, but it trips again immediately when a power tool is plugged in. What does this repeated tripping indicate?

A. The outdoor receptacle is wet from rain and must be dried before the GFCI will hold its reset position

B. The power tool draws more current than the GFCI outlet is rated for and a higher-amperage circuit is needed

C. The power tool or its cord has a ground fault — current is leaking from the hot conductor to ground through damaged insulation, a wet connection, or an internal short in the tool

D. The GFCI device itself has failed and must be replaced with a new unit before any tools can be connected

5. A carpenter is using a pneumatic roofing nailer and notices that the exhaust port is directing compressed air toward their face with each firing cycle. The exhaust air contains a fine oil mist from the nailer's lubricant. What must the carpenter do?

A. Cover the exhaust port with tape to redirect the air downward away from the face during each cycle

B. Rotate the adjustable exhaust deflector (if equipped) to direct the exhaust away from the face, or reposition the work angle so the exhaust does not blow toward the carpenter — inhaling oil mist causes respiratory irritation

C. Continue working because the oil mist from the nailer lubricant is a food-grade mineral oil that is harmless

D. Remove the exhaust port cap to increase the exhaust area and dilute the oil mist concentration below it

6. A scaffold has been erected adjacent to a public sidewalk. Pedestrians walk directly beneath the scaffold platform. What protection must be installed to prevent falling objects from striking pedestrians below?

A. Warning signs posted at 3-metre intervals along the sidewalk alerting pedestrians to the overhead hazard

B. A crossing guard stationed at each end of the scaffold to stop pedestrians when materials are being moved

C. A chain-link fence around the scaffold base that redirects pedestrians to the opposite side of the street

D. A solid overhead protection canopy (fan scaffold or sidewalk shed) that catches any objects falling from the work platform before they reach the pedestrian walkway below

7. A carpenter is using a circular saw and notices that the blade wobbles slightly during operation. The cut it produces has a wider kerf than normal and the cut surface is rough. What is the most likely cause of the blade wobble?

A. The blade arbour nut is loose, the arbour washer is missing or damaged, or the blade has a bent body plate — the carpenter must stop immediately, disconnect the power, and inspect the blade mounting for loose components or blade damage

B. The blade teeth are unevenly sharpened and the imbalanced cutting forces create a wobble during rotation

C. The motor bearings are worn and the armature shaft deflects sideways under the cutting load from the wood

D. The saw base plate is not perpendicular to the blade and the angled contact causes the blade to oscillate

8. A carpenter is working in a confined area inside a large concrete tank that is under construction. The space has limited ventilation. Another crew is welding steel reinforcement nearby. What atmospheric hazard can the welding create inside the confined space?

A. Welding produces intense UV radiation that reflects off the concrete walls and causes burns at a distance

B. Welding sparks ignite concrete dust particles in the confined space, creating a deflagration explosion

C. Welding consumes oxygen and produces toxic fumes (including nitrogen dioxide, ozone, and metal fumes) that accumulate in the poorly ventilated space and can cause asphyxiation or chemical pneumonia

D. Welding generates electromagnetic pulses that interfere with the carpenter's battery-powered tools nearby

9. A carpenter is performing overhead work, installing blocking between ceiling joists while standing on a stepladder. Sawdust and wood chips fall into the carpenter's eyes repeatedly during the cutting and nailing. What PPE should the carpenter be wearing for this overhead task?

A. Standard safety glasses with side shields that provide adequate protection from falling debris above

B. Safety goggles with a full seal around the eyes that prevent sawdust from entering from any direction — standard safety glasses with gaps at the top allow debris to fall behind the lenses during overhead work

C. A full face shield that covers the entire face and deflects falling debris away from the eyes and face

D. No eye protection is needed because the carpenter can look away when cutting to avoid falling debris

10. A carpenter notices that a temporary power distribution panel on the job site has a burn mark around one of the circuit breaker connections. The breaker feels hot to the touch. What does this condition indicate, and what should the carpenter do?

A. The burn mark indicates a recent power surge that has already resolved and the breaker is safe to continue

B. The hot breaker means the circuit is loaded to exactly its rated capacity and is operating as designed

C. The burn mark is cosmetic paint damage from ultraviolet exposure and has no electrical significance

D. The burn mark and heat indicate a loose or corroded connection that creates high resistance — this is a fire hazard; the carpenter must de-energize the panel, report the condition, and have a licensed electrician repair it before the circuit is re-energized

11. When setting up a portable table saw, the carpenter must verify that the blade guard returns to the fully lowered position after each cut. The guard is spring-loaded and should automatically cover the blade when the workpiece clears the back of the blade. What hazard exists if the guard does not return?

A. The exposed spinning blade remains unguarded after the cut — the carpenter or a nearby worker can contact the exposed blade when reaching to remove the workpiece, set the fence, or clean the table

B. The guard prevents dust collection from working and sawdust accumulates around the blade dangerously

C. The guard prevents the anti-kickback pawls from engaging and the next workpiece will kick back violently

D. The guard restricts cooling airflow to the blade and the motor overheats if the guard stays in the raised spot

12. A carpenter is working on a rooftop and needs to dispose of scrap material. The carpenter considers throwing scrap lumber off the roof to a clear area below rather than carrying it down the ladder. Why is this practice prohibited?

A. Thrown lumber damages the ground surface and creates ruts that accumulate water near the foundation

B. Throwing lumber from height generates noise that exceeds the job site sound level limit during work hours

C. Thrown scrap can bounce, deflect, or shatter on impact and strike workers, pedestrians, or equipment at ground level — material must be lowered by rope, chute, or enclosed debris container to prevent struck-by injuries

D. The weight of the falling lumber damages the lumber itself and reduces its value for recycling programs

13. A carpenter is reading a site plan and encounters contour lines drawn at 1.0-metre intervals. Three contour lines are very close together at one section of the lot and widely spaced at another section. What do these contour line spacings indicate about the terrain?

A. Closely spaced contours indicate flat terrain and widely spaced contours indicate a steep slope condition

B. Closely spaced contours indicate underground utilities and widely spaced contours indicate clear ground

C. The spacing between contour lines has no relationship to the terrain and is only a drafting convention

D. Closely spaced contour lines indicate a steep slope (rapid elevation change over a short horizontal distance) and widely spaced contours indicate gentle or flat terrain

14. A carpenter must calculate the number of risers for a stairway connecting a basement floor at elevation 96.750 m to a main floor at elevation 99.550 m. The riser height must be between 175 mm and 200 mm. What is the correct number of risers?

A. 14 risers at 200 mm each based on dividing 2,800 by the maximum allowable riser height for the stair

B. 16 risers at 175 mm each — the total rise is 99.550 − 96.750 = 2,800 mm, and 2,800 ÷ 16 = 175 mm, which is at the minimum of the acceptable range

C. 10 risers at 280 mm each based on dividing the total rise by an arbitrary number outside the code range

D. 20 risers at 140 mm each based on dividing the total rise by an excessive number of risers below range

15. A carpenter is laying out anchor bolt positions on a concrete form. The specification calls for anchor bolts within 300 mm of each end of each sill plate section and within 300 mm of each side of every opening. At a door opening, how many additional bolts are required beyond the regular spacing?

A. Two additional bolts — one within 300 mm on each side of the door opening to anchor the sill plate ends that terminate at the opening

B. One additional bolt at the centre of the door opening to provide connection for the future door threshold

C. Four additional bolts — two on each side of the door opening for redundant connection at the opening

D. No additional bolts because the regular 1,800 mm on-centre spacing provides adequate anchoring at doors

16. A carpenter is reading a detail drawing and encounters a symbol that looks like an arrow with a tail pointing toward a wall section. The arrow has a number inside a circle at the tail end and another number below the circle. What does this symbol typically represent?

A. A dimension reference that indicates the measurement is in metres rather than millimetres on the drawing

B. A material change indicator showing where one building material transitions to a different type on the wall

C. A section cut indicator — the arrow shows the viewing direction, the number in the circle identifies the section detail number, and the number below indicates the drawing sheet where the section is found

D. A construction sequence marker that tells the carpenter which wall section to build first during framing

17. A carpenter needs to determine the amount of gravel required for a rectangular granular pad beneath a concrete slab. The pad is 15.0 m × 10.0 m and must be 150 mm deep after compaction. What is the volume of gravel needed before compaction, assuming a 25% compaction factor?

A. 22.5 cubic metres based on the compacted volume only without adding the compaction expansion factor

B. 18.75 cubic metres based on calculating the volume with an incorrect 150 mm depth conversion factor

C. 37.5 cubic metres based on multiplying the correct volume by two instead of the compaction factor

D. 28.13 cubic metres — the compacted volume is 15.0 × 10.0 × 0.15 = 22.5 m^3, and adding 25% for compaction gives 22.5 × 1.25 = 28.13 m^3 of loose gravel needed before compaction

18. A carpenter is performing layout for a partition wall on a concrete slab. The chalk line has been snapped on the slab. Before drilling for the bottom plate anchors, the carpenter measures from the chalk line to the parallel exterior wall at several points along the line. The measurements vary by 8 mm over 6 metres. What does this variation indicate?

A. The exterior wall is not perfectly straight — it has an 8 mm bow or deviation over the 6-metre length, and the carpenter must decide whether to follow the chalk line (keeping the partition straight) or adjust the partition to maintain a consistent distance from the bowed exterior wall

B. The chalk line was not snapped accurately and must be re-snapped with a fresh chalk string for precision

C. The measuring tape has a damaged hook that introduces 8 mm of error into every measurement taken

D. The concrete slab has an 8 mm slope over 6 metres that is affecting the horizontal measurements on it

19. A carpenter is estimating material for a ceiling. The room is L-shaped: the main section is 5.0 m × 4.0 m and the extension is 3.0 m × 2.0 m. What is the total ceiling area?

A. 20.0 square metres based on calculating only the main section and omitting the extension from the total

B. 26.0 square metres based on adding the full area of a rectangle that encloses the entire L-shape outline

C. 26.0 square metres based on adding the two rectangular sections: (5.0 × 4.0) + (3.0 × 2.0) = 20.0 + 6.0 = 26.0 m^2

D. 6.0 square metres based on calculating only the extension section without the main area of the ceiling

20. When a carpenter encounters the abbreviation "NTS" on a construction drawing, what does it mean?

A. "Not To Scale" written in a different format using only the first letter of each word for the abbreviation

B. "Not To Scale" — the drawing is a schematic or illustration that does not accurately represent the proportions of the building; dimensions must be read from the noted values, not scaled from the drawing

C. "National Trade Standard" — the drawing conforms to the national standard for construction drawings

D. "New Technical Specification" — the drawing has been updated with new specifications since the last issue

21. A carpenter is laying out a building using batter boards. The batter boards are set approximately 1.2 metres outside each building corner. String lines stretched between the batter boards represent the building lines. Why are the batter boards set outside the building footprint rather than at the exact corner locations?

A. Batter boards outside the footprint provide space for the surveyor's transit to sight along the string lines

B. Batter boards at the exact corners would be destroyed when the foundation excavation begins at the edges

C. Batter boards are set outside the building footprint so they remain undisturbed during excavation, form construction, and concrete placement — the string lines can be removed and re-strung from the permanent batter boards at any time to re-establish the building corners

D. Batter boards outside the footprint allow the carpenter to measure the foundation overdig distance easily

22. A carpenter is using a transit to establish a building line between two points 50 metres apart. After setting up the transit over the first point and sighting to the second point, the carpenter needs to set intermediate points along the line. How does the carpenter align each intermediate stake?

A. The carpenter sights through the transit and directs the stake holder to move left or right until the stake is exactly on the crosshair line — the transit's telescope locks on the line between the two points and any intermediate point on the crosshair is on the same line

B. The carpenter stretches a string between the two end points and aligns each stake to the string by eye

C. The carpenter measures the distance from each end point to the intermediate stake to verify it is equidistant

D. The carpenter uses a laser level to project a horizontal line from one point to the other for stake alignment

23. A carpenter needs to calculate the total linear metres of 38 × 89 mm (2 × 4) material needed for wall plates on a building with a total perimeter of 48 metres. The walls are non-bearing interior partitions requiring only a single bottom plate and a single top plate (no double top plate). What is the total plate material needed?

A. 48 metres based on the perimeter only without multiplying by the number of plates per wall section

B. 144 metres based on using three plates per wall section for non-bearing partitions instead of two

C. 192 metres based on using four plates per wall section for a double-plate system on all partitions

D. 96 metres based on two plates per wall (one bottom + one top): 48 metres × 2 = 96 metres total

24. A carpenter is reading a mechanical drawing and sees a duct labeled "8 × 14 R.A." What does "R.A." indicate about this duct?

A. "Rigid Aluminum" — the duct is fabricated from rigid aluminum sheet metal for the building's duct system

B. "Return Air" — the duct carries air from the conditioned spaces back to the HVAC unit for recirculation

C. "Refrigerant Appliance" — the duct connects to a refrigeration system rather than a forced-air system

D. "Radiant Assembly" — the duct is part of a radiant heating system installed in the floor or ceiling cavity

25. A carpenter is estimating the concrete volume for a circular column footing and the cylindrical column above it. The footing is 1,200 mm in diameter and 300 mm deep. The column is 400 mm in diameter and 3.0 metres tall. Using $\pi = 3.14$, what is the combined concrete volume?

A. 0.339 cubic metres for the footing only without calculating the cylindrical column volume above it

B. 0.717 cubic metres based on using the diameter instead of the radius in the area calculation formula

C. 0.716 cubic metres based on footing volume of $\pi \times 0.6^2 \times 0.3 = 0.339$ m³ plus column volume of $\pi \times 0.2^2 \times 3.0 = 0.377$ m³, total = 0.339 + 0.377 = 0.716 m³

D. 1.432 cubic metres based on doubling the correct answer for a column that extends both above and below

26. A carpenter is performing layout for a stairway and must verify the headroom. The stairway opening in the floor above starts 2.4 metres (measured horizontally) from the bottom of the stairs. The floor-to-floor height is 2.7 metres. At the point where the stair passes beneath the floor edge, what approximate headroom exists if the stairs have a 7/12 pitch?

A. Approximately 2.7 m minus the rise at the 2.4 m horizontal point — the rise at 2.4 m from the bottom is $2.4 \times (7/12) = 1.4$ m, so headroom $\approx 2.7 - 1.4 = 1.3$ m, which is far below the minimum 1.95 m required

B. 2.7 metres because headroom equals the floor-to-floor height at all points along the stair flight below

C. 1.95 metres exactly because the stair opening is always designed to provide minimum code headroom

D. 3.1 metres because the headroom is measured from the nosing to the ceiling above, adding the tread depth

27. A carpenter is building formwork for a concrete wall and must calculate the lateral concrete pressure at the bottom of the form. The wall is 3.0 metres tall and will be poured at a rate of 1.5 metres per hour. The concrete temperature is 20°C. Using the simplified formula for lateral pressure ($P = 7.2 + 785R / (17.8 + T)$ where R is rate in m/h and T is temperature in °C), what is the approximate maximum lateral pressure?

A. 7.2 kPa based on using only the first constant in the formula without the rate and temperature variables

B. 72.0 kPa based on multiplying the height by the full hydrostatic head of 24 kN/m³ without rate reduction

C. 24.0 kPa based on using the concrete unit weight multiplied by one metre of head for a simplified approach

D. Approximately 38.3 kPa based on the formula: $7.2 + (785 \times 1.5) / (17.8 + 20) = 7.2 + 1177.5 / 37.8 = 7.2 + 31.1 = 38.3$ kPa — this determines the form tie spacing and waler design

28. When a concrete truck arrives at a job site, the delivery ticket shows specific information about the concrete mix. The carpenter must verify this information before accepting the load. Which item on the delivery ticket is most critical for the carpenter to verify before placement begins?

A. The driver's name and truck number for the project documentation records in the site log book

B. The specified mix design (compressive strength), slump range, air content, and the time of batching — these confirm the concrete meets the specification and has not exceeded the maximum delivery time

C. The total weight of the concrete in the truck for calculating the crane lift if the concrete is placed by bucket

D. The colour of the delivery ticket because different colours indicate different mix types at the batch plant

29. A carpenter is placing concrete for a slab-on-grade and the specification requires sawcut control joints at 4.5-metre spacing in both directions. The sawcutting crew will cut the joints after the concrete has hardened enough to support the saw but before random shrinkage cracking occurs. What is the typical time window for sawcutting after placement?

A. Within the first 30 minutes after the concrete is placed to cut while the surface is still soft and workable

B. Between 24 and 48 hours after placement when the concrete has reached 50% of its 28-day strength

C. Between 4 and 12 hours after placement — as soon as the concrete can support the saw weight without ravelling at the cut edges, but before uncontrolled shrinkage cracking begins (typically within the first 24 hours)

D. After 7 days of curing when the concrete has reached adequate strength for the saw blade to cut cleanly

30. A carpenter strips forms from a concrete wall and notices small, rounded voids (3 to 6 mm diameter) scattered across the surface. These voids are called bug holes (surface air voids). While they are cosmetic, the specification requires them to be filled on this architectural wall. What material is used to fill bug holes?

A. A cement-based grout (a paste made from portland cement, fine sand, and water, or a proprietary patching compound) is rubbed into the surface with a rubber float to fill the voids without discolouring the surrounding concrete

B. Epoxy injection is used to fill each individual bug hole with a syringe for a permanent structural repair

C. Acrylic latex caulking is applied to each bug hole and smoothed flush with the surrounding wall surface

D. Spray-applied concrete sealer is used to fill the voids and simultaneously seal the entire wall surface area

31. A concrete specification calls for a "water-cement ratio not to exceed 0.45." What does this ratio mean, and why is it critical?

A. The ratio means 45% of the total mix volume must be water for adequate workability during placement

B. The ratio means the cement weight must be 0.45 times the water weight in the concrete batch design

C. The ratio means the aggregate moisture content must not exceed 0.45% by weight of the dry aggregate

D. The ratio means the weight of water divided by the weight of cement must not exceed 0.45 — this is the single most important factor controlling concrete strength and durability; lower ratios produce stronger, more durable concrete

32. A carpenter is building a form for a concrete wall that includes a window buck. The buck defines the rough opening in the concrete wall. Before the pour, the carpenter must brace the buck to prevent it from floating upward when the concrete reaches the bottom of the buck. Why does the buck tend to float?

A. The wood buck is heavier than the concrete and sinks to the bottom of the form during the pour placement

B. Wet concrete exerts an upward buoyant force on the buck because the wood is lighter than the liquid concrete — the buck must be braced or weighted to resist this upward force and maintain its position

C. The vibrator creates a pumping action that pushes the buck upward through the concrete during vibration

D. Air trapped beneath the buck during the pour expands from the heat of hydration and pushes the buck up

33. A carpenter is pouring a concrete slab in a heated building during winter. The building interior is maintained at 18°C but the ground beneath the slab is frozen at −5°C. Why is the frozen subgrade a concern for the slab?

A. Frozen ground provides better bearing capacity than thawed ground, which is actually beneficial for slabs

B. The frozen ground temperature has no effect on the slab because the heated building maintains the cure

C. The frozen ground creates a cold sink beneath the slab that draws heat from the bottom of the concrete

D. Frozen subgrade extracts heat rapidly from the bottom of the fresh concrete, potentially freezing the lower portion of the slab before it gains adequate strength — the subgrade must be thawed before placement

34. When a carpenter builds forms for a concrete beam, the beam soffit (bottom form) must be supported by shores that are adjustable in height. Why must the shores be adjustable rather than fixed-height?

A. Adjustable shores compensate for variations in the ground surface elevation or the supporting floor surface

B. Adjustable shores allow the carpenter to quickly remove them by lowering them after the concrete cures

C. Adjustable shores allow precise setting of the beam soffit elevation to match the engineering drawings — the soffit height must be exact because it determines the finished beam position, and adjustable shores provide millimetre-level height control

D. Adjustable shores are required by code because fixed-height timber shores are not permitted for beam forms

35. A carpenter is vibrating concrete in a thick slab (250 mm) and inserts the vibrator vertically. The vibrator head is 50 mm in diameter. When the vibrator is withdrawn, a hole remains in the concrete surface that does not close on its own. What does this indicate about the concrete?

A. The concrete mix has adequate workability and the hole will close during the bull floating operation after

B. The vibrator head diameter is too large for this slab thickness and a smaller vibrator should be selected

C. The concrete has been over-vibrated at this location and has segregated, with the paste rising to the top

D. The concrete mix is too stiff (low slump) — a workable mix closes the vibrator hole when the vibrator is withdrawn because the surrounding concrete flows back into the void; a stiff mix cannot flow back

36. When building forms for a retaining wall, the carpenter must install drainage provisions. In addition to weep holes through the wall, what drainage component is installed against the back (earth side) of the wall before backfilling?

A. A layer of compacted clay soil pressed against the wall surface to seal the back face against water entry

B. A drainage composite (dimpled membrane) or a layer of free-draining gravel that creates a drainage path for groundwater to flow downward to the footing drain rather than building hydrostatic pressure against the wall

C. A layer of rigid foam insulation that diverts water sideways along the wall to the building corners

D. A continuous polyethylene sheet draped over the back face that directs all water to the base of the wall

37. A carpenter is finishing a concrete slab and must apply a liquid membrane curing compound immediately after the final trowel pass. The compound is sprayed on the surface and forms a thin film. If the carpenter applies the curing compound too heavily, what problem can occur?

A. Excessive curing compound can create a barrier that is too thick for the concrete to cure through — however, the primary concern is that excess compound may interfere with the adhesion of any subsequent floor covering, coating, or sealer applied to the surface

B. The thick compound layer traps heat and causes the slab to overheat and crack from thermal expansion

C. The heavy application dissolves the surface paste and creates a dusty, weak surface layer on the concrete

D. Excessive compound makes the surface permanently slippery and creates a fall hazard in the building

38. A carpenter is placing concrete for a residential basement slab. The specification calls for a minimum slab thickness of 100 mm. During placement, the carpenter checks the thickness at multiple locations by pushing a ruler through the wet concrete to the top of the granular base below. Several readings show only 75 mm of thickness. What must the carpenter do?

A. Continue placement and add extra concrete at those locations during the next truck delivery for thickness

B. Accept the 75 mm thickness because the 25 mm shortfall is within a reasonable construction tolerance

C. Add concrete at the thin areas immediately to bring the slab to the specified 100 mm minimum thickness before the surrounding concrete begins to set — a 25% reduction in thickness significantly reduces the slab's load-bearing capacity

D. Record the thin areas in the project log and notify the building inspector after the slab has cured fully

39. A carpenter is constructing forms for a circular concrete column. The column is 500 mm in diameter. The carpenter uses a manufactured cardboard tube form (Sonotube). Before placing the concrete, the carpenter must brace the tube form to prevent it from shifting or lifting during the pour. How is the tube braced?

A. The tube is weighted with sandbags placed on top to prevent it from lifting during the concrete placement

B. The tube is glued to the footing surface with concrete adhesive to prevent lateral movement during pour

C. The tube is held in place only by the surrounding formwork and does not require independent bracing

D. The tube is braced laterally with diagonal braces from the tube to the ground or adjacent structure at multiple points along its height, and is anchored at the base to prevent lateral displacement and uplift from the buoyant force of the wet concrete

40. A carpenter is placing concrete in a deep grade beam form. The concrete truck is parked at a distance and the concrete is transported to the form by wheelbarrow. Each wheelbarrow load takes approximately 3 minutes for the round trip. During the placement, the carpenter notices that the concrete at the bottom of the form is beginning to stiffen while the top is still being filled. What risk does this situation create?

A. The slow placement rate is adequate as long as each load is vibrated immediately upon arrival at the form

B. The slow placement rate creates a risk of cold joints forming within the grade beam because the lower concrete stiffens before the upper concrete is placed and vibrated into it — the vibrator may not be able to knit the layers together

C. The slow placement rate increases the concrete strength because each layer has time to partially cure

D. The slow placement rate has no effect because grade beams are poured in a single continuous operation

41. When a concrete specification calls for "Type HS cement," what property does this cement type provide?

A. High early strength that allows rapid form stripping within 24 hours of placement during fast-track work

B. High heat of hydration for cold weather applications that maintain concrete temperature during curing

C. High workability that maintains slump for extended periods during long-distance transport from the plant

D. High sulphate resistance — this cement is formulated to resist chemical attack from sulphates in the soil or groundwater that can cause deterioration of standard cement concrete over time

42. A carpenter is building a form for a concrete stairway that will be cast monolithically with a landing. The landing connects to the stairway at a 90-degree turn. The form must be built as a single structure that accommodates both the straight stair run and the landing platform. What is the most challenging forming aspect of this configuration?

A. Building the riser forms so they align perfectly with the stringer forms on each side of the straight stair run

B. Forming the intersection where the stair soffit meets the landing soffit at the turn — the two sloped surfaces meet at different angles, and the form must create a smooth transition between the stair slope and the level landing while supporting the combined concrete weight

C. Calculating the concrete volume for the combined stair and landing pour to order the correct amount

D. Installing the reinforcing steel at the stair-to-landing junction where the bars change direction at the turn

43. A carpenter is framing a complex hip roof and must install a valley rafter where a lower roof intersects the main roof. The valley rafter runs from the ridge of the lower roof down to the wall plate at the intersection corner. What determines the length of this valley rafter?

A. The valley rafter length equals the common rafter length of the lower roof multiplied by the building width

B. The valley rafter length equals the distance between the two ridges measured horizontally on the plan

C. The valley rafter run is determined by the intersection geometry — it equals the common rafter run of the intersecting roof multiplied by 1.414 ($\sqrt{2}$) for a 90-degree intersection; the rafter length is then calculated using the valley unit line length for the given pitch

D. The valley rafter length equals the hip rafter length of the main roof regardless of the intersecting pitch

44. When framing a floor system with engineered I-joists, the carpenter must install squash blocks (web stiffeners) at specific locations. In addition to bearing points, where else are squash blocks commonly required?

A. At the locations where concentrated loads from above (bearing walls, posts, columns) transfer through the floor system — the squash blocks reinforce the thin web to prevent it from buckling under the concentrated point load

B. At every joist-to-joist bridging location to provide nailing for the cross-bridging members between joists

C. At the midpoint of every joist span to prevent the web from buckling under uniform floor loading conditions

D. Only at the rim joist connection where the I-joist meets the perimeter of the floor system at each end

45. A carpenter is constructing a wall that must resist lateral loads from both wind and seismic forces. The engineer specifies a "Type 1 shear wall" with specific hold-down, nailing, and aspect ratio requirements. What is the maximum height-to-length aspect ratio typically allowed for a standard wood-frame shear wall panel?

A. 1:1 meaning the wall panel must be exactly as long as it is tall for effective shear resistance performance

B. 4:1 meaning the wall can be four times taller than it is wide, with reduced capacity at higher ratios

C. There is no maximum ratio because any wall section provides racking resistance regardless of proportions

D. Typically 2:1 to 3.5:1 (depending on the code and configuration) — a shear wall panel that is too narrow relative to its height tends to overturn rather than resist the lateral force in shear

46. A carpenter is framing a wall section that will have a built-in fireplace. The fireplace requires a combustible-free zone around the firebox. The carpenter must maintain a minimum clearance between all wood framing and the masonry firebox. What is the typical minimum clearance?

A. 25 mm clearance filled with non-combustible insulation between the wood framing and the masonry firebox

B. 50 mm clearance — all combustible framing must maintain at least 50 mm from the masonry firebox surface, and this gap must remain clear (no insulation, no debris) to prevent heat transfer ignition

C. No clearance is needed if the masonry firebox is lined with firebrick on the interior combustion surfaces

D. 12 mm clearance provided by a sheet of non-combustible cement board between the wood and masonry

47. A carpenter is installing a structural ridge beam for a roof with no ceiling joists (cathedral ceiling). The beam supports the full weight of the rafters, sheathing, roofing, and snow load. When selecting the beam size from the engineer's specification, the beam depth is critical. Why can't the carpenter substitute a shallower beam of the same width?

A. A shallower beam weighs less and may blow off the posts during high-wind events on the roof structure

B. A shallower beam has fewer nail holes available for the rafter connections at the ridge of the roof line

C. A shallower beam has less bending capacity — the moment of inertia (stiffness) increases with the cube of the depth, so even a small depth reduction dramatically reduces the beam's ability to resist bending and deflection

D. A shallower beam requires larger posts that would protrude through the ceiling below the cathedral space

48. A carpenter is building a deck and the local building code requires that the deck guard posts must withstand a specific lateral load applied at the top of the post. The post is 1,070 mm tall and is bolted to the outside of the rim joist. What creates the greatest stress on this post-to-rim joist connection?

A. The lateral force at the top of the post creates a moment (torque) at the base connection — the 1,070 mm lever arm multiplies the applied force, creating a prying action that tries to pull the top bolt out and push the bottom bolt into the rim joist

B. The vertical weight of the guard rail and balusters creates a downward force that shears the bolts in the post

C. Wind pressure on the guard surface pushes the post inward toward the deck centre during storm events

D. The thermal expansion of the post material creates a longitudinal stress that tries to push the bolts out

49. When framing a gable end wall, the carpenter must install the gable studs at progressively decreasing lengths following the roof slope. A common method is to pre-calculate the "common difference" between successive gable studs. If the stud spacing is 400 mm on centre and the roof pitch is 6/12, what is the common difference between adjacent gable studs?

A. 300 mm based on multiplying the stud spacing by the rise-per-foot ratio: $400 \times (6/12) = 400 \times 0.5 = 200$

B. 400 mm because each stud is spaced 400 mm apart and the difference equals the spacing regardless of pitch

C. 600 mm based on adding the rise (6) to the spacing (400) for the combined common difference value

D. 200 mm — the common difference equals the stud spacing multiplied by the tangent of the roof angle (or equivalently, spacing × pitch ratio): 400 × (6/12) = 400 × 0.5 = 200 mm

50. A carpenter is installing manufactured floor trusses and the truss drawings show a diagonal web member identified as a "compression web." This web member is in compression under the design loads. What concern does a compression web create that a tension web does not?

A. A compression web has no special concern because both tension and compression webs carry the same loads

B. A compression web can buckle laterally if it is not braced — unlike a tension web that straightens under load, a compression web tends to bow sideways under load and must be laterally braced to prevent buckling failure

C. A compression web generates more heat than a tension web due to the friction between the wood fibres

D. A compression web makes more noise (creaking) than a tension web when the floor is loaded above it

51. A carpenter is framing a floor system and must install a beam flush with the joists (a flush beam). The joists are connected to the beam using joist hangers. The carpenter notices that the beam deflects 8 mm at mid-span under the joist loads. Is this deflection acceptable?

A. The 8 mm deflection is never acceptable because flush beams must have zero deflection at mid-span

B. The deflection is acceptable regardless of the span because all beams deflect proportionally under load

C. The acceptability depends on the beam span — the Building Code typically limits floor beam deflection to L/360 (span divided by 360); for a 4-metre beam, the maximum is 4,000/360 = 11 mm, so 8 mm would be acceptable; for a shorter beam, 8 mm may exceed the limit

D. The 8 mm deflection indicates the beam has failed and must be replaced immediately with a larger size

52. A carpenter is framing a wall and encounters a condition where a duct boot (the rectangular transition piece that connects an HVAC duct to a floor register) must pass through the bottom plate of the wall. The duct boot is 75 mm × 250 mm. The bottom plate is a single 38 × 89 mm member. Can the carpenter cut a 75 × 250 mm notch in the bottom plate?

A. Yes, but the bottom plate must be reinforced with a metal tie plate (nail plate) on each side of the notch to bridge the interruption and maintain the plate's lateral continuity for transferring shear forces along the wall

B. No, notches in the bottom plate are never permitted under any circumstances in the Building Code

C. Yes, without reinforcement because the bottom plate carries no loads in a non-bearing partition wall section

D. No, the duct must be rerouted to avoid the bottom plate entirely regardless of the wall load condition

53. A carpenter is building a cantilevered bay window floor that extends 600 mm past the exterior wall. The cantilevered joists are 38 × 235 mm (2 × 10) at 400 mm on centre. The engineer specifies that the joists must extend at least 1.8 metres past the wall into the building (a 3:1 backspan ratio). What secures the backspan end of the cantilevered joists?

A. The weight of the interior floor structure above the backspan holds the joist ends down by gravity alone

B. The subfloor adhesive and nailing to the backspan portion of the joist provides adequate pull-down resistance

C. Construction adhesive applied between the cantilevered joist and the adjacent standard joist prevents uplift

D. The backspan ends of the cantilevered joists must be connected to the floor system above with blocking and structural connections that resist the uplift force — when the cantilever is loaded, the backspan end tends to lift, and the connection must resist this overturning force

54. A carpenter is installing wall sheathing and the building inspector requires that the sheathing nails penetrate a minimum depth into the framing. For standard structural sheathing nailed with 63 mm nails through 11 mm OSB, what is the approximate nail penetration into the stud?

A. 52 mm based on subtracting the sheathing thickness from the nail length: 63 − 11 = 52 mm of penetration

B. 63 mm penetration into the stud because the full nail length embeds in the wood framing behind the panel

C. 38 mm penetration based on the standard minimum penetration for structural sheathing connections

D. 25 mm penetration based on using half the nail length as the effective penetration into the stud framing

55. When framing a floor over a crawl space, the Building Code requires access to the crawl space for maintenance and inspection. What are the minimum dimensions for a crawl space access opening?

A. 300 mm × 300 mm because crawl space access only needs to fit a plumber's camera inspection system

B. 400 mm × 500 mm because this size allows tools and small equipment to be passed into the crawl space

C. 500 mm × 700 mm (approximately 20 × 28 inches) — this is the typical minimum size that allows a person to physically enter the crawl space for inspection, maintenance, and repair work

D. 900 mm × 900 mm to allow a full-size adult to walk into the crawl space in an upright standing position

56. A carpenter is constructing a deck and the specification calls for the deck boards to be installed with a 3 mm gap between each board. The gap allows water to drain through the deck surface and air to circulate beneath the boards. If the carpenter installs the boards without gaps (tight together), what problem occurs?

A. Without gaps, water pools on the deck surface between boards and accelerates decay at the board edges — additionally, the boards expand when they absorb moisture, and without gaps to accommodate this expansion, the boards cup, buckle, or push apart from the concentrated swelling pressure

B. The deck boards will shrink excessively and create gaps wider than 6 mm that are uncomfortable underfoot

C. The deck becomes too heavy for the framing to support because the tight installation eliminates air pockets

D. The Building Code specifically prohibits tight-fitting deck boards because the code requires drainage gaps

57. A carpenter is framing a wall and must install a fire stop at the top of the wall where it meets the floor system above. In platform framing, the bottom plate of the upper wall and the subfloor panel automatically provide fire stopping between the wall cavity below and the floor cavity above. In what framing configuration does this automatic fire stopping NOT occur?

A. In balloon framing, the studs run continuously from the sill plate to the roof plate without any intermediate floor platform — the continuous stud cavities create unobstructed vertical channels from the foundation to the attic

B. In post-and-beam framing where the wall studs are replaced by timber columns spaced at wider intervals

C. In conventional platform framing with cathedral ceilings where the ceiling follows the roof slope upward

D. In any framing configuration where the upper floor joists run parallel to the wall below them in the plan

58. A carpenter is installing a floor truss system and the truss manufacturer's drawing shows a specific bearing condition: "minimum 89 mm bearing on each end." The carpenter sets one truss with only 64 mm of bearing because the wall plate is not quite wide enough at that location. What is the risk?

A. The 64 mm bearing has no structural consequence because the truss reaction force is small at the ends

B. The concentrated reaction force on only 64 mm of bearing may exceed the crushing strength of the wood plate — the truss can settle as the plate fibres compress, creating a dip in the floor and potentially a progressive failure

C. The 64 mm bearing only affects the truss warranty and has no effect on the structural performance of it

D. The truss will slide off the plate during the roof installation phase because 64 mm provides no friction

59. A carpenter has completed framing a hip roof and is installing the roof sheathing. The carpenter starts at the eave and works upward toward the ridge. At the hip lines, the sheathing panels must be cut at an angle. What angle is this cut on a hip roof with a 90-degree plan angle?

A. 45 degrees — on a standard hip roof where the plan angle at the hip is 90 degrees, the sheathing panels meet at the hip line at 45 degrees from the eave line, and each panel is cut at 45 degrees to fit the hip

B. 22.5 degrees based on half the 45-degree angle for the sheathing cut at each side of the hip line on roof

C. 90 degrees because the sheathing panels meet at a right angle at the hip line on the roof surface above

D. The angle varies with each course and cannot be predetermined because the hip line is not straight

60. A carpenter is installing a structural panel on a shear wall and discovers that one stud has a split along its length where the sheathing nails must be driven. The split extends 300 mm up the stud from the bottom plate. Can the carpenter nail into this split stud?

A. Yes, the split has no effect on the sheathing nailing because the nail penetrates both halves of the split

B. Yes, if the carpenter pre-drills the nail holes through the split portion to prevent further splitting

C. No — nails driven into a split stud have dramatically reduced withdrawal and shear resistance because the nail does not engage intact wood fibres on both sides; the split stud must be replaced or sistered before the shear panel can be effectively nailed at that location

D. No, but only because the building inspector requires a specific notation in the project file for the split

61. A carpenter is installing pre-finished lap siding on a wall that has a horizontal joint at the second-floor band joist area. A horizontal trim board is installed at this joint. Above and below the trim board, the siding courses are independent (they do not continue across the trim). What flashing detail is required at this horizontal trim board?

A. No flashing is needed because the trim board itself serves as the water management detail at this joint

B. A Z-flashing is installed above the trim board — the upper leg tucks behind the siding and housewrap above, and the lower leg extends over the top of the trim board to direct water outward rather than behind the trim

C. A bead of caulking above and below the trim board provides a watertight seal against water penetration

D. The trim board is installed at a 5-degree angle to shed water forward away from the wall surface below

62. When installing vinyl siding, the carpenter must allow for thermal expansion at all termination points. A vinyl siding panel that is 3.6 metres long can expand approximately 9.5 mm over the full temperature range. How should the carpenter handle the expansion at the panel ends where they meet at a lap joint (where two panels overlap)?

A. The panels must be butted tightly together at every lap joint with no gap for a clean appearance on wall

B. The panels must overlap by at least 25 mm and the overlapping end must not be nailed down within the overlap zone so the underlying panel can slide freely as it expands and contracts beneath the overlapping piece

C. The panels must be glued at the overlap to prevent wind from catching the exposed edge during storms

D. The panels must overlap by at least 25 mm, and the overlap end must face away from the prevailing wind; however, the upper panel IS nailed, while the lower panel slides freely beneath the overlap

63. A carpenter is installing fibre cement siding and reaches a location where an exterior electrical outlet box is mounted on the wall. The siding must be cut to fit around the box. After cutting, a gap exists between the siding edge and the box perimeter. How is this gap sealed?

A. The gap is sealed with paintable exterior caulking to prevent water from entering behind the siding at the penetration — the caulking must be applied before the outlet cover plate is installed so the seal is continuous around the full perimeter

B. The outlet cover plate overlaps the siding edge by 10 mm and no additional sealant is needed at the gap

C. A rubber gasket behind the outlet cover plate compresses against the siding face to seal the penetration

D. The fibre cement siding is installed tight against the box with no gap, eliminating the need for sealant

64. A carpenter finishes installing asphalt shingles and must verify the nailing pattern before the roof is considered complete. The standard nailing pattern for three-tab shingles requires four nails per shingle. Where must these four nails be placed?

A. One nail at each end of the shingle and two nails evenly spaced in the centre area of the strip shingle

B. All four nails clustered in the centre of the shingle for maximum holding power at the heaviest point

C. The four nails are placed in a line just above the cutout slots (approximately 25 mm above the self-seal adhesive strip) — this location secures both the shingle being nailed and the top edge of the shingle in the course below through the overlap

D. Two nails at the top edge and two nails at the bottom edge of the shingle for balanced attachment

65. A carpenter is installing a pre-hung exterior door and must adjust the weatherstripping for an airtight seal. The door has a compression bulb weatherstrip on the head and strike jamb. After closing the door, the carpenter sees that the compression is uneven — tight at the top and loose at the bottom of the strike side. What adjustment corrects this?

A. Replace the compression bulb weatherstrip with a new piece that has a thicker profile at the bottom section

B. Adjust the strike-side jamb shims — add shims at the lower portion to push the jamb closer to the door slab, compressing the weatherstrip evenly from top to bottom

C. Plane the door edge at the top to reduce the compression at the tight area for a more uniform seal

D. Install a second layer of weatherstripping at the bottom of the strike jamb to increase compression there

66. When installing a continuous ridge vent on an asphalt shingle roof, the carpenter must first cut the sheathing back from the ridge to create a ventilation slot. What is the typical width of this slot on each side of the ridge?

A. 12 mm (½ inch) on each side of the ridge for a total 25 mm opening that provides minimal ventilation

B. 25 mm (1 inch) on each side — some manufacturers specify different widths based on their product design

C. 75 mm (3 inches) on each side for maximum airflow through the ridge vent opening at the roof peak

D. The full width between the last rafter on each side of the ridge for an unobstructed opening at the peak

67. A carpenter is installing exterior wood trim and must protect the end grain at all cut ends from moisture absorption. The carpenter has already back-primed all trim pieces before installation. What additional treatment is applied specifically to the cut end grain?

A. A coat of exterior primer or a water-repellent preservative is applied to every exposed end grain surface — end grain absorbs moisture 10 to 15 times faster than face grain, and unprotected end grain is the primary entry point for moisture that causes rot

B. End grain is left unprotected because the back-priming covers the full surface including the cut ends

C. End grain is sealed with construction adhesive applied in a thick coat that fills the open wood pores

D. End grain is protected by dipping the cut end in molten wax that penetrates the open wood cell structure

68. A carpenter is installing metal step flashing and notices that the roofing nails used to fasten the step flashing are protruding through the roof sheathing into the attic space. In winter, moisture can condense on these exposed nail shanks (called "nail pops" or "shiners") and drip onto the insulation below. How can this condensation be prevented?

A. The protruding nail tips should be cut flush with the underside of the sheathing using diagonal cutters

B. The attic must be heated to prevent any surface from reaching the dew point temperature in the winter

C. Adequate attic ventilation keeps the attic air dry enough to prevent condensation from forming on the exposed nail shanks — proper soffit-to-ridge ventilation reduces the moisture level in the attic air below the condensation threshold

D. The protruding nails must be pulled and replaced with shorter nails that do not penetrate the sheathing

69. When installing horizontal lap siding, the carpenter must flash the top edge of each window and door. A drip cap (head flashing) is installed above the head casing. If the wall has a rain screen with a drainage cavity behind the cladding, where must the drip cap be positioned relative to the drainage cavity?

A. The drip cap upper leg must extend into the drainage cavity behind the furring strip so water running down the cavity is intercepted and directed outward at the window head rather than continuing down behind the window

B. The drip cap sits entirely in front of the drainage cavity on the exterior face of the furring strips only

C. The drip cap upper leg extends behind the housewrap so water from the wall surface above enters the cavity

D. The drip cap is positioned at the same plane as the window frame with no interaction with the cavity

70. A carpenter is installing a pre-hung exterior door and must ensure the sill (threshold) is properly supported. The threshold spans the full width of the rough opening. If the subfloor beneath the threshold has any voids or low spots, what problem results?

A. The threshold flexes under foot traffic, breaking the seal between the threshold and the door bottom sweep

B. The low spots fill with water during rain events and create a puddle beneath the door threshold surface

C. The threshold support is provided entirely by the door frame sides and the subfloor condition is irrelevant

D. An unsupported threshold flexes under foot traffic at the void location, repeatedly compressing and releasing the door bottom seal, which eventually cracks the seal and allows water and air to penetrate beneath the door

71. A carpenter is completing the exterior cladding installation and must install kick-out (diverter) flashings at every location where a roof-to-wall step flashing run terminates at an eave. What happens if kick-out flashings are omitted?

A. Without kick-out flashings, the accumulated water from the step flashing run pours directly behind the wall cladding at the base of the wall-to-roof intersection, causing concealed wood rot, mould, and structural damage to the wall framing that may go undetected for years

B. The omitted kick-out has only a minor cosmetic effect because the gutter below catches most of the water

C. The wall cladding above the intersection point absorbs the water and distributes it evenly across the surface

D. The step flashing redirects all water onto the roof surface and no water reaches the wall at the base

72. A carpenter is installing PVC (vinyl) trim boards as exterior window casing. PVC trim has a significantly higher thermal expansion rate than wood. When installing a 2.4-metre PVC casing piece vertically, what must the carpenter do to accommodate thermal expansion?

A. Install the PVC casing tightly against the head trim and sill trim with no gaps at either end of the piece

B. Nail the PVC casing at every 200 mm for maximum holding against the wall to prevent thermal movement

C. Leave a small gap (approximately 1.5 to 3 mm) at the top and bottom of the vertical casing piece to accommodate thermal expansion — PVC expands approximately 1.5 mm per metre over a 50°C range

D. Use adhesive instead of nails so the PVC can expand freely beneath the adhesive bond at the wall surface

73. A carpenter is installing the final course of vinyl siding beneath the soffit. The remaining space is less than a full panel width. The carpenter rips the panel to fit and must install it without the nailing flange (which was removed during the rip). What holds this final piece in position?

A. Construction adhesive applied to the back of the ripped panel bonds it to the wall sheathing permanently

B. A utility trim (undersill trim) installed along the soffit line receives the cut edge of the ripped panel — the panel is snap-lock punched along its cut upper edge to create tabs that lock into the trim channel

C. The J-channel at the soffit grips the cut edge of the panel by friction only without any mechanical lock

D. Face nails driven through the exposed face of the ripped panel into the wall studs at 400 mm spacing

74. When installing cedar shingle siding, the carpenter must maintain a specific exposure for each course. The exposure is determined by the shingle length and the number of layers of coverage desired. For 400 mm (16-inch) shingles with triple coverage, what is the maximum exposure?

A. 200 mm — half the shingle length because two layers of shingles overlap at every point on the wall

B. 133 mm — one-third of the shingle length for triple coverage (three layers) at every point on the wall

C. 267 mm — two-thirds of the shingle length that provides only double coverage at each wall location

D. The maximum exposure for triple coverage with 400 mm shingles is approximately 133 mm — the exposure equals (shingle length minus the minimum headlap) divided by 3, ensuring three complete layers protect every point on the wall

75. A carpenter is installing exterior door hardware and must verify the door lock's backset. The backset is the distance from the edge of the door to the centre of the lock bore hole. What are the two standard residential lock backsets?

A. 60 mm (2-3/8 inches) and 70 mm (2-3/4 inches) — these are the two standard backsets for residential door locks, and the carpenter must verify which backset matches the pre-bored hole in the door before purchasing the lock

B. 25 mm and 50 mm based on the European metric standard for residential door hardware installations

C. 100 mm and 125 mm for commercial-grade door hardware on residential exterior door applications

D. There is only one standard backset (60 mm) and all residential locks use this dimension exclusively

76. A carpenter is installing a continuous metal drip edge along a gable rake (the sloped edge of the roof at the gable end). The rake drip edge must be installed in a specific sequence relative to the underlayment. What is the correct installation sequence at the rake?

A. The underlayment is installed first, and then the rake drip edge is installed over the top of the underlayment — at the rake, the drip edge goes over the underlayment (the opposite of the eave, where the drip edge goes under the underlayment)

B. The rake drip edge is installed first, and then the underlayment is installed over the drip edge flange

C. The rake drip edge and underlayment are installed simultaneously for proper integration at the rake

D. No drip edge is required at the rake because the rake trim (fascia) provides adequate weather protection

77. A carpenter is installing a solid wood interior door slab into an existing jamb. The door slab is 3 mm wider than the jamb opening. The carpenter must plane the door to fit. Which edge should the carpenter plane — the hinge edge or the lock edge?

A. Both edges should be planed equally (1.5 mm from each side) for balanced material removal from the slab

B. The lock (strike) edge should be planed because removing material from the hinge edge changes the hinge barrel position and may affect the door swing, while the lock edge can be trimmed without affecting the hinge alignment

C. The hinge edge should be planed because the hinges can be repositioned to accommodate the new edge

D. Neither edge should be planed because a 3 mm oversize door cannot be installed in the existing jamb

78. When installing a floating laminate floor, the carpenter must install expansion gaps around the entire perimeter and at all fixed objects (columns, pipes, door frames). The typical expansion gap is 10 to 12 mm. After installation, the baseboard covers the gap at the walls. But at a floor-to-pipe transition, the gap is visible. How is this gap concealed?

A. A bead of colour-matched caulking is applied around the pipe to fill the visible expansion gap permanently

B. Expanding spray foam is injected around the pipe to fill and seal the gap against air and moisture intrusion

C. The floor plank is cut tightly around the pipe with no gap because pipes do not create expansion forces

D. A split-ring escutcheon plate (pipe collar) is installed around the pipe — the two-piece ring snaps around the pipe and covers the expansion gap while still allowing the floor to move freely beneath it

79. A carpenter is installing a stairway handrail and must ensure the handrail profile is "graspable." The Building Code specifies the dimensions of a graspable handrail. What is the key dimensional requirement?

A. The handrail must have a circular or near-circular cross-section with an outside diameter between 32 mm and 43 mm (1-1/4 to 1-3/4 inches), allowing the user's fingers to wrap around the rail for a secure grip

B. The handrail must be at least 75 mm wide to provide a flat resting surface for the user's palm during use

C. The handrail must be square in cross-section with rounded corners for a comfortable and secure grip

D. The handrail must be at least 50 mm in diameter to prevent a child's hand from wrapping around it

80. A carpenter has installed drywall on a ceiling and notices that one section of the ceiling has a noticeable sag between the joists — the drywall panel deflects downward in the centre of each bay. The drywall is 12.7 mm (1/2 inch) standard and the joist spacing is 600 mm on centre. What caused the sag, and what is the solution?

A. The drywall screws were not driven deep enough and the panels are pulling away from the joist surfaces

B. The joists have deflected under the roof load above and the drywall is following the joist deflection below

C. Standard 12.7 mm drywall is too thin for 600 mm joist spacing on a ceiling — at this spacing, the unsupported span causes the drywall to sag under its own weight; 15.9 mm (5/8 inch) drywall or 12.7 mm at 400 mm spacing is required for ceilings

D. The drywall adhesive has failed and the panels have separated from the joists at the centre of each bay

81. A carpenter is building a closet and must install a clothes rod (closet pole) at the standard height. The rod must support the weight of hanging clothes, which can be substantial (a full rod of winter coats may weigh 40 to 50 kg). What is the standard closet rod height, and how is it supported?

A. The rod is typically installed at 1,525 to 1,675 mm (60 to 66 inches) above the finished floor, supported by end brackets screwed into wall studs or solid blocking — for spans exceeding 1.2 metres, a centre support bracket prevents the rod from sagging under the load

B. The rod is installed at 2,100 mm (84 inches) matching the standard door height for visual consistency

C. The rod is installed at 900 mm (36 inches) above the floor for easy access when hanging and removing clothes

D. The rod requires no specific height and is positioned based only on the homeowner's personal preference

82. A carpenter is installing vinyl base (rubber cove base) in a commercial hallway. The adhesive is applied to the back of the base, and the base is pressed against the wall. At the outside corners, the base must wrap around the corner without cutting. What technique allows the rigid vinyl base to bend around the outside corner?

A. The vinyl base is pre-heated with a heat gun at the corner location — the heat softens the vinyl, allowing it to bend around the outside corner without cracking; when it cools, it retains the curved shape permanently

B. The vinyl base is scored on the back face at the corner and bent along the score line for a sharp fold

C. The vinyl base is stretched around the corner using clamps that hold it in position until the adhesive cures

D. The vinyl base is cut at 45 degrees on each side of the corner and the two pieces are butted together

83. When installing a pre-hung door, the carpenter must check the door for proper operation after the jamb is secured. The carpenter swings the door to various positions and releases it. What test determines if the door is properly installed?

A. The door must swing freely to any position without binding and remain stationary at any angle when released — if the door swings open or closed on its own, the hinge-side jamb is not plumb

B. The door must swing freely to any position without binding and should slowly close on its own from gravity

C. The door must bounce back to the half-open position from both the fully open and fully closed positions

D. The door must require a slight push to close from any position to confirm the weatherstripping is adequate

84. A carpenter is installing kitchen countertops and must join two sections at a 90-degree corner using a mitre joint. The laminate countertop sections are joined from below using draw bolts (also called mitre bolts). Before tightening the draw bolts, what must the carpenter apply to the mitre faces?

A. Wood glue applied to the exposed particleboard core faces for structural bonding at the mitre joint

B. Construction adhesive applied in a thick bead for gap-filling capability between the two mitre surfaces

C. No adhesive is needed because the draw bolts alone provide adequate joint tightness for the countertop

D. A thin, even application of colour-matched seam filler or silicone applied to both mitre faces — when the draw bolts pull the joint tight, the sealer fills any micro-gaps and prevents moisture from penetrating the exposed particleboard core at the joint

85. A carpenter is installing hardwood flooring and reaches a floor heating vent (register). The vent opening is 100 mm × 300 mm. The hardwood must terminate neatly at the vent opening on all four sides. How does the carpenter ensure clean edges at this opening?

A. The carpenter frames the vent opening with matching hardwood trim pieces that are flush with the floor surface — the flooring terminates at the trim, and the register grille sits inside the trim frame on a ledge

B. The carpenter cuts each flooring board to fit tightly around the vent opening with the exposed cut edges hidden by the register grille that overlaps the flooring by 10 to 15 mm on each side

C. A manufactured vent boot is installed in the subfloor that provides a finished metal edge at the floor level

D. The carpenter installs the flooring continuously over the vent opening and cuts the opening after installation

86. A carpenter is installing tile backer board on a bathroom wall above a bathtub. The backer board panels are 12 mm thick cement board. The carpenter must fasten the panels to the wood studs. What fastener type is correct for cement backer board?

A. Standard drywall screws driven at 200 mm on centre through the backer board into the wood studs behind

B. Galvanized roofing nails driven at 150 mm on centre that provide the required corrosion resistance

C. Alkali-resistant cement board screws (with corrosion-resistant coating and serrated heads) at 200 mm on centre — these screws are designed to countersink into the hard cement board without cracking it and resist the alkaline moisture environment

D. Stainless steel wood screws with flat heads driven at 300 mm spacing through the cement board panels

87. When installing interior trim, the carpenter encounters a condition where the casing must terminate against a plinth block at the base of a door opening. The plinth block is thicker and wider than the casing above it. What is the purpose of the plinth block?

A. The plinth block provides a fire stop between the door casing and the baseboard at the floor junction

B. The plinth block creates a visual transition between the door casing and the baseboard — the thicker, wider block provides a substantial base that the thinner casing sits on top of, and the baseboard butts against the side of the block, eliminating the need for a complex joint where three different trim pieces meet

C. The plinth block supports the door hinge weight by providing additional bearing surface at the base

D. The plinth block raises the casing height to match the baseboard height for a consistent trim alignment

88. A carpenter is installing a shower curb for a tile shower. The curb is framed with 2×4 lumber and must be waterproofed. What is the critical waterproofing requirement for the shower curb?

A. Only the top of the curb requires waterproofing because the sides are protected by the tile installation

B. The curb waterproofing only needs to cover the interior (shower side) face and the top surface of the curb

C. A waterproof membrane is needed only on the curb interior face where the shower water directly contacts

D. The waterproofing membrane must wrap completely over the top of the curb and down both sides (interior and exterior) — water that penetrates the tile and grout on the curb top can migrate to either side, and complete wrapping prevents water from reaching the wood framing from any direction

89. A carpenter is installing floating engineered hardwood flooring and discovers that the subfloor has a hump — a high spot that raises 6 mm over a 1.8-metre span. The flooring manufacturer specifies that the subfloor must be flat within 3 mm per 1.8 metres. What must the carpenter do before installing the flooring?

A. Sand or plane down the high spot until the subfloor meets the flatness tolerance of 3 mm per 1.8 metres — installing the floating floor over the out-of-tolerance hump creates a rocking condition, gaps between planks, and clicking noises underfoot

B. Install a thicker underlayment pad over the hump that compresses to compensate for the height difference

C. Install the flooring over the hump and the weight of the furniture will flatten the flooring over time naturally

D. Add a second layer of underlayment over the entire floor to bring the general surface above the hump level

90. A carpenter is installing a built-in bookshelf and must ensure that the shelves are level when the unit is installed against a wall that is not perfectly plumb. The bookshelf unit is 2.4 metres tall and 1.2 metres wide. If the carpenter builds the unit square and plumb, and the wall behind it leans 8 mm over the 2.4-metre height, what condition results?

A. The bookshelf sits flat against the wall because the 8 mm lean is within the tolerance for built-in furniture

B. The top of the bookshelf contacts the wall while the bottom has an 8 mm gap (or vice versa) — the visible gap at the top or bottom must be concealed with scribe moulding or the back of the unit must be scribed to the wall

C. The bookshelf tips forward 8 mm at the top, creating a hazard that requires anchoring to the wall studs

D. The shelves tilt 8 mm from side to side because the wall lean translates to a horizontal shelf slope directly

91. A carpenter is renovating a house built in 1945 and encounters original plaster on wood lath walls. The homeowner wants to add electrical outlets to the room. The electrician asks the carpenter to cut openings in the plaster for the electrical boxes. What technique minimizes damage to the surrounding plaster when cutting box openings?

A. Use a reciprocating saw to cut the opening quickly before the vibration can damage the surrounding plaster

B. Score the plaster along the outline with a utility knife first, then carefully cut the opening using an oscillating multi-tool with a plunge-cut blade — scoring prevents cracks from propagating beyond the cut line, and the multi-tool's oscillation minimizes vibration that loosens the surrounding plaster from the lath

C. Break the plaster with a hammer and chisel along the outline because plaster cuts are not possible cleanly

D. Remove the entire plaster panel from floor to ceiling and replace it with drywall for the electrical installation

92. During a renovation, a carpenter discovers that the existing floor joists in a bedroom are 38 × 184 mm (2 × 8) spanning 3.6 metres at 400 mm on centre. The homeowner wants to install a heavy slate tile floor (approximately 40 kg/m²) in this room. The carpenter is concerned about the joist capacity. Why is this concern valid?

A. Slate tile weighs the same as carpet and the existing joists are automatically adequate for the new flooring

B. The existing joists have adequate capacity for any residential floor covering because all floor coverings weigh

C. The floor only needs additional support at the doorway threshold where the tile transition strip is installed

D. Slate tile at 40 kg/m² adds significant dead load to the floor system — the existing 2×8 joists at 3.6 metres may already be near their capacity under standard loading, and the additional tile weight may exceed the allowable design load; a structural evaluation is needed before installation

93. A carpenter is renovating a kitchen and must relocate a load-bearing wall 600 mm to widen the kitchen. The carpenter must install a temporary support wall, remove the existing bearing wall, install a new beam, and frame the new wall at the relocated position. What is the correct sequence for this work?

A. Install the temporary support wall first (to carry the loads above while the bearing wall is removed), then remove the existing wall, install the new beam and posts, and finally frame the new wall at the relocated position — the temporary wall is removed only after the new beam is carrying the loads

B. Remove the existing wall first because the floor above will temporarily span the opening without support

C. Install the new wall at the relocated position first, then remove the old wall because the new wall takes over

D. Install the beam first by cutting through the existing wall to insert it without removing the wall entirely

94. A carpenter is converting an attic into living space and must install knee walls along the sloped ceiling to create usable wall height. The knee wall is typically 1.2 to 1.5 metres tall, framed perpendicular to the ceiling joists (which are also the attic floor joists). What insulation detail is critical behind the knee wall?

A. No insulation is needed behind the knee wall because the ceiling insulation above provides all thermal value

B. The short attic space behind the knee wall contains no conditioned air and does not require any insulation

C. Batt insulation installed between the rafters above the knee wall, combined with proper ventilation baffles at the eave, ensures that the insulated building envelope is continuous from the first-floor ceiling through the knee wall and up the sloped ceiling to the ridge

D. Rigid foam insulation glued to the back face of the knee wall provides the only thermal barrier needed

95. A renovation involves replacing an old wood-frame window with a new vinyl window. The old window was 1,200 × 900 mm (width × height). The new vinyl window is 1,150 × 850 mm — slightly smaller. The existing rough opening is 1,230 × 930 mm. Can the carpenter install the smaller window in the existing rough opening?

A. No, the rough opening must be reduced to match the new window's recommended rough opening exactly

B. Yes — the existing rough opening is slightly larger than needed, but the extra space can be shimmed and insulated; the carpenter must verify that the shimming space is not excessive (typically up to 25 mm on each side is acceptable) and that the window is properly supported and sealed

C. No, because any gap larger than 6 mm between the window and the rough opening cannot be shimmed

D. Yes, but only if the existing rough opening is enlarged further to provide even spacing around the window

96. A carpenter discovers during a renovation that the existing house has no vapour barrier in the exterior walls. The walls have batt insulation between the studs but no polyethylene on the interior side. The carpenter is finishing the interior with new drywall. Should the carpenter install a polyethylene vapour barrier before the new drywall?

A. No vapour barrier is ever needed in renovations because it is only required by code for new construction

B. Only the bathroom and kitchen walls need a vapour barrier because these rooms generate the most moisture

C. A vapour barrier must be installed on every wall regardless of climate zone or wall assembly analysis

D. The decision depends on the climate zone and wall assembly — in cold climates, a polyethylene vapour barrier on the warm side of the insulation prevents moisture migration into the wall cavity; however, the carpenter should consult the building code and possibly a building envelope specialist because adding a vapour barrier to some assemblies can trap moisture

97. A carpenter is renovating a bathroom and must install a new subfloor for a tile floor. The existing subfloor is 15.9 mm (5/8 inch) plywood on joists at 400 mm on centre. The tile installation requires a minimum subfloor thickness of 28 mm for adequate stiffness. What should the carpenter install?

A. An additional layer of 12 mm plywood screwed and glued over the existing subfloor to achieve a combined thickness of approximately 28 mm, providing the required stiffness for the tile installation

B. Remove the existing subfloor and install a single 28 mm thick plywood panel for a monolithic substrate

C. Install 12 mm cement backer board directly over the existing 15.9 mm plywood to achieve the total thickness

D. Install the tile directly on the existing 15.9 mm plywood because modern thinset adhesives compensate

98. A carpenter is performing an energy retrofit and must install rigid foam insulation on the interior of a concrete basement wall. The foam is 50 mm thick extruded polystyrene (XPS). After installing the foam, the carpenter must install a thermal barrier (fire protection) over the exposed foam face. What material satisfies this requirement?

A. A coat of intumescent paint applied directly to the foam surface that expands when exposed to fire heat

B. Standard 6 mil polyethylene sheeting stapled over the foam face for combined vapour and fire protection

C. 12.7 mm (1/2 inch) drywall installed over the foam face — drywall provides the required thermal barrier (15-minute fire protection) that prevents the foam from igniting during a fire event in the basement

D. A second layer of rigid foam installed over the first provides double the fire resistance at the wall surface

99. A renovation project involves converting a single large room into two smaller rooms by installing a new partition wall with a door. The homeowner wants the wall to provide good sound isolation between the two rooms. What framing and insulation technique provides the best sound isolation in a standard partition wall?

A. A single row of 2×4 studs at 400 mm on centre with fibreglass insulation and standard drywall on each side

B. A staggered-stud wall with 2×4 studs alternating on a 2×6 bottom and top plate, with fibreglass insulation filling the full cavity — the staggered studs break the structural connection between the two drywall surfaces, dramatically reducing sound transmission

C. A single row of 2×6 studs with dense-pack cellulose insulation for maximum sound absorption in the cavity

D. A double layer of drywall on each side of a standard 2×4 wall without any cavity insulation for isolation

100. A carpenter completes a major renovation and the homeowner asks about the warranty for the carpentry work. What is the standard practice regarding warranty for renovation carpentry?

A. No warranty exists for renovation work because the carpenter cannot guarantee the existing structure

B. The material manufacturer warranties cover all defects and the carpenter provides no additional warranty

C. A 5-year warranty is required by law for all renovation work in every Canadian province without exception

D. The carpenter typically provides a one-year workmanship warranty that covers defects in the carpentry installation — this is separate from manufacturer warranties on materials, and the warranty terms should be documented in the construction contract

Practice Exam 17: Answer Key and Explanations

1. B — Bi-metal demolition blades have hardened high-speed steel teeth welded to a flexible alloy steel body. The hardened teeth cut through both wood and embedded nails without stalling, catching, or losing teeth. Standard wood blades lack the tooth hardness to cut metal and grab on nails, causing violent bucking.

2. D — Heat exhaustion requires immediate cooling and rehydration. The worker must be moved to a cool, shaded area, laid down with legs elevated to improve circulation, clothing loosened, cool wet cloths applied, and small sips of water given if conscious. If symptoms worsen to confusion or loss of consciousness, this indicates heat stroke requiring emergency medical services.

3. A — Canadian highway traffic regulations require a red or orange flag (minimum 300 × 300 mm) on any load extending more than 1.2 metres past the rear of the vehicle during daytime. The flag makes the protruding load visible to following drivers. At night, a red light or red reflector is required in addition to the flag.

4. C — A GFCI that trips immediately when a tool is connected indicates current is leaking from the hot conductor to ground — a ground fault. The fault may be in the tool's cord (damaged insulation), plug (wet connection), or motor (internal short). The GFCI is functioning correctly by detecting this leakage and cutting power.

5. B — The adjustable exhaust deflector redirects the compressed air and oil mist away from the carpenter's breathing zone. Inhaling aerosolized pneumatic tool oil causes respiratory irritation and can contribute to lipoid pneumonia with chronic exposure. If the nailer has no adjustable deflector, the carpenter must reposition their work angle.

6. D — A solid overhead protection canopy (sidewalk shed or fan scaffold) intercepts falling tools, materials, and debris before they reach pedestrians below. Warning signs alone do not prevent injuries

— a physical barrier is required when scaffolds are erected over public walkways. The canopy must support the impact of foreseeable falling objects.

7. A — Blade wobble is most commonly caused by a loose arbour nut, a missing or damaged arbour washer, or a bent blade body. The carpenter must stop immediately, disconnect power, and inspect all blade mounting components. Operating with a wobbling blade increases kickback risk, produces poor cuts, and can cause the blade to break.

8. C — Welding in a confined space consumes oxygen from the limited air volume and produces toxic fumes including nitrogen dioxide, ozone, carbon monoxide, and metal fumes from the electrode and base material. These contaminants accumulate rapidly in poorly ventilated spaces. Forced-air ventilation and atmospheric monitoring are required.

9. B — Standard safety glasses have gaps at the top between the lens and the brow that allow sawdust to fall behind the lenses during overhead work. Full-seal safety goggles eliminate these gaps, preventing debris from entering from any direction. Overhead cutting, drilling, and nailing generate falling particles that standard glasses cannot block.

10. D — A burn mark and hot breaker indicate a high-resistance connection — typically a loose or corroded wire terminal that generates heat under current flow. This is a serious fire hazard that can ignite the panel enclosure or adjacent wiring. The panel must be de-energized and repaired by a licensed electrician before re-use.

11. A — If the blade guard does not return to the fully lowered position after a cut, the spinning blade remains exposed above the table surface. Any contact — reaching to remove the workpiece, adjusting the fence, cleaning the table — can result in severe laceration. The guard mechanism must be repaired before the saw is used.

12. C — Lumber thrown from a rooftop accelerates under gravity and can bounce, deflect, or shatter on impact. Even in a "clear" area, bouncing debris can travel well beyond the intended landing zone and strike workers, pedestrians, or equipment. Material must be lowered by rope, chute, or enclosed debris container.

13. D — Closely spaced contour lines indicate steep terrain where the elevation changes rapidly over a short horizontal distance. Widely spaced contour lines indicate flat or gently sloping terrain where the elevation changes gradually. This visual relationship is fundamental to reading topographic site plans.

14. B — Total rise = 99.550 − 96.750 = 2,800 mm. Testing 16 risers: 2,800 ÷ 16 = 175.0 mm per riser. This falls exactly at the minimum of the 175–200 mm acceptable range. Testing 15 risers: 2,800 ÷ 15 = 186.7 mm (also acceptable). The carpenter selects the option that provides the most comfortable riser height.

15. A — A door opening interrupts the sill plate on each side. The Building Code requires anchor bolts within 300 mm of each plate termination, including each side of every opening. Two additional bolts — one on each side of the door — anchor the short plate sections that terminate at the opening edges.

16. C — A section cut symbol uses an arrow to show the viewing direction, a number in the circle to identify the section detail, and a number below the circle to indicate the drawing sheet where the section is found. This cross-referencing system allows the carpenter to quickly locate the detailed section view.

17. D — Compacted volume = 15.0 × 10.0 × 0.15 = 22.5 m³. Gravel compacts approximately 25% during mechanical compaction, so the loose volume must be 25% more: 22.5 × 1.25 = 28.13 m³. Ordering only the compacted volume results in a pad that is 150 mm × 0.75 = 112.5 mm deep — 37.5 mm short.

18. A — An 8 mm variation over 6 metres between the chalk line and the exterior wall indicates that the exterior wall is bowed or not straight. The carpenter must decide whether to maintain the partition perfectly straight (creating a varying gap from the exterior wall) or adjust the partition to follow the exterior wall's contour.

19. C — The L-shaped ceiling is calculated as two rectangles: main section (5.0 × 4.0 = 20.0 m²) plus extension (3.0 × 2.0 = 6.0 m²) = 26.0 m² total. Breaking irregular shapes into simple rectangles is the standard method for area calculations on material takeoffs.

20. B — "NTS" means "Not To Scale" — the drawing does not accurately represent the proportional dimensions of the building. The carpenter must read all dimensions from the noted values on the drawing rather than measuring the drawing with a scale ruler to determine sizes.

21. C — Batter boards are set outside the building footprint so they remain undisturbed during all phases of site work — excavation, forming, concrete placement, and backfilling. The string lines stretched between batter boards can be removed during construction and re-strung at any time to verify building corner locations.

22. A — The carpenter sights through the transit telescope and directs the stake holder to move left or right until the stake is precisely on the crosshair. Once the transit is locked on the line between the two end points, any intermediate point on the crosshair falls on the same straight line with millimetre precision.

23. D — Non-bearing partition walls require only two plates: one bottom plate and one top plate (no double top plate). Total plate material = perimeter × 2 = 48 × 2 = 96 linear metres. The double top plate is required only on bearing walls to provide continuous horizontal tie across plate joints.

24. B — "R.A." stands for "Return Air" — the duct carries conditioned air from the rooms back to the HVAC unit for filtering, reconditioning, and recirculation. The carpenter must know the duct type and routing to frame wall cavities, soffits, and floor openings that accommodate the ductwork without cutting structural members.

25. C — Footing volume = $\pi \times 0.6^2 \times 0.3 = 3.14 \times 0.36 \times 0.3 = 0.339$ m³. Column volume = $\pi \times 0.2^2 \times 3.0 = 3.14 \times 0.04 \times 3.0 = 0.377$ m³. Combined = 0.339 + 0.377 = 0.716 m³. Always use the radius (not the diameter) in the area calculation to avoid quadrupling the result.

26. A — At 2.4 m horizontal from the bottom, the rise = 2.4 × (7/12) = 1.4 m. The stair surface at that point is 1.4 m above the lower floor. Headroom = floor-to-floor height − rise = 2.7 − 1.4 = 1.3 m. This is far below the 1.95 m minimum, indicating the floor opening must extend further back to provide adequate headroom.

27. D — Using the formula: P = 7.2 + (785 × 1.5) / (17.8 + 20) = 7.2 + 1177.5 / 37.8 = 7.2 + 31.1 = 38.3 kPa. This calculated pressure determines the maximum form tie spacing and waler design. At the bottom of the form, the ties must be closer together to resist this pressure without the panels deflecting.

28. B — The delivery ticket must confirm the correct mix design (specified strength), slump range, air content, and batching time. The strength must match the specification, the slump must be within the specified range for workability, the air content must provide freeze-thaw resistance, and the batching time must not exceed the maximum delivery time.

29. C — Sawcutting must occur between approximately 4 and 12 hours after placement — early enough that uncontrolled random cracking has not yet begun, but late enough that the concrete supports the saw weight without ravelling (pulling aggregate from the cut edges). This window is critical and varies with temperature and mix.

30. A — A cement-based grout (portland cement, fine sand, and water, or a proprietary patching compound) is rubbed into the wall surface with a rubber float. The grout fills the bug holes without discolouring the surrounding concrete because it is made from the same basic materials. The grout is applied wet and excess is wiped off.

31. D — The water-cement ratio (w/c) is the weight of water divided by the weight of cement. A w/c of 0.45 means each kilogram of cement is mixed with 0.45 kg of water. This ratio is the single most important factor controlling concrete strength and durability — lower ratios produce stronger, less permeable concrete.

32. B — Liquid concrete is denser than wood (concrete = 2,400 kg/m³ vs. wood = ~500 kg/m³). When the concrete level reaches the bottom of a wooden buck, the concrete exerts buoyant force that pushes the lighter wood upward — the same principle that makes a cork float. The buck must be braced down to resist this force.

33. D — Frozen subgrade at −5°C extracts heat rapidly from the bottom of the fresh concrete slab. The lower portion of the slab can freeze before adequate hydration occurs, permanently weakening the concrete at the bottom where compressive stresses from the subgrade are concentrated. The subgrade must be thawed before placement.

34. C — Adjustable shores allow the carpenter to set the beam soffit elevation to millimetre precision. The soffit position determines the finished beam bottom elevation, which affects ceiling clearance, floor levels, and alignment with adjacent structural elements. Fixed-height shores cannot provide this level of adjustment.

35. D — A workable concrete mix flows back into the void left by the withdrawn vibrator, closing the hole. A stiff (low-slump) mix lacks the fluidity to flow back and the hole remains open. This indicates the mix may need adjustment, or the carpenter must work the surface with a float to close the holes.

36. B — A drainage composite (dimpled membrane) or free-draining gravel creates a vertical drainage path along the back of the retaining wall. Groundwater flows downward through this drainage layer to the perforated footing drain rather than building hydrostatic pressure against the wall — hydrostatic pressure causes wall failures.

37. A — Excess curing compound forms a thick membrane that may interfere with the adhesion of floor coverings, coatings, sealers, or toppings applied later. The thick compound layer must be mechanically

removed (by grinding or shot-blasting) before adhesive-applied finishes can bond to the concrete surface.

38. C — A slab at 75 mm instead of the specified 100 mm has 25% less thickness than required. This dramatically reduces the slab's load-bearing capacity and increases deflection under load. Additional concrete must be added at the thin areas immediately — before the surrounding concrete begins to set — to achieve the specified minimum thickness.

39. D — Sonotube column forms must be braced laterally at multiple points along their height to prevent wind, worker contact, or concrete placement forces from displacing them. The base must be anchored to the footing to resist the buoyant uplift force from the wet concrete. An unbraced tube can shift during the pour, producing a crooked column.

40. B — The slow wheelbarrow placement rate allows the lower concrete to begin stiffening before the upper concrete is placed. If the vibrator cannot penetrate into the stiffened lower layer, a cold joint forms — a horizontal weak plane with reduced bond, reduced shear capacity, and potential for water leakage.

41. D — Type HS cement is formulated for "High Sulphate resistance." Sulphates in soil and groundwater react with standard portland cement compounds, causing the concrete to expand, crack, and deteriorate over time. Type HS cement contains reduced tricalcium aluminate content that resists this sulphate attack.

42. B — The stair-to-landing intersection requires the sloped stair soffit form to meet the level landing soffit form at a precise angle. The two surfaces meet at different slopes, and the shoring beneath must support both the angled stair weight and the flat landing weight simultaneously. This three-dimensional forming is the most complex aspect.

43. C — The valley rafter run equals the common rafter run of the intersecting roof multiplied by 1.414 ($\sqrt{2}$) for a standard 90-degree intersection. This is the same geometric relationship as the hip rafter — the valley runs diagonally in plan view. The rafter length is then calculated using the valley unit line length for the specific pitch.

44. A — Squash blocks (web stiffeners) are required wherever concentrated point loads from above — bearing walls, posts, columns, or beams — transfer through the floor system. The concentrated load would buckle the thin I-joist web without the stiffeners distributing the force between the top and bottom flanges.

45. D — A shear wall panel that is too narrow relative to its height tends to overturn rather than resist lateral forces in shear. The typical maximum aspect ratio is 2:1 to 3.5:1 depending on the code. Beyond this ratio, the hold-down forces become impractical and the wall's shear capacity is significantly reduced.

46. B — All combustible framing must maintain at least 50 mm clearance from masonry fireboxes and chimneys. This gap must remain clear — no insulation, no debris — to prevent heat conducted through the masonry from raising the adjacent wood temperature to its ignition point. Headers and trimmers around the firebox opening must respect this clearance.

47. C — A beam's moment of inertia (stiffness) increases with the cube of its depth. Even a small reduction in depth dramatically reduces both the bending capacity and the stiffness. A beam that is 10% shallower has approximately 27% less stiffness, which means significantly more deflection under the same load.

48. A — The lateral force at the top of the 1,070 mm post creates a moment (turning force) at the base connection. The lever arm multiplies the applied force — the moment equals the force times the 1,070 mm arm length. This moment creates a prying action that tries to pull the upper bolts out and push the lower bolts into the rim joist.

49. D — Common difference = stud spacing × pitch ratio = 400 × (6/12) = 400 × 0.5 = 200 mm. Each successive gable stud is 200 mm shorter than the one before it. This constant difference allows the carpenter to calculate all gable stud lengths by subtracting 200 mm from each previous stud.

50. B — Compression members tend to buckle laterally under load — the member bows sideways at its weakest axis. Tension members do not buckle because the tensile force straightens rather than bows the member. Compression webs in floor trusses must be laterally braced at the spacing specified by the truss manufacturer.

51. C — Floor beam deflection is limited to L/360 of the span by the Building Code. For a 4-metre beam: 4,000 ÷ 360 = 11.1 mm maximum deflection. The 8 mm deflection is acceptable for this span. However, for a 2.5-metre beam: 2,500 ÷ 360 = 6.9 mm maximum, and 8 mm would exceed the limit.

52. A — A 75 × 250 mm notch in a 38 × 89 mm bottom plate removes more than the plate width. For a non-bearing partition, the plate can be interrupted, but a metal tie plate (nail plate) must be installed on

each side of the notch to maintain the plate's lateral continuity for transferring shear and connection forces.

53. D — The backing angle for a hip rafter is a bevel cut along both top edges so the two adjacent roof planes meet smoothly. Without backing, the hip rafter's square top edge protrudes above the adjacent sheathing planes, creating a ridge that the sheathing cannot lie flat against. The bevel angle depends on the roof pitch.

54. B — The cantilevered joist backspan tends to lift under load (the cantilever acts as a lever with the fulcrum at the wall). The backspan end must be connected to the floor structure above with blocking and structural fasteners that resist this uplift. Without positive hold-down, the backspan end lifts and the cantilever drops.

55. C — Standard nail penetration = nail length − sheathing thickness = 63 − 11 = 52 mm into the stud. This exceeds the minimum required penetration for structural sheathing connections. The actual penetration into the stud determines the nail's shear capacity in the shear wall.

56. A — Deck boards installed without gaps trap water between boards, accelerating decay at the board edges where moisture persists longest. Additionally, when the boards absorb moisture, they expand. Without gaps to accommodate this expansion, the swelling boards push against each other, causing cupping, buckling, and fastener failure.

57. A — In balloon framing, the wall studs run continuously from the foundation sill plate to the roof plate without any intermediate floor platform. This creates unobstructed vertical cavities from the basement to the attic that act as chimneys during a fire, allowing rapid flame spread through the building. Fire stops must be installed at every floor level.

58. B — With only 64 mm of bearing instead of the required 89 mm, the truss reaction force is concentrated on a smaller area. The wood plate fibres may crush under this concentrated load, allowing the truss to settle progressively. This creates a dip in the floor and can initiate failure at adjacent connections.

59. A — On a standard hip roof with a 90-degree plan angle, the hip line bisects the corner at 45 degrees. The sheathing panels on each side of the hip meet at this 45-degree line. Each panel is cut at 45 degrees from the eave line to fit tightly against the hip.

60. C — Nails driven into a split stud cannot develop their full shear and withdrawal capacity because the nail does not engage intact wood fibres on both sides of the shank. The split allows the nail to displace without resistance. The stud must be replaced or sistered with a sound member before the shear panel is nailed.

61. B — A Z-flashing above the horizontal trim board intercepts water flowing down the wall from above. The upper leg tucks behind the upper wall siding and housewrap, and the lower leg extends over the top of the trim board. Water is directed outward at the trim rather than flowing behind it into the wall cavity.

62. D — Vinyl siding panels overlap at least 25 mm at lap joints. The overlapping end faces away from the prevailing wind to prevent wind from catching the exposed edge. The upper (overlapping) panel is nailed normally, while the underlying panel slides freely as it expands and contracts beneath the overlap.

63. A — The gap between the fibre cement siding and the electrical box is sealed with paintable exterior caulking applied before the outlet cover plate is installed. This ensures a continuous seal around the full perimeter of the penetration. The cover plate provides additional weather protection over the caulked joint.

64. C — The four nails are placed in a line just above the cutout slots, approximately 25 mm above the self-seal adhesive strip. At this height, each nail passes through the current shingle and the top edge of the shingle in the course below (the overlap zone), securing both shingles simultaneously. This is the manufacturer's specified nailing line.

65. B — Uneven weatherstrip compression indicates the strike-side jamb is not uniformly positioned relative to the door slab. Adding shims at the lower portion of the strike jamb pushes it closer to the door, compressing the weatherstrip evenly from top to bottom for a complete perimeter seal.

66. B — The typical ventilation slot is approximately 25 mm (1 inch) on each side of the ridge, though manufacturers may specify different widths. The total opening is approximately 50 mm wide. This slot allows warm, moist air from the attic to exit through the ridge vent, which is installed over the slot and covered with ridge cap shingles.

67. A — End grain absorbs moisture 10 to 15 times faster than face grain because the open wood cell ends act as tiny straws that wick water into the wood interior. A coat of exterior primer or water-

repellent preservative applied to every cut end seals these open cells and prevents the concentrated moisture uptake that initiates rot.

68. C — Adequate attic ventilation — balanced soffit intake and ridge exhaust — keeps the attic air temperature and moisture level low enough to prevent condensation on cold surfaces including exposed nail shanks. Without ventilation, warm moist air from below condenses on every cold surface in the attic.

69. A — In a rain screen wall, water drains vertically down the drainage cavity behind the cladding. At the window head, the drip cap upper leg must intercept this cavity drainage and redirect it outward — preventing cavity water from flowing behind the window frame. The drip cap bridges the drainage cavity at the window head.

70. D — An unsupported threshold flexes at the void location each time someone steps on it. This repeated flexing compresses and releases the door bottom seal cyclically, eventually cracking the seal material and breaking the adhesive bond. The resulting gap allows water, air, and insects to penetrate beneath the door.

71. A — Without kick-out flashings, all the water accumulated along the step flashing run — from every course of shingles above — concentrates at the base and pours directly behind the wall cladding. This concentrated water flow causes concealed rot, mould, and structural damage that may go undetected for years until the wall fails.

72. C — PVC expands approximately 1.5 mm per metre over a 50°C temperature range. For a 2.4-metre piece, the expansion is approximately 3.6 mm. A gap of 1.5 to 3 mm at each end accommodates this movement. Without gaps, the expanding PVC pushes against the adjacent trim and buckles outward from the wall.

73. B — The snap-lock punch creates raised tabs on the cut upper edge. These tabs lock into the utility trim (undersill trim) channel, providing a mechanical grip that holds the ripped panel securely without visible face nails. This is the standard vinyl siding technique for all final ripped courses at soffits and window sills.

74. D — For triple coverage with 400 mm shingles, the maximum exposure is approximately 133 mm (one-third of the shingle length). At this exposure, every point on the wall is covered by three complete

shingle layers — the visible course, the course behind it, and the course behind that — providing maximum weather protection.

75. A — The two standard residential lock backsets are 60 mm (2-3/8 inches) and 70 mm (2-3/4 inches). The carpenter must verify which backset matches the pre-bored hole in the door slab before purchasing the lockset. Installing a lock with the wrong backset positions the bolt incorrectly relative to the strike plate.

76. A — At the rake (gable edge), the drip edge is installed over the underlayment — the opposite of the eave sequence. At the eave, the drip edge goes under the underlayment. This difference ensures that water running down the underlayment flows over the rake drip edge and off the roof edge.

77. B — Material should be removed from the lock (strike) edge because trimming the hinge edge changes the hinge barrel position relative to the jamb, potentially affecting the swing geometry and creating hinge bind. The lock edge can be planed without affecting the hinge alignment or door operation.

78. D — A split-ring escutcheon plate (pipe collar) is a two-piece decorative ring that snaps around the pipe and sits on the floor surface, covering the expansion gap. The two-piece design allows installation around the existing pipe, and the floor expands freely beneath the collar without constraint.

79. A — A graspable handrail must have a circular cross-section between 32 mm and 43 mm outside diameter (or equivalent graspable shape) that allows the user's fingers to wrap fully around the rail. This grip prevents the hand from sliding off the rail during a loss of balance — a critical safety dimension.

80. C — Standard 12.7 mm (1/2 inch) drywall sags under its own weight on ceilings when the joist spacing exceeds approximately 400 mm. At 600 mm spacing, 15.9 mm (5/8 inch) drywall is required for ceilings because its greater thickness and weight resistance prevents sagging between joists.

81. A — The standard closet rod height is 1,525 to 1,675 mm (60 to 66 inches) above the finished floor for a single-hang closet. End brackets must be screwed into wall studs or solid blocking. For spans exceeding 1.2 metres, a centre support bracket prevents sagging under the weight of heavy winter clothing.

82. C — Vinyl cove base is pre-heated with a heat gun at the outside corner location. The heat softens the rigid vinyl, allowing it to bend smoothly around the corner without cracking or kinking. When the vinyl cools, it retains the curved shape permanently. Heating is the only way to achieve a seamless outside corner.

83. A — A properly installed door swings freely without binding and remains stationary at any position when released. If the door swings open or closed on its own, the hinge-side jamb is not plumb — gravity acts on the door through the tilted hinge axis, pulling it in one direction.

84. D — Colour-matched seam filler or silicone is applied to both mitre faces before the draw bolts are tightened. When the bolts pull the joint tight, the sealer fills micro-gaps and prevents moisture from penetrating the exposed particleboard core. Moisture in the core causes swelling, delamination, and joint failure.

85. B — The flooring boards are cut to fit around the vent opening. The register grille sits on top of the installed flooring and overlaps the cut edges by 10 to 15 mm on each side, concealing the raw cuts. The grille frame provides the finished edge at the opening.

86. C — Alkali-resistant cement board screws have a corrosion-resistant coating and serrated heads designed to countersink into the hard cement board without cracking it. Standard drywall screws cannot penetrate or seat properly in cement board, and their corrosion resistance is inadequate for the alkaline wet environment.

87. B — The plinth block creates a visual transition where three trim pieces converge — the door casing, the baseboard, and the plinth itself. The thicker, wider block provides a substantial base that the thinner casing sits on top of, and the baseboard butts against the side of the block, eliminating the complex three-way joint.

88. D — The waterproofing membrane must wrap completely over the curb top and down both sides. Water penetrating the tile and grout on any curb surface can migrate in any direction through the wood. Complete wrapping prevents water from reaching the framing from the shower side, the top, or the bathroom side.

89. A — A 6 mm hump over 1.8 metres exceeds the 3 mm per 1.8 metre tolerance by double. The high spot must be sanded or planed down to within tolerance. Installing floating flooring over an out-of-

tolerance hump creates a rocking condition that opens joints between planks and produces clicking sounds underfoot.

90. C — If the bookshelf is built plumb and the wall leans 8 mm, the top of the bookshelf tips forward 8 mm away from the wall at the top. This forward lean creates a tipping hazard — especially with a tall, heavy bookshelf loaded with books. The unit must be scribed to the wall or anchored to the wall studs for safety.

91. B — Scoring the plaster along the outline with a utility knife first creates a clean break line that prevents cracks from propagating beyond the intended opening. The oscillating multi-tool's gentle oscillation minimizes the vibration that loosens surrounding plaster from the wood lath — reciprocating saws produce too much vibration.

92. D — Slate tile at 40 kg/m² adds significant dead load to the existing floor system. The 2×8 joists at 3.6 metres may already be near their allowable capacity under standard residential loading. Adding the slate weight could exceed the joist design load, causing excessive deflection or structural failure. An engineering evaluation is required.

93. A — The temporary support wall must be installed first to carry the loads above the bearing wall before anything is removed. With the loads safely transferred to the temporary wall, the existing bearing wall is removed, the new beam and posts are installed, and the new wall is framed. The temporary wall is removed only after the new beam is carrying the loads.

94. C — The insulated building envelope must be continuous from the first-floor walls, through the knee wall, and up the sloped ceiling to the ridge. Batt insulation between the rafters above the knee wall, combined with ventilation baffles at the eave, completes this thermal envelope. The unheated space behind the knee wall is essentially an exterior zone.

95. B — The existing rough opening (1,230 × 930 mm) is only 40 mm wider and 40 mm taller than the new window (1,150 × 850 mm), leaving approximately 20 mm on each side for shimming. This is within the acceptable shimming range (up to approximately 25 mm per side). The carpenter shims, insulates, and seals the window normally.

96. D — The need for a vapour barrier depends on the climate zone, the existing wall assembly, and the building science of the specific wall configuration. In cold climates, a polyethylene vapour barrier on the

warm side prevents moisture migration. However, in some assemblies, adding a vapour barrier can trap moisture. The carpenter should consult the code and consider professional guidance.

97. A — An additional layer of 12 mm plywood screwed and glued over the existing 15.9 mm subfloor produces a combined thickness of approximately 28 mm. The adhesive and screws create composite action between the two layers, providing the stiffness required for tile installation. This is more practical than removing the existing subfloor.

98. C — Exposed rigid foam insulation requires a thermal barrier to prevent ignition during a building fire. Standard 12.7 mm (1/2 inch) drywall provides the required 15-minute thermal barrier by shielding the foam from direct flame exposure long enough for occupant evacuation.

99. B — A staggered-stud wall breaks the direct structural connection between the two drywall surfaces. Sound vibrations that reach the drywall on one side must travel through the flexible insulation (rather than directly through rigid studs) to reach the opposite drywall. This dramatically reduces sound transmission compared to standard stud walls.

100. D — The standard workmanship warranty for renovation carpentry is typically one year. This covers defects in the carpenter's installation — nail pops, joint separations, drywall cracks from settling, and similar workmanship issues. Material warranties from manufacturers are separate and typically longer. All warranty terms should be documented in the construction contract.