

PRACTICE EXAM 6

NCCCO Core Written Exam Simulation — 90 Questions

Time Allowed: 90 Minutes | Format: Multiple Choice | Passing Score: 70% (Scaled)

Answer all 90 questions. Do not leave any question blank. Record your answers on a separate sheet before checking the answer key.

DOMAIN 1: SITE WORK

Questions 1–18

1. Which of the following statements about the controlling entity's ground condition obligations under OSHA 1926.1402 is CORRECT?

- A. The controlling entity must certify in writing that the ground is safe for crane operations before any setup begins
 - B. Ground condition disclosure is only required when the crane's rated capacity exceeds 50 tons
 - C. The controlling entity must provide the crane operator and equipment owner with all available information about the ground conditions — including known or suspected subsurface conditions, the location of underground utilities, and the proximity of structures — before crane setup
 - D. The controlling entity is only required to disclose utility locations — subsurface soil conditions are the crane owner's responsibility to investigate
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2. A crane is being set up near a building that was demolished six months ago. The foundation and basement slab were removed, and the excavation was backfilled. The surface appears level and solid. What is the specific bearing capacity concern with this setup location?

- A. Demolition backfill placed without engineered compaction does not achieve the natural consolidation of undisturbed soil — the backfilled area may have significantly lower bearing capacity than the surrounding undisturbed ground, and no visual surface assessment can confirm the actual subsurface condition
- B. Demolition sites require a hazmat assessment before crane setup due to potential contamination in the fill material

C. The backfill may contain remnant foundation concrete that creates uneven load distribution under outrigger pads

D. Basement excavation backfills are prohibited crane setup locations under OSHA 1926 Subpart CC until two years of natural settlement have elapsed

3. An operator is asked to set up a crawler crane directly on a native soil surface. The lift director states that a soil investigation confirmed 2,500 psf bearing capacity at this location. The manufacturer requires 3,000 psf for the planned configuration. What is the correct approach?

A. Proceed — the 2,500 psf confirmed reading is adequate for lifts below 75% of rated capacity, which is what the plan calls for

B. Use the outrigger chart section, which has lower bearing pressure requirements than the crawler chart

C. Have the geotechnical engineer confirm whether ground improvement or additional matting can bring the effective bearing pressure within the required threshold — proceeding on ground that cannot support the required bearing pressure is not acceptable

D. Reduce all lifts to the percentage that brings the required bearing pressure within the confirmed 2,500 psf capacity

4. Under OSHA 1926 Subpart CC, who is specifically authorized to make the determination that ground conditions are adequate for crane setup when no formal soil investigation data is available?

A. The crane operator, based on professional judgment and experience

B. A qualified person who evaluates the available information and applies engineering principles — verbal assurance from the site superintendent alone is not sufficient

C. The lift director, who bears overall safety responsibility for the lift

D. The crane manufacturer's field representative, who is trained in setup requirements for that specific crane model

5. A utility locate marks a buried 8-inch natural gas main running directly through the center of the planned crane setup area, 3 feet below grade. Which statement CORRECTLY describes the required action?

- A. The crane cannot be set up over an active natural gas main without engineering evaluation of the pipe's structural capacity under the anticipated outrigger loads and confirmation of protective measures — a gas main rupture under crane load could be catastrophic
 - B. A 3-foot depth is the minimum safe clearance for crane outrigger operations over any buried utility — setup may proceed with standard timber mat coverage
 - C. The utility company must be contacted to reduce line pressure before crane setup can proceed
 - D. The area must be tested for gas leaks before each shift to confirm the line is intact — if no leaks are detected the setup may proceed
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6. An operator arrives at a new job site and is directed to a setup area. The area has been freshly graded, the surface is compacted gravel, and the controlling entity provides a soil boring report from 60 feet away showing 3,500 psf capacity. What concern must be addressed before accepting this report as valid for the setup location?

- A. Soil reports expire after 6 months — if the boring report is older than 6 months it cannot be used regardless of proximity
 - B. The lift director must countersign the soil report before it can be used as the basis for crane setup
 - C. The boring location is 60 feet away — soil conditions can vary significantly across even short distances; the engineer who prepared the report must confirm whether the boring data is representative of the actual setup location before it can be used
 - D. A gravel surface always requires a separate surface bearing capacity test regardless of what the subsurface boring shows
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7. A crane is scheduled to work adjacent to a shoreline where previous high tides have saturated the upper soil layers. Which of the following BEST describes the risk this condition creates?

- A. Tidal saturation creates electrical grounding hazards that require the crane to be bonded to a ground rod before operations
- B. Shoreline soils saturated by tidal action may have very low effective bearing capacity due to high moisture content and wave-induced vibration — the near-zero cohesion and elevated pore pressure in the saturated zone can cause sudden bearing failure under crane loads
- C. Tidal saturation is only a concern if the crane will be operating at high tide — at low tide the surface can be assessed visually and used if it appears firm

D. Shoreline operations require a U.S. Army Corps of Engineers permit before any heavy equipment can operate within 50 feet of the high-water mark

8. Under OSHA 1926 Subpart CC, what is the minimum approach distance for energized power lines rated between 50 kV and 200 kV?

- A. 10 feet — the standard minimum for all energized lines below 300 kV
 - B. 15 feet — applicable to all lines between 50 kV and 250 kV
 - C. 20 feet — the standard for lines in the 50–200 kV range
 - D. The minimum approach distance increases at a rate of 4 inches per kV above 50 kV — for a 200 kV line this equals 10 feet + $(150 \times 0.4 \text{ inches}) = 15 \text{ feet}$ minimum; the OSHA table must be consulted for the specific voltage class
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9. A job site manager tells the crane operator that underground utilities in the crane area were located and marked last year and "nothing has changed." Is last year's utility locate acceptable for the current crane setup?

- A. No — utility locates reflect conditions at the time they are performed; underground infrastructure can change due to construction, repairs, and emergency work; a current locate must be performed before crane setup regardless of when the previous locate was done
 - B. Yes — utility locates remain valid for 24 months if no major construction has occurred in the area since the locate was performed
 - C. Yes — the site manager's representation constitutes the controlling entity's required disclosure under OSHA 1926.1402
 - D. The validity period of a utility locate depends on the utility type — gas and electric locates expire in 30 days, while telecommunications and water locates remain valid for 12 months
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10. During a site walk before crane setup, an operator notices the area near the planned rear outrigger location has vegetation that is significantly taller and lusher than the surrounding area. What does this pattern suggest?

- A. Lush vegetation is a positive indicator of high organic content in the soil, which improves its bearing capacity

B. Tall lush vegetation in a localized area can indicate a buried leaking utility, elevated subsurface moisture, or disturbed fill — any of these conditions suggests the soil at that location may differ from the surrounding area and requires investigation before outrigger placement

C. The vegetation indicates the area was previously irrigated and is otherwise unremarkable for crane setup purposes

D. OSHA requires vegetation to be cleared to a minimum 10-foot radius around each outrigger before crane setup

11. A crane is set up and begins operating when the site manager informs the operator that a water main break occurred 200 feet away two hours ago and was just repaired. What action must the operator consider?

A. No action is required — the water main break occurred 200 feet away and has been repaired; this does not affect the crane's operating area

B. Increase hydraulic pressure to the outriggers to compensate for any potential ground softening from water migration

C. Continue the current pick but request a site assessment after the load is set

D. Consider whether the water main break could have saturated soil within the crane's operating area through subsurface flow — if there is any possibility the repair area is within the influence zone of the outrigger loads, the setup must be evaluated before continuing

12. Which of the following scenarios represents a condition where the crane operator must STOP and request ground condition evaluation before proceeding?

A. The outrigger pad sinks 1/4 inch during initial load application but stabilizes immediately

B. One outrigger shows a gradual, continuous downward movement of 1/2 inch over 20 minutes with the load suspended — ongoing uncontrolled movement indicates active ground failure and the load must be landed before the failure progresses

C. The ground surface around one outrigger pad develops a small surface crack when the crane picks its first load of the day

D. The adjacent lane of traffic creates vibration that the operator can feel in the crane cab during crane travel

13. Under OSHA 1926 Subpart CC, when a crane is working near power lines and an encroachment occurs — a part of the crane contacts or enters the minimum approach distance — what is the FIRST action required?

- A. The operator must immediately shut down the engine to de-energize the crane through the engine ground
 - B. Ground personnel must move away from the crane as quickly as possible while the operator attempts to move the crane away from the line
 - C. The operator must stop and not move the crane — all personnel must stay away from the crane; the utility company must be contacted to de-energize the line before the crane is moved or any personnel approach; movement must be authorized by the utility
 - D. The lift director must be notified and must authorize the recovery procedure before any crane movement occurs
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14. A crane is set up on a large parking lot when a ground worker radios that they can feel the asphalt surface deflecting slightly underfoot when they walk near the front outrigger. No visible cracking has occurred. What does this finding indicate?

- A. Deflection of the asphalt surface underfoot near an outrigger indicates the asphalt is distributing the outrigger load into the sub-base, but the sub-base may be inadequate — the surface deflection is an early warning of potential sub-base failure; the operator must land any suspended load and have the condition evaluated before continuing
 - B. Slight surface deflection around heavily loaded outriggers is normal and expected — the asphalt is flexing rather than failing
 - C. The parking lot was designed for vehicle loads, not concentrated crane loads — the operator must reposition to a gravel or dirt surface before any further lifting
 - D. The deflection indicates the tire inflation is too high — deflate the crane's outrigger tires to increase the contact area and reduce point loading
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15. A crane is operating in an area where a geotechnical investigation identified loose sand from grade to 6 feet depth, underlain by dense gravel. The outrigger pads are sized for 2,500 psf. What specific concern does this soil profile create?

- A. Dense gravel underlain by loose sand is a common soil profile that provides adequate crane support without additional measures
 - B. The loose sand from grade to 6 feet is inadequate for outrigger support regardless of pad size — the pads must be sized to bring the bearing pressure within the loose sand's much lower capacity or the crane must use a different setup location
 - C. The dense gravel at 6 feet provides a bearing stratum but the loose sand's shear strength governs the effective surface bearing capacity; the engineer must confirm whether the pad size and any matting system is adequate for the loose sand layer specifically — the dense gravel at depth does not substitute for adequate shallow support
 - D. Sand layers require dewatering to a depth of 3 feet below grade before crane outrigger loads can be applied
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16. A power line crosses the job site at 40 feet elevation. The crane's maximum boom tip height in the planned configuration is 85 feet. The horizontal distance from the crane to the nearest line is 38 feet. The line is rated at 25 kV. Which of the following CORRECTLY describes whether this configuration presents a power line hazard?

- A. No hazard — the 38-foot horizontal distance exceeds the 10-foot minimum approach distance for a 25 kV line
 - B. A hazard exists — the 10-foot minimum approach distance applies in three dimensions; when the boom tip height exceeds the line elevation, the vertical and lateral components of the approach distance must both be maintained; at 85-foot boom tip height and 40-foot line height, the boom tip could be within 10 feet of the line in three-dimensional space even at 38 feet horizontal distance
 - C. No hazard — minimum approach distances apply only to horizontal measurement from the crane's center of rotation to the nearest line
 - D. The 25 kV voltage class requires only a 5-foot approach distance under OSHA's de minimis exemption for distribution-level voltages below 50 kV
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17. What is the OSHA 1926 Subpart CC requirement when a crane must work in an area where it is not possible to confirm that buried utilities have been located?

- A. The operator may proceed if the lift director assumes responsibility in writing for any underground utility damage
- B. The utility company must verify in writing that no buried utilities exist in the area before operations begin

C. The crane must not set up or operate in the area until utility location information has been obtained — operating without utility locate information exposes the operation to catastrophic ground and electrical hazards that cannot be managed without knowing what is underground

D. A ground-penetrating radar survey must be performed within 24 hours before each day's crane operations in areas with incomplete utility locate coverage

18. A crane operator is working on a site adjacent to a river bank. The bank is 12 feet high and the crane's rear outriggers are positioned 8 feet from the edge. The soil is sandy loam. What specific concern does this proximity create?

A. The riverbank proximity requires a U.S. Coast Guard notification before any crane operates within 25 feet of a navigable waterway

B. No specific concern — 8 feet of setback exceeds the 5-foot minimum required setback from any embankment edge

C. The 8-foot setback from a 12-foot-high sandy loam riverbank is potentially inadequate — outrigger loads at this proximity can increase shear stress in the bank beyond its stability limit, causing slope failure; the minimum setback should be evaluated by a geotechnical engineer based on the bank geometry and soil properties

D. The concern is limited to crane operation during high-water events — at normal water levels, proximity to riverbanks does not create additional bearing capacity concerns

DOMAIN 2: OPERATIONS

Questions 19–41

19. An operator is preparing for the day's first lift when the lift director states the pre-shift inspection was completed by the previous shift's operator. The previous shift ended 10 hours ago. What is required?

A. Accept the previous shift's inspection documentation — inspections remain valid for 12 hours between shifts

B. The current operator must perform their own pre-shift inspection before operating — the inspection is the current operator's responsibility and cannot be transferred; conditions could have changed in the 10 hours since the previous inspection

C. Verify with the previous operator by phone that no new deficiencies developed during shutdown before proceeding

D. Conduct a 5-minute abbreviated inspection covering only controls and emergency stop devices — the full inspection was already completed by the previous operator

20. An operator is performing a pick and the LMI reads 94% when the load is two feet off the ground. The pre-lift calculation projected the pick would be approximately 87%. What should the operator do?

A. Continue the lift — a 7% discrepancy between projected and actual LMI reading is within the instrument's expected tolerance range

B. Slow the hoist speed and continue monitoring — if the LMI stabilizes before reaching 100%, the lift can proceed to full working height

C. Reset the LMI to the pre-lift calculation value and continue — the projected figure is more accurate than the instrument reading at low hook heights

D. Lower the load back to the ground immediately — a 7% discrepancy between the projected and actual LMI reading indicates the actual hook load exceeds what was planned; the load weight must be verified, the operating radius must be measured, and the rigging weight must be confirmed before any further attempt

21. An operator is making a slow swing when a signal person gives a stop signal. The operator stops crane rotation but the load continues to swing in an arc due to momentum. The signal person immediately gives a hoist-up signal to move the load above the obstruction before the swing brings it into contact. What should the operator do?

A. Follow the hoist-up signal immediately — the signal person has authority over crane movement and their judgment takes priority

B. Sound the horn and wait for the lift director to authorize the hoist before responding to the signal person

C. Do not hoist — hoisting a swinging load increases the pendulum energy and changes the load's arc unpredictably; the correct response is to hold all functions and allow the load to pendulum to a stop, then assess the clearance situation before resuming any movement

D. Lower the load quickly to bring it to ground contact before the swing can cause contact with the obstruction

22. Under OSHA 1926 Subpart CC, which of the following CORRECTLY describes the operator's authority to refuse a pick?

- A. An operator may refuse any pick they believe is unsafe — including exceeding the load chart, inadequate rigging, unsafe site conditions, or any other condition they personally observe that impairs safe crane operation; this refusal is protected from adverse employment action under OSHA 1926.1418
 - B. An operator may refuse a pick only when the LMI confirms the load exceeds rated capacity
 - C. An operator may refuse a pick only after obtaining written confirmation from the lift director that the unsafe condition has been reported to the site safety officer
 - D. An operator may refuse a pick during the pre-shift inspection period but must comply with all pick instructions once operations have commenced for the shift
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23. A crane operator has just landed a load and the riggers are beginning to disconnect the hook. Another crew member approaches the cab and asks the operator to move the hook slightly to give the riggers better access. The signal person has not given a signal. What must the operator do?

- A. Move the hook slightly as requested — minor hook repositioning during rigging operations is considered a cooperative action and does not require a formal signal
 - B. Decline to move the hook until the designated signal person provides an authorized signal — no crane movement is permitted based on verbal requests from non-signal personnel regardless of how minor the movement appears
 - C. Consult with the lift director by radio before responding to the crew member's request
 - D. Move the hook only if the crew member is a qualified rigger — riggers may request crane movement during the disconnect phase of a lift
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24. An operator begins a hoist and immediately hears a loud popping sound from the boom area. The load has not moved. The LMI shows no reading change. What must the operator do?

- A. Continue hoisting slowly — a single popping sound is a common occurrence during initial load application as mechanical components seat under load
- B. Increase hoist speed to complete the pick quickly and investigate the sound once the load is at working height
- C. Complete the pick, set the load, and report the sound during the post-shift inspection
- D. Stop immediately — an audible structural sound during initial load application is an emergency indicator that must be investigated before any further crane function is used; lower the load if possible, secure the crane, and have a qualified person inspect the boom and all structural connections before resuming operations

25. Under OSHA 1926 Subpart CC, which of the following is a condition that makes a crane operation a "critical lift" regardless of the load percentage of rated capacity?

- A. Any pick within 50 feet of an energized power line rated above 50 kV
 - B. Any pick involving a load that has never been previously weighed and verified by a certified scale
 - C. Multi-crane lifts and personnel platform operations are critical lifts by definition regardless of load weight — neither requires the 75% threshold to be reached to trigger critical lift requirements
 - D. Any pick over 10,000 pounds at a construction site with three or more active crane operations
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26. A crane operator is working in a congested area where the swing arc passes over a location where workers are present. The lift director instructs the operator to proceed because the workers are "experienced and know to watch out." What must the operator do?

- A. Proceed as instructed — the lift director has overall responsibility for worker safety and their instruction overrides the operator's concern
 - B. Refuse to swing over the workers and stop operations until the area is cleared — OSHA 1926.1425 prohibits swinging the load over personnel in the drop zone regardless of their experience or awareness; the lift director's instruction to proceed does not override this prohibition
 - C. Proceed at reduced swing speed while sounding the horn to alert the workers
 - D. Proceed only after verbally confirming that each worker in the swing path has acknowledged the overhead hazard
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27. An operator is performing a routine lift when the hoist suddenly stops responding to the control input. The load is suspended 18 feet above a concrete floor. The crane's emergency lowering system is functional. What is the FIRST priority?

- A. Alert all personnel in the area and use the emergency lowering system to lower the load to the ground safely — protecting the load and ground personnel is the first priority before any diagnostic steps are taken
- B. Attempt to restore hoist function by cycling the controls three times before using emergency procedures
- C. Secure the crane in place with all brakes and contact the manufacturer's emergency service line for guidance

D. Notify the lift director and wait for instructions before using the emergency lowering system

28. A crane operator is asked to make a pick in conditions with steady 28 mph winds. The manufacturer's wind limit for this boom configuration is 30 mph. Is this operation permitted?

A. Yes — 28 mph is within the manufacturer's stated limit and the operation may proceed normally

B. Yes — wind limits are advisory only; the operator may use professional judgment to exceed them when completing a time-sensitive lift

C. Yes — the 30 mph limit is for unladen boom travel; loaded picks may be made at higher wind speeds because the load acts as a stabilizer

D. Permitted per the manufacturer's limit — but the operator must assess the actual effect of wind on this specific load; a large flat surface area can generate wind force that, combined with load weight, creates a different risk profile than the manufacturer's generic limit assumes; both the rated limit and the actual load characteristics must be considered

29. During crane operations, an operator notices the wire rope on the hoist drum has jumped off the drum flange and is resting against the drum housing structure on one side. No load is currently suspended. What is the correct action?

A. Continue operations carefully — rope contact with the drum housing is normal when the drum is near empty and poses no structural concern

B. Reduce load to 50% of rated capacity and continue with enhanced visual monitoring of the drum condition

C. Stop operations — rope that has displaced off the drum flange can be pinched or damaged where it contacts the housing; this condition must be corrected and the rope inspected before any further picks

D. Hoist to minimum depth and spool additional rope onto the drum to push the displaced section back into position

30. An operator completes a pre-lift check and confirms the load chart capacity at 32-foot radius with an 80-foot boom on full outriggers. Before the pick, the rigger asks the operator to move the crane 2 feet closer to the load to make the rigging easier. The operator repositions accordingly. What must happen before picking?

- A. Re-confirm the load chart capacity at the new operating radius — moving the crane 2 feet toward the load reduced the operating radius from 32 to 30 feet, which changes the applicable chart value; since capacity typically increases at shorter radii the pick will likely be within capacity, but this must be verified, not assumed
 - B. Nothing — moving closer to the load reduces the operating radius and always increases rated capacity, so the pre-lift check at 32 feet is conservative
 - C. Re-verify only if the new radius puts the load below 25 feet, where structural limits may differ from stability limits
 - D. Notify the lift director of the repositioning and wait for confirmation before proceeding
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31. During the course of a day with 15 identical repetitive picks, an operator notices that the 12th pick feels heavier than the previous 11 even though the same load is being picked. The LMI confirms a slightly higher reading. What is the most likely explanation and required action?

- A. The LMI calibration drifts during continuous use and requires resetting every 10 picks — recalibrate and continue
 - B. The operating radius may have increased slightly due to outrigger settling, boom deflection accumulation, or the load swinging outward — stop and re-measure the actual operating radius and confirm current outrigger conditions before continuing the pick sequence
 - C. Slight variation in perceived load weight is normal in repetitive operations as the operator's tactile sensitivity increases — no action is needed if the LMI reading is within 5% of the expected value
 - D. The load itself may have gained moisture during the shift — re-weigh the load before the 13th pick
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32. A crane is traveling on a job site roadway with the boom at maximum transport angle and no load on the hook. The operator rounds a corner and sees the roadway has a 6% cross-slope across the direction of travel. What concern does this create?

- A. A 6% cross-slope during boom travel is within standard operational tolerance for all terrain cranes and requires no special consideration
- B. A 6% cross-slope is above the typical 1% levelness tolerance — the crane's stability margin in the transport position is reduced on a cross-slope; the operator must assess whether the cross-slope is within the manufacturer's travel limitations for this configuration before proceeding
- C. The concern is limited to boom tip clearance — at maximum transport angle, a cross-slope may reduce the clearance between the boom tip and overhead obstructions

D. Cross-slopes during crane travel are only a concern when a load is suspended; unladen travel can proceed at any cross-slope within the site's road design specification

33. A personnel platform proof test has been completed and passed. Before boarding personnel, the operator must confirm which of the following?

- A. The crane operator's NCCCO certification includes a personnel hoisting endorsement
 - B. The lift director has signed the proof test documentation before personnel are permitted to board
 - C. The platform has been visually inspected for any deformation, cracking, or structural distress that occurred during the proof test — only after a satisfactory post-test inspection may personnel be authorized to board the platform
 - D. The rigging used in the proof test must be replaced with new rigging before the actual personnel lift begins
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34. An operator is making a blind lift where the load will pass through a narrow gap between two structures. The gap is 4 feet wider than the load on each side. What specific operational requirement applies to this configuration?

- A. A 4-foot clearance on each side exceeds the minimum 2-foot clearance required for blind lifts through confined spaces
 - B. The signal person must be stationed at a position where they can see both the load and all four sides of the gap simultaneously — if no single position provides complete visibility of the load and all four clearance points, additional signal persons must be positioned to cover each clearance zone
 - C. Blind lifts through gaps narrower than 10 feet require the use of a secondary camera system in addition to signal person communication
 - D. The lift director must be stationed at the gap to visually monitor clearance while the signal person controls crane movement
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35. Under OSHA 1926 Subpart CC, when may a crane operator leave the cab without landing the load?

- A. When the operator must use the restroom and no relief operator is available — briefly leaving the cab during active operations is permitted in this circumstance

- B. When performing a multi-crane tandem lift, one operator may temporarily leave the cab to assist with rigging while the other crane maintains load support
 - C. The operator may never leave the cab while a load is suspended — leaving the cab with a load suspended is specifically prohibited under OSHA 1926.1417 regardless of circumstances
 - D. The operator may leave the cab while the load is at rest in a temporary landing zone during a multi-stage lift
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36. An operator is completing the last lift of the shift. As the load is being set, the engine temperature gauge enters the red zone and the engine shuts down automatically due to thermal protection. The load is 3 feet above the final set point. What is the correct response?

- A. Restart the engine immediately so the load can be completed to the final set point before shutdown
 - B. Use the crane's hand pump emergency lowering feature to continue the final 3 feet to set — the load is already in control and this is the designed emergency procedure for this situation
 - C. Wait 15 minutes for the engine to cool, then restart and complete the set
 - D. Immediately engage all brakes and locks, assess whether the load is in a stable temporary position, use emergency lowering systems if available to land the load safely, and do not restart the engine until the overheating cause has been identified — the thermal shutdown is a protection event that cannot be overridden by restarting until the cause is corrected
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37. A crane's LMI activates a warning alarm at 90% of rated capacity during a pick that was pre-calculated at 82%. The operator is certain the load weight is correct and the radius was measured carefully before the pick. What should be investigated?

- A. The LMI requires recalibration — a consistent 8% over-reading indicates instrument error, not an actual capacity concern
- B. The rigging weight was likely underestimated in the pre-lift calculation — re-weigh the rigging assembly
- C. Both actual operating radius and actual total hook load — including the block and all rigging below the hook — must be confirmed; the 8% discrepancy could reflect a radius increase from boom deflection under load, an underestimated rigging weight, or a heavier-than-expected payload; each variable must be verified against the actual condition
- D. The boom length must be re-measured — LMI over-reading at 90% when 82% was calculated is a symptom of incorrect boom length entry in the LMI setup

38. Which of the following BEST describes the operator's responsibility when the designated signal person gives a signal that the operator believes will result in a dangerous condition?

- A. The operator must follow all signals from the designated signal person — the signal person bears full responsibility for the consequences of their signals
 - B. The operator must follow the signal but document their concern in the daily log immediately after the move is completed
 - C. The operator must follow all signals from the designated signal person except a stop signal — the operator may accelerate the crane's movement to clear a dangerous zone before stopping
 - D. The operator may and must refuse to follow any signal they believe will result in an unsafe condition — the operator has the authority and responsibility to refuse unsafe instructions regardless of their source; the stop signal from the operator's own judgment overrides any signal from a signal person
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39. An operator notices that the crane's outrigger float on the rear-right has developed a crack through the float plate. The crane is between picks. What must happen?

- A. Continue operations with reduced load on the rear-right outrigger — reduce all picks to 65% of rated capacity until the float is replaced during planned maintenance
 - B. Remove the crane from service — a cracked outrigger float is a structural deficiency that must be evaluated and repaired before any further operations; the float is a critical load-bearing component and its failure during a lift could be catastrophic
 - C. Mark the crack with a paint pen, document it, and notify maintenance — the float may continue to be used until the end of the current shift
 - D. Reduce the crane's rear-right outrigger load by repositioning the crane to shift weight toward the other outriggers and continue operations
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40. A crane is performing a critical lift when a non-critical emergency on the job site causes the lift director to request the operator hold the load at height while the emergency is addressed. The load has been suspended for 22 minutes. What concern must be managed?

- A. OSHA prohibits suspended load holds exceeding 15 minutes — the load must be set immediately regardless of the site emergency

- B. There is no time limit concern — a properly rigged load on a mechanically sound crane may be held at height for as long as operationally necessary
- C. Hydraulic leakage in the hoist brake circuit can cause the load to slowly lower over time during extended holds — brake drift must be monitored continuously during the hold, and if any downward movement is detected the load must be landed immediately regardless of the site situation
- D. The load must be set within 30 minutes or the critical lift plan must be formally revised
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41. Which of the following CORRECTLY describes when an operator may use an LMI reading as a substitute for a load chart capacity check?

- A. When the LMI is equipped with a manufacturer-certified calibration certificate less than 6 months old
- B. When the lift director has confirmed the LMI was properly calibrated at the beginning of the current project
- C. Never — the LMI is a supplemental safety device that provides a real-time load moment indication; it does not replace the operator's obligation to identify the correct load chart capacity value for the specific configuration before each pick; the load chart is the definitive capacity reference
- D. When the pick is below 75% of the LMI's maximum rated load for the instrument model
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DOMAIN 3: TECHNICAL KNOWLEDGE

Questions 42–66

42. A wire rope is found during inspection to have a section where the outer wires appear flattened and worn on one side only — a condition sometimes called "peening." What most likely caused this condition?

- A. The rope has been subjected to shock loading — peening on all outer wires simultaneously is the classic indicator of a sudden overload event
- B. The rope has been running through a sheave that is too large for the rope diameter, allowing the rope to oscillate inside the groove
- C. The rope has been used in a choker hitch application that caused torsional stress in the outer strand layer
- D. Unilateral peening indicates the rope has been running at an excessive fleet angle — the rope has been contacting the side of the sheave groove, compressing and flattening the outer wires on the contact side; this requires inspection of the fleet angle geometry and removal of the damaged rope

43. Under ASME B30.5, which of the following is a required element of a crane's frequent inspection?

- A. Checking for visible deformations, cracks, or wear in the hooks, shackles, and load block components — hooks showing any measurable increase in throat opening or visible damage must be flagged for evaluation
 - B. Measuring the wire rope's diameter at 10 points along its length and calculating the average to confirm compliance with the minimum diameter requirement
 - C. Verifying that the crane's serial number plate matches the number recorded on the load chart certificate
 - D. Conducting a functional test of the emergency engine shutoff under load to confirm automatic protection systems are operational
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44. A rigger is selecting a shackle for a lift where the shackle will be subjected to a sustained load at approximately 30 degrees off the pin axis due to the geometry of the rigging assembly. What type of shackle is most appropriate for this application?

- A. A round pin shackle rated at 150% of the required capacity — the extra capacity provides sufficient margin to accommodate the angular load
 - B. A bolt-type anchor shackle — for applications with angular loading, the bolt-type anchor shackle's symmetrical bow geometry provides better resistance to side loading than a screw-pin type, though the rigging should still be redesigned to eliminate the angular load if possible
 - C. No shackle type is rated for angular loading — all shackles must be loaded in-line and the rigging must be redesigned
 - D. A screw-pin shackle with the pin moused with wire to prevent rotation under the angular load
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45. Under ASME B30.9, when a synthetic web sling's working load limit tag is missing or illegible, what must happen?

- A. The sling's capacity may be estimated from its width and number of plies using the ASME B30.9 capacity estimation table
- B. A qualified rigger may assign a conservative working load limit based on the sling's physical condition and dimensions

- C. The sling must be removed from service immediately — without a legible tag, the rated capacity cannot be confirmed; a sling with no verifiable working load limit must not be used for any lift
- D. The sling may continue in service for loads below 2 tons while replacement is obtained
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46. Which ASME B30 standard governs the design, construction, and use of synthetic round slings?

- A. ASME B30.9 — this standard covers slings of all types including wire rope, chain, metal mesh, synthetic web, and synthetic round slings used for overhead lifting
- B. ASME B30.20 — synthetic round slings are classified as below-the-hook lifting devices
- C. ASME B30.26 — synthetic round slings are classified as rigging hardware under this standard
- D. ASME B30.10 — synthetic round slings attach at the hook position and are therefore governed by the hook and rigging hardware standard
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47. A crane has been out of service for 6 months due to a project shutdown. Before returning the crane to service, which inspection is required in addition to the normal pre-shift inspection?

- A. A pre-shift inspection by a qualified operator plus a load test to 100% of rated capacity before any production lifts are made
- B. The standard frequent inspection checklist with enhanced attention to corrosion, fluid condition, and any deterioration that may have occurred during the idle period
- C. No additional inspection is required — if the crane was properly stored and the pre-shift inspection is completed normally, the crane may return to service
- D. A periodic inspection equivalent — ASME B30.5 and OSHA 1926.1412 require that cranes that have been idle for a period exceeding three months be inspected before returning to service at a level commensurate with a periodic inspection, covering all items that could have deteriorated during the idle period
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48. An operator's NCCCO TLL certification is due to expire in 45 days. The operator applies for recertification but the testing date is scheduled for 60 days from now — 15 days after the certification expires. What is the operator's status during those 15 days?

- A. NCCCO automatically grants a 30-day grace period for operators with active recertification applications, covering the 15-day gap

B. The operator is not qualified under OSHA 1926.1427 during those 15 days — an expired certification is not valid regardless of pending applications; the employer must not permit the operator to operate covered equipment during this period; the employer should seek an earlier test date or arrange alternative qualified coverage

C. The operator may continue working under expired certification if the lift director provides written authorization for each shift during the gap period

D. The 15-day gap is within OSHA's allowable certification lapse window of 30 days, so the operator may continue working during this period

49. Under OSHA 1926 Subpart CC, what is the minimum design factor required for wire rope used for personnel hoisting with rotation-resistant rope construction?

A. 10 — the minimum design factor for rotation-resistant rope in personnel hoisting is higher than for standard rope; OSHA 1926.1414 specifies a design factor of 10 for this rope type in personnel hoisting applications

B. 7 — the minimum design factor for all crane wire rope in personnel hoisting regardless of construction type

C. 8 — rotation-resistant rope requires a design factor of 8, which is one increment above the 7 required for standard rope

D. 5 — rotation-resistant rope's torque-balanced construction allows a reduced design factor compared to standard rope

50. A crane hook's safety latch is found during inspection to be stiff and requiring significant force to open manually. The latch functions but does not spring back quickly. What does this indicate?

A. A stiff but functional latch is acceptable — latches are designed to resist accidental opening and should require some force

B. The latch spring has weakened — while the latch still closes, a slow-return latch may not reseal properly after a sling passes through the throat, creating a condition where the latch appears closed but is not fully engaged; the latch must be repaired or replaced

C. The stiff latch indicates the hook is due for lubrication — apply hook lubricant and retest; if the latch springs back normally after lubrication it may continue in service

D. A hook with a stiff latch must be replaced entirely — ASME B30.10 prohibits continued use of any hook with abnormal latch behavior regardless of whether the latch still closes

51. Under ASME B30.5, which condition requires a wire rope to be removed from service regardless of how many broken wires are present?

A. Any wire rope that has been in service for more than 5 years must be removed regardless of broken wire count or condition

B. Any wire rope that has been used on a critical lift — personnel platform operations require a fresh rope for every new critical lift cycle

C. Wire rope with evidence of heat damage — heat damage destroys the metallurgical properties of the steel wires and the rope must be replaced regardless of visible wire breaks; ASME B30.5 lists heat damage as an absolute removal condition

D. Any wire rope that has been in contact with hydraulic fluid — hydraulic fluid degrades the rope's fiber core, requiring immediate replacement

52. A rigger is preparing a 4-leg wire rope bridle for a lift. Two of the four leg terminations are swaged sleeves and two are wedge sockets. The load is symmetric. What concern does the mixed termination type create?

A. No concern — swaged sleeves and wedge sockets have identical efficiency ratings for all practical purposes

B. Different end termination types may have different efficiency ratings — swaged sleeves typically have higher efficiency than wedge sockets; if the legs with wedge sockets are at different angles than the legs with swaged sleeves, the effective capacity of each leg differs; the sling assembly must be rated for the lowest-efficiency termination type in the assembly

C. Mixed terminations are prohibited under ASME B30.9 — all legs in a multi-leg wire rope sling assembly must use the same type of termination

D. The concern is purely visual — mixed terminations can confuse riggers about which legs have been inspected; re-tag both pairs with matching color code for the appropriate inspection cycle

53. An employer's crane operator qualification program uses written tests, field evaluations, and documented performance assessments. The program has not been audited by a nationally recognized accreditation body. Under OSHA 1926.1427, does this program qualify operators?

- A. Yes — OSHA 1926.1427 accepts employer-developed qualification programs without third-party accreditation provided the program includes written and practical evaluation components
 - B. Yes — employer programs are equivalent to third-party certification for operators who have completed at least 1,000 hours of crane operation before beginning the program
 - C. No — employer qualification programs must be audited by a nationally recognized accreditation body to be compliant with OSHA 1926.1427; without the required audit, operators qualified under the program are not considered qualified under the regulation regardless of the program's content quality
 - D. Yes — OSHA 1926.1427 accepted employer programs without accreditation before the December 2018 compliance deadline and this provision remains in effect for operators qualified before that date
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54. Under OSHA 1926 Subpart CC, who is specifically responsible for determining whether an individual meets the definition of a "qualified rigger" for a given lift?

- A. The employer — the employer must confirm that the individual designated as a qualified rigger possesses the knowledge, training, and experience to rig loads safely for the specific lift, and bears responsibility for this determination
 - B. The lift director — the lift director evaluates rigger qualifications on-site before each lift
 - C. The signal person qualification authority — signal persons who have demonstrated competence in hand signals are automatically qualified as riggers
 - D. NCCCO — all qualified riggers must hold current NCCCO Rigger Level I or Level II certification to meet the OSHA qualified rigger standard on construction projects
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55. A crane's load block has a 4-sheave configuration with wire rope reeved through all four sheaves. During inspection, one sheave is found to have a cracked groove rim that extends 180 degrees around the sheave's circumference. What is required?

- A. Remove the cracked sheave from service and reduce reeving to 3 parts of line using the remaining sheaves — a cracked sheave that is bypassed in the reeving does not affect structural integrity
- B. Mark the crack and re-inspect after 20 operating hours — a partial rim crack that does not extend through the sheave web is a monitor condition only
- C. Apply a weld repair to the cracked rim in the field and return to service after the repair cools and is visually inspected

D. Remove the block from service — a cracked sheave is a structural failure in the load block assembly; the block must be removed, the sheave replaced, and the assembly inspected and verified before the block returns to service

56. Which statement CORRECTLY describes the relationship between a crane's "rated capacity" and its "maximum capacity"?

A. Rated capacity and maximum capacity are equivalent terms — the manufacturer uses both interchangeably in different documents

B. Rated capacity is the load the crane may safely lift in a given configuration; the maximum capacity is the highest rated capacity value across all possible configurations; a crane's maximum capacity applies only to the specific configuration under which it was achieved and cannot be used as a general operating limit

C. Rated capacity is 80% of maximum capacity — the remaining 20% is the manufacturer's built-in safety margin for unexpected load variations

D. Maximum capacity is the load chart value; rated capacity is the value after deducting block and rigging — the two terms describe gross and net capacity respectively

57. Under OSHA 1926.1403, who is responsible for ensuring that the assembly and disassembly of a crane is performed according to the manufacturer's procedures?

A. The site safety officer, who must be present during all crane A&D operations on a construction project

B. The crane owner — the crane owner bears primary responsibility for ensuring A&D follows manufacturer procedures

C. A qualified person who directs the assembly and disassembly — OSHA 1926.1403 requires that A&D be directed by a qualified person who has the knowledge, training, and experience to direct assembly and disassembly of the specific crane type

D. The project general contractor, who must approve the A&D procedure before operations begin

58. A crane's load line has been in service for 14 months. The periodic inspection found the rope to be within all ASME B30.5 removal criteria. Under ASME B30.5, what records requirement applies to this finding?

- A. No records requirement exists for ropes that pass periodic inspection — records are only required when ropes are replaced or removed from service
 - B. The results of rope inspection must be documented and these records must be retained for as long as the rope remains in service — ASME B30.5 requires inspection records to be maintained throughout the rope's service life
 - C. Records of periodic rope inspection must be maintained for 3 years from the date of inspection
 - D. The inspection results must be recorded on the load chart certificate and the date initialed by the periodic inspector
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59. Under OSHA 1926.1414, what is the minimum design factor for the main load line wire rope on a construction crane used for standard material hoisting with non-rotation-resistant rope?

- A. 5 — the OSHA minimum design factor for standard crane hoist rope in material hoisting applications is 5:1
 - B. 3.5 — this is the design factor established by ASME B30.5 for standard crane rope in most applications
 - C. 7 — the OSHA minimum design factor for non-rotation-resistant rope used for material hoisting is 5:1 for the wire rope itself; however, for personnel hoisting the factor is 7
 - D. The minimum design factor for standard non-rotation-resistant rope in general crane use is a safety factor calculation applied against the maximum static load, not a fixed value specified in OSHA 1926.1414
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60. A multiple crane lift plan specifies that each crane's operator will follow signals only from the designated lift director's authorized signal person. During the lift, the lift director communicates directly to each operator by radio rather than through a signal person. Is this compliant with the lift plan and OSHA requirements?

- A. No — all signals must be given in writing before the lift begins; radio communication during the lift is not an approved signaling method under OSHA 1926 Subpart CC
- B. Yes, provided the lift plan was updated before the lift began to reflect radio communication as the signaling method — OSHA 1926.1419 permits any signaling method that is established, understood, and documented before operations begin
- C. Yes — radio communication between the lift director and operators is always permitted as a supplemental communication channel regardless of the signaling method specified in the lift plan

D. No — changing the signaling method from what was specified in the pre-lift meeting without formally revising the lift plan and re-briefing all personnel is a plan deviation that requires the lift to stop until the communication protocol is formally updated

61. An operator is reviewing their employer's crane training records and finds that their initial qualification evaluation was documented 4 years ago but their employer has never conducted a re-evaluation. Is this compliant with OSHA 1926.1427?

A. Yes — OSHA 1926.1427 employer qualification programs require initial evaluation but do not mandate periodic re-evaluation after qualification is established

B. Yes — re-evaluation is only required when the operator transitions to a new crane type or after a documented safety incident

C. This depends on whether the employer's program includes a re-evaluation requirement — OSHA 1926.1427 requires that employer programs evaluate the effectiveness of operator qualification; a program that never conducts follow-up evaluation may not be demonstrating ongoing compliance; the employer should verify their program meets all regulatory requirements

D. No — OSHA 1926.1427 requires operator re-evaluation every 24 months; a 4-year gap without re-evaluation is a direct compliance violation

62. Which of the following CORRECTLY describes the purpose of the two-block prevention system (ATB device) under OSHA 1926.1415?

A. The ATB device prevents the load block from contacting the boom tip by triggering an alarm when the block rises within 6 feet of the tip, giving the operator time to stop hoisting before contact occurs

B. The ATB device provides only an alarm function — stopping is the operator's responsibility after the alarm activates; a device that stops the hoist automatically is not required by OSHA 1926.1415

C. There is no requirement for the ATB device under OSHA 1926.1415; the device is a voluntary manufacturer-installed feature that is not subject to regulatory requirements

D. The ATB device must include both an audible/visible alarm AND an automatic function that stops the hoist before two-blocking occurs — a device that only alarms without stopping is not compliant, and failure of either function requires the crane to be removed from service

63. Under OSHA 1926 Subpart CC, what is the specific penalty provision if an employer knowingly requires a non-qualified operator to operate a crane covered under the regulation?

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- A. A first-time violation results in a written warning; subsequent violations result in civil penalties up to \$15,625 per violation
 - B. The employer is subject to a civil penalty only if the non-qualified operator causes a reportable injury during the shift
 - C. Penalties under OSHA 1926 Subpart CC for operator qualification violations are assessed as serious violations — the employer may also face willful violation penalties if the non-qualification was knowingly tolerated; the crane's insurer may deny coverage for any incident during non-qualified operation
 - D. The non-qualified operator bears individual regulatory liability — OSHA's enforcement of operator qualification requirements focuses on individual credential holders, not employers
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64. A crane's load line wire rope shows a 6% reduction in diameter at a point 20 feet from the drum. The rope's nominal diameter is 1-inch. What is the significance of this finding?

- A. A 6% diameter reduction is within normal wear tolerance — rope wear up to 10% is acceptable under ASME B30.5 criteria
 - B. A 6% or greater reduction in diameter from the rope's nominal dimension is an ASME B30.5 removal-from-service criterion — the rope must be replaced; diameter reduction indicates internal wire breakage, core failure, or severe external wear that is not reliably captured by outer wire inspection alone
 - C. A 6% diameter reduction requires a reduction in allowable working load but not rope removal — calculate the new allowable working load based on the reduced cross-section and continue using the rope at that limited capacity
 - D. A 6% diameter reduction is significant only if it occurs at a running sheave contact point — diameter reduction in non-contact sections of the rope is not a removal criterion
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65. What is the primary structural limitation of synthetic web slings that makes them unsuitable for certain industrial applications?

- A. Synthetic web slings have lower working load limits than wire rope slings of the same weight, making them economically impractical for heavy industrial use
- B. Synthetic web slings cannot be used in vertical hitch applications — their geometry requires basket or choker hitch configuration
- C. Synthetic web slings are degraded by prolonged ultraviolet exposure, chemical contact, heat above 194°F for polyester and 180°F for nylon, and physical abrasion from sharp edges — in environments with

these hazards, synthetic web slings may lose capacity without visible external warning; the application environment must be evaluated before selecting synthetic web slings

D. Synthetic web slings cannot be marked with a working load limit that exceeds 10 tons, limiting their usefulness in heavy lift applications

66. Under OSHA 1926 Subpart CC, when a crane is returned to service after repairs that affected the structural components of the boom, what must happen before the crane may perform production lifts?

A. The operator must perform a pre-shift inspection that specifically includes the repaired area before returning to production operations

B. The repair must be documented in the daily log and the crane may return to service at 75% of rated capacity for the first shift as a break-in period

C. A structural repair verification test lift must be performed to 100% of the crane's maximum rated capacity before production operations resume

D. The structural repair must be reviewed and approved by the crane manufacturer or a qualified engineer — OSHA 1926.1412 requires that structural modifications or repairs be evaluated by a qualified authority before the crane returns to service; a self-performed return-to-service is not acceptable after structural work

DOMAIN 4: LOAD CHARTS

Questions 67–90

67. A crane's gross capacity at 25-foot radius with a 75-foot boom on full outriggers is 54,000 pounds. The hook block weighs 1,100 pounds. A spreader beam weighs 2,400 pounds. Six wire rope slings weigh 150 pounds each. Eight shackles weigh 32 pounds each. What is the available net payload capacity?

A. 51,900 pounds

B. 50,794 pounds

C. 50,244 pounds

D. 49,544 pounds

68. A load chart note states: "Ratings shown are gross capacities and include the weight of the hook block." The hook block weighs 850 pounds. The stated gross capacity is 41,000 pounds. Rigging weighs 580 pounds. The payload is 39,200 pounds. Based on the chart note, what is the correct capacity analysis?

A. Net capacity: $41,000 - 850 - 580 = 39,570$ lb; since $39,570 > 39,200$ lb, lift proceeds

B. The chart note means the gross value already incorporates the 850-pound block; no block deduction is required; only the 580-pound rigging deduction is needed; net capacity = $41,000 - 580 = 40,420$ lb; $40,420 > 39,200$; the lift can proceed — but note this interpretation assumes the block weight is already baked into the 41,000 lb figure

C. Net capacity: 41,000 lb gross minus rigging (580) = 40,420 lb; since the block is included in the chart, only rigging is deducted; $40,420 > 39,200$ lb; the lift can proceed

D. The chart note is advisory — all standard deductions including block and rigging must always be made regardless of chart notes to ensure conservative operation

69. A crane's load chart shows both stability-based and structural-limit capacity values for the same configuration. At 15-foot radius with an 85-foot boom, the stability limit is 72,000 pounds but the structural limit shows only 58,000 pounds. Which governs?

A. The stability limit of 72,000 pounds governs — stability is always the limiting factor in load chart development

B. The structural limit of 58,000 pounds governs — when structural limits are lower than stability limits for a given configuration, the structural limit is the rated capacity for that configuration; using the higher stability value would overload the crane's structure

C. The operator may choose either value — structural limits apply to boom-critical configurations and stability limits apply to radius-critical configurations; the lift director determines which is applicable

D. Neither value is valid without the manufacturer's written confirmation that both limit types apply to this specific crane serial number

70. An operator measures the operating radius before a pick as 28 feet. After the load comes off the ground, the LMI shows the radius has increased to 30.5 feet. The chart at 30.5 feet shows lower capacity than at 28 feet and the total hook load now exceeds net capacity at 30.5 feet. What caused this and what is required?

- A. The LMI radius measurement is inaccurate — radius must always be measured physically and the LMI reading disregarded for actual radius confirmation
 - B. The load shifted its center of gravity during lift-off, pulling the hook outward and reading as an increased radius
 - C. Hydraulic pressure to the outrigger cylinders decreased after load application, allowing the crane to tilt slightly and increasing the operating radius through boom deflection
 - D. Boom deflection under the load increased the actual radius beyond the pre-lift measurement — the crane is now operating beyond the confirmed radius and beyond rated capacity; the load must be lowered to the ground before the boom deflection is investigated and the actual operating radius confirmed to be within a configuration the chart supports
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71. A crane's load chart has columns for three jib offset angles: 5°, 15°, and 25°. The jib is currently set at 20° offset. Which chart column applies?

- A. The 15° column must be used — when the actual jib offset falls between two chart columns, the lower offset angle's lower capacity value applies; interpolating between columns is not permitted; the 15° column provides the conservative limit for the 20° actual configuration
 - B. The 25° column may be used — it corresponds to the greater offset angle and the capacity is lower, making it the more conservative choice for any angle between 15° and 25°
 - C. Interpolation between the 15° and 25° columns is required — the exact capacity at 20° must be calculated by linear interpolation
 - D. The jib must be physically adjusted to one of the three rated offset positions before any lift is made — operating at an offset angle not listed in the chart means operating without a defined rated capacity
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72. A crane's load chart shows the following gross capacities at 30-foot radius for different boom lengths: 60-foot boom at 39,000 lb, 75-foot boom at 34,500 lb, 90-foot boom at 29,000 lb. The crane is configured with the 75-foot boom. A lift requires 31,000 pounds net capacity. Block weighs 800 lb and rigging weighs 650 lb. Can this lift proceed?

- A. No — with a 75-foot boom, gross capacity is 34,500 lb; deductions total 1,450 lb; net capacity is 33,050 lb; this exceeds the required 31,000 lb; however, using the 60-foot boom would provide even more capacity — the operator should use the 60-foot boom for maximum safety margin
- B. Yes — gross capacity with the 75-foot boom is 34,500 lb; deductions: block (800) + rigging (650) = 1,450 lb; net capacity = 33,050 lb; 33,050 lb exceeds the required 31,000 lb; the lift can proceed with the 75-foot boom

C. No — a 31,000 lb required net capacity against a 34,500 lb gross capacity means the lift is at 89.9% of gross capacity, which triggers critical lift requirements regardless of net capacity

D. Yes — the average of the three boom configurations' capacity is 34,167 lb, which provides a statistical confidence interval confirming the 75-foot boom is adequate

73. A crane is configured with the outriggers at 50% extension, which gives a specific load chart column with its own capacity values. The operator finds the required pick is 3,000 pounds beyond the net capacity in the 50% extension column. The full extension column shows adequate capacity. What is the correct process for changing to full extension with the load already on the ground?

A. With the load on the ground and the crane unladen, the operator may extend to full extension and use the full extension chart column without any additional steps

B. The operator must land the load, lock all crane functions, physically extend all outriggers to full extension, confirm each outrigger is at full extension, re-level the crane within tolerance, confirm tires are off the ground at all four outriggers, and then re-confirm the full extension capacity before picking

C. The operator must submit a configuration change form to the lift director before any outrigger adjustment may be made

D. The outriggers may be extended to full while the load is on the ground — once extended, the crane must be re-leveled and tires confirmed off the ground; then the full extension capacity values apply without further verification

74. Which of the following statements about load chart validity is CORRECT?

A. A load chart remains valid for the life of the crane as long as the crane has not been modified and has passed its most recent periodic inspection

B. A load chart is invalid if the crane's counterweight configuration differs from the configuration specified in the chart section being referenced — even a small difference in installed counterweight invalidates the chart section developed for a different counterweight amount

C. Load charts may be used for modified crane configurations provided the modification is minor — defined as less than 10% change in any single physical dimension

D. A load chart developed for a 3-axle carrier version of a crane model may be used for a 4-axle carrier version of the same model when the boom and counterweight specifications are identical

75. A crane's load chart gross capacity at 20-foot radius is 68,000 lb. After deducting all rigging, net capacity is 64,800 lb. The payload is 64,500 lb. This represents what percentage of net capacity, and what is the appropriate level of scrutiny before proceeding?

A. 99.5% of net capacity — this lift is within rated capacity but operates with essentially no margin; every input must be verified precisely: the payload weight from a certified source, the operating radius by direct measurement, all rigging weights confirmed individually, and the crane configuration verified against the chart section; no estimation is acceptable at this margin level

B. 94.9% of gross capacity — this falls below the 95% informal threshold for additional scrutiny; standard pre-lift procedures apply

C. 94.9% of gross capacity — this exceeds 90% and requires a written engineering review before proceeding under OSHA 1926 Subpart CC

D. 99.5% of net capacity — this is a critical lift because it exceeds the 75% threshold; however, no additional verification beyond the standard critical lift plan is required

76. A crane's load chart explicitly states: "All capacities are based on freely suspended loads — capacity is reduced when loads are picked from or set to a position that requires the load to be dragged horizontally." A pick involves lifting a steel beam that has been resting on grade beams and must be dragged horizontally 18 inches to clear the adjacent structure before it can hang freely. Which statement is CORRECT?

A. An 18-inch horizontal drag is negligible — loads must be dragged more than 3 feet before the chart note applies

B. The operator may drag the load at reduced speed to minimize the friction load — the chart note does not prohibit dragging but requires a speed limit

C. The chart note means the rated capacity does not apply to this pick as configured — dragging the load introduces horizontal force components that increase the effective load on the crane above the hanging weight; the lift must be replanned to allow free vertical lift-off or the additional forces must be engineered and confirmed to be within the crane's actual capability

D. The lift director may authorize the drag pick in writing, which satisfies the chart note requirement and restores the full rated capacity for the operation

77. Two cranes are performing a tandem lift. The lift plan uses equal load sharing. After the pick, the load rotates 15 degrees clockwise due to asymmetric wind loading. Crane A's assigned load portion increases by 8,000 pounds as a result of the rotation. Crane A is now at 103% of its net capacity. What must happen?

- A. The 3% over-capacity on Crane A is within the 5% operational tolerance for tandem lifts — continue and correct the rotation slowly
 - B. The lift must stop — all crane movement must cease immediately; a tandem crane lift where one crane has exceeded its rated capacity is an emergency condition; the load must be set to a safe surface by coordinated movement directed by the lift director, and the lift replanned to prevent the load rotation from occurring on the next attempt
 - C. Crane A must increase boom angle to reduce operating radius and thereby access a higher capacity chart value to compensate
 - D. The signal person must direct Crane B to swing toward Crane A to redistribute the load back to the equal sharing arrangement without stopping the lift
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78. A crane's load chart shows a capacity of 27,000 lb at 40-foot radius. The chart contains a footnote: "Ratings apply to picking and setting within the rated radius — do not use for extended holds at maximum radius." The operator plans to pick at 38-foot radius, swing 90 degrees, and hold at 40-foot radius for 25 minutes while the rigging crew positions the landing pad. Does the footnote affect this plan?

- A. The footnote only applies to holds exceeding 60 minutes — a 25-minute hold is within the footnote's implied allowance
 - B. No — footnotes about extended holds are advisory only; the rated capacity applies at all times regardless of duration as long as the crane is within the rated configuration
 - C. No — the footnote applies to holds where the crane is experiencing thermal or hydraulic fatigue; a 25-minute hold in normal operating conditions is not an "extended hold" under B30.5
 - D. Yes — the footnote is a manufacturer restriction on how this capacity value may be used; a 25-minute hold at maximum rated radius may exceed the fatigue and thermal limits the manufacturer designed for this configuration; the lift plan must be revised so the hold occurs at a shorter radius or the manufacturer must confirm the 25-minute hold at 40-foot radius is acceptable
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79. A crane's gross capacity at 22-foot radius is 61,000 lb. After deducting block (1,200 lb), rigging (890 lb), and a spreader bar (3,400 lb), the net capacity is 55,510 lb. The payload is 55,000 lb. During the lift, the spreader bar is found to weigh 3,800 lb rather than 3,400 lb as estimated. What is the impact?

- A. The 400-pound underestimation in spreader bar weight means the actual total hook load is 400 pounds more than calculated; the actual total deductions = $1,200 + 890 + 3,800 = 5,890$; actual net payload capacity = $61,000 - 5,890 = 55,110$ lb; since 55,000 lb payload < 55,110 lb actual net capacity, the lift is still within capacity

B. The gross capacity is 61,000 lb and the total deductions are now 5,890 lb; the payload plus deductions = $55,000 + 5,890 = 60,890$ lb, which is below the 61,000 lb gross capacity; the lift is within rated capacity

C. No impact — a 400-pound variance in spreader bar weight is within the 1% tolerance for rigging weight estimation in the pre-lift calculation

D. The 400-pound discovery must trigger a full recalculation before the lift proceeds further, even though the preliminary check suggests the lift remains within capacity — mid-lift discovery of inaccurate rigging weight requires landing the load and completing a verified recalculation before continuing

80. A crane is configured for a pick at 55-foot radius. The load chart shows 18,200 lb gross at 55 feet and 15,800 lb gross at 60 feet. After the pick, the operator needs to set the load at 58-foot radius. The operator confirms 58-foot capacity before the set. During the swing, the boom passes over a piece of equipment that causes the operator to temporarily increase boom angle, reducing the radius to 42 feet. The chart at 42 feet shows significantly higher capacity. Does this radius reduction create any concern?

A. No — reducing the radius always increases the capacity margin; any temporary reduction in operating radius during a swing is beneficial and creates no concern

B. No — the temporary radius reduction was incidental to avoiding an obstruction and does not constitute a planned configuration change requiring chart review

C. No — the operator confirmed capacity at both the pick and set radii; the temporary variance at 42 feet is within the swing path and is not a discrete lift configuration

D. No — but the operator must also confirm that the reduced radius at 42 feet did not result in the load approaching any overhead obstruction during the boom angle increase, and must confirm that all confirmed capacity check points along the lift path remain valid for the actual path taken

81. A crane's rated capacity in the over-rear configuration on full outriggers is 88,000 lb. The same crane's 360-degree capacity at the same configuration is 71,000 lb. The lift director plans to use the over-rear value to pick a load that weighs 83,000 lb total hook load. The pick and set points are both directly over the rear. What condition must be continuously maintained throughout this lift to preserve the validity of the over-rear chart?

A. The load must be maintained within 6 degrees of the crane's centerline in both the lateral and longitudinal directions throughout all phases of the lift

B. There is no additional condition — the over-rear rating is valid as long as the pick and set points are over the rear

C. The lift director must station an observer at each outrigger to continuously confirm full extension throughout the lift

D. The load must travel directly over the rear — no lateral swing that moves the load outside the rear quadrant is permissible; the over-rear rating is invalid if the swing path passes through any other quadrant, even momentarily; if the swing path cannot be confirmed as staying within the rear quadrant, the 360-degree value of 71,000 lb governs

82. A crane operator is planning a pick where the load chart shows a structural limit of 92,000 lb at the planned configuration. The planned total hook load is 87,500 lb. Before using the structural limit value, what must the operator confirm?

A. Structural limit values are automatically verified by the LMI — if the LMI confirms the configuration, the structural limit applies without additional operator verification

B. The crane is confirmed in the exact physical configuration for which the structural limit was developed — boom length, counterweight, outrigger extension, and all other configuration variables must exactly match the chart specification; any deviation from the exact configuration invalidates the structural limit rating

C. The crane manufacturer's field representative has reviewed the planned lift and approved use of the structural limit capacity

D. The structural limit capacity has not been used in any previous lift during the same shift — structural limit ratings may be used a maximum of once per shift to protect boom fatigue life

83. An operator picks a 38,000-pound load at 24-foot radius. The chart at 24 feet shows 43,000 lb gross. Block weighs 950 lb. Rigging weighs 720 lb. After setting the load, the operator is asked to use the same hook and rigging to pick a second load at 30-foot radius. The second load is also 38,000 pounds but requires a different sling configuration — a four-leg bridle instead of the two-leg bridle used on the first pick. The four-leg bridle weighs 1,380 lb. What must the operator do before the second pick?

A. Confirm the load chart capacity at 30-foot radius, deduct the new rigging assembly weight (block 950 + bridle 1,380 = 2,330 lb), and verify the resulting net capacity supports the 38,000 lb payload; the change in rigging assembly and the change in radius both require a fresh capacity check

B. Apply the same capacity calculation used for the first pick — if the first pick was within capacity, the second pick with the same payload is also within capacity

C. Confirm only the radius change — if 30-foot capacity exceeds the 24-foot capacity used for the first pick, no recalculation is needed

D. The second pick requires a new lift plan because changing the rigging configuration after initial setup constitutes a modification requiring lift director approval regardless of capacity

84. A crane operator is asked to confirm whether a specific pick will require a critical lift plan. The crane's rated capacity at the planned configuration is 95,000 lb. The payload is 68,000 lb. The hook block weighs 1,400 lb. The rigging weighs 2,100 lb. Is a critical lift plan required?

A. No critical lift plan required — total hook load is 71,500 lb ($68,000 + 1,400 + 2,100$); $71,500 \div 95,000 = 75.3\%$; this exceeds the 75% threshold — correction: the lift DOES require a critical lift plan

B. Yes — total hook load is 71,500 lb; $71,500 \div 95,000 = 75.3\%$; this exceeds the 75% critical lift threshold; a written critical lift plan and pre-lift meeting are required before this pick proceeds

C. No — the 75% threshold is calculated on payload alone; $68,000 \div 95,000 = 71.6\%$, which is below 75%; no critical lift plan is required

D. No — critical lift threshold is calculated on rigging-free payload as a percentage of gross capacity; $68,000 \div 95,000 = 71.6\%$, which is below the threshold

85. A crane's load chart shows 29,000 lb gross at 35-foot radius for the 70-foot boom, but shows no value for 35-foot radius for the 80-foot boom. The crane is rigged with the 80-foot boom and the operator needs to pick at 35-foot radius. What does the missing chart value indicate?

A. The 80-foot boom has a minimum operating radius of 40 feet — the boom geometry prevents a plumb pick at 35 feet with 80 feet of boom; the crane must use the 70-foot boom or reposition to achieve a radius within the 80-foot boom's chart range

B. The 70-foot boom chart section may be used conservatively for the 80-foot boom configuration at this radius since the shorter boom's values are lower

C. There is no rated capacity for the 80-foot boom at 35-foot radius — a missing chart value means no rated capacity exists for that configuration; the operator cannot perform this pick with the 80-foot boom at 35 feet; the crane must be reconfigured, repositioned, or the boom length changed to bring the lift within a rated configuration

D. Contact the manufacturer for the 80-foot boom capacity at 35 feet — the chart was likely abbreviated to save space and the value exists in the manufacturer's expanded data

86. Before beginning a series of repetitive picks that will each be at varying radii between 22 and 30 feet, what load chart verification strategy should the operator use?

A. Confirm capacity at the maximum planned radius of 30 feet only — if the heaviest load is within capacity at 30 feet, all picks at shorter radii are automatically within capacity

B. This assumes the load weight stays constant — if each pick involves the same load, confirming capacity at 30-foot maximum radius satisfies the requirement for all shorter radii; if any pick involves a different load weight than was confirmed at 30 feet, a new capacity check is required for that load at its specific radius

C. Confirm capacity at each radius individually as each pick is made — varying radii require real-time radius measurement and chart confirmation before each individual pick

D. Create a radius-capacity matrix from the load chart showing net capacity at every foot of radius from 22 to 30 feet; confirm before the series begins that no planned load weight exceeds the net capacity at any radius in the range; confirm actual radius before each pick and verify it falls within the pre-confirmed range

87. A crane is equipped with a 3-part reeving system for a series of light picks. For one specific pick, the lift director asks the operator to add parts of line to get to 5-part reeving to increase mechanical advantage. The load chart shows the 5-part reeving capacity is higher than 3-part at this configuration. What concern must be addressed before making this change mid-operation?

A. No concern — adding parts of line always increases capacity and may be done at any time without additional chart verification

B. Additional parts of line require the lift director's sign-off in the daily log before the change is made

C. Parts of line changes require the load to be on the ground — reeving cannot be changed while any load is suspended

D. Changing from 3-part to 5-part reeving is a configuration change that affects load line speed, drum capacity, and the applicable load chart section — the operator must confirm the load is on the ground, the reeving change is physically complete and verified, the drum has sufficient line to accommodate the additional parts, and the 5-part chart section applies to the planned configuration before picking

88. Two cranes are performing a tandem lift. Crane A has a net capacity of 54,000 lb at its radius and Crane B has a net capacity of 67,000 lb at its radius. The load plan assigns Crane A 42% of the total load and Crane B 58%. The total load — payload plus all rigging and spreader bar — is 108,000 pounds. What is each crane's assigned share and can this lift proceed?

A. Crane A: 45,360 lb; Crane B: 62,640 lb — both shares exceed the cranes' individual net capacities; this lift cannot proceed

B. Crane A: 45,360 lb (42% of 108,000); Crane B: 62,640 lb (58% of 108,000); Crane A's share of 45,360 lb is within its 54,000 lb net capacity; Crane B's share of 62,640 lb is within its 67,000 lb net capacity; both cranes are within their individual rated capacities and the lift can proceed

C. Crane A: 45,360 lb; Crane B: 62,640 lb — Crane B's 62,640 lb share represents 93.5% of its net capacity, which is too close to the limit to proceed without additional engineering review

D. OSHA requires that each crane in a tandem lift carry no more than 75% of its individual rated capacity — at 84% ($45,360 \div 54,000$) and 93.5% respectively, both cranes exceed this limit

89. A crane's load chart has a maximum rated radius of 60 feet for a given configuration. The operator plans a pick at 57-foot radius and a set at 60-foot radius. During the set, the tagline crew loses control and the load drifts 2 feet outward to 62-foot radius before the operator can respond. What are the consequences of this event?

A. The 2-foot exceedance at the set point was uncontrolled and temporary — this falls within the operational tolerance for load placement and no follow-up action is required

B. The 2-foot radius exceedance beyond the chart maximum means the crane operated outside its rated capacity — this is an overload event; the crane must be stopped, the load landed safely, and a post-incident inspection completed before any further operations; the absence of visible damage does not mean the crane was unaffected

C. This event requires documentation but not an inspection if the load was within 5% of the chart maximum capacity when the exceedance occurred

D. The lift director assumes regulatory liability for the uncontrolled drift — the operator and crane owner have no further obligation after documenting the event in the daily log

90. An operator has been operating at 78% of rated capacity on full outriggers. The next pick requires the same payload but at a 10-foot greater radius. The operator does not re-confirm the chart capacity and assumes the 78% reading means adequate margin remains. What is wrong with this assumption?

A. Nothing — at 78% of rated capacity, a 10-foot radius increase cannot mathematically push the lift above 100% because 78% leaves 22% remaining capacity, which is more than enough for a 10-foot radius adjustment

B. A 10-foot radius increase may require only a minor chart re-check — if the new radius falls within the same chart row, no capacity change occurs

C. The assumption is wrong only if the new radius crosses into a new chart section — within the same section, prior capacity confirmations remain valid for all radii

D. Rated capacity decreases significantly as operating radius increases — at 78% of rated capacity for a given configuration, even a moderate radius increase can push the lift above 100% of the new configuration's rated capacity; the operator must look up and confirm the capacity at the new radius regardless of the prior percentage reading

Answer Key and Explanations

1. C. The controlling entity must provide all available information about ground conditions before crane setup OSHA 1926.1402 requires the controlling entity to disclose all available information about ground conditions — including known or suspected subsurface conditions, underground utility locations, and the proximity of structures. This disclosure must occur before crane setup begins. The regulation does not require a written certification that the ground is safe, and it does not limit the requirement to cranes above a specific capacity threshold.

2. A. Demolition backfill without engineered compaction has significantly lower bearing capacity than undisturbed soil Excavations from demolished basements are typically backfilled with mixed materials placed without the systematic compaction and density testing that engineered fill requires. This backfill does not develop the natural consolidation of undisturbed native soil. The surface may appear solid and level while the subsurface remains loose, compressible, and capable of sudden bearing failure under crane loads. Visual assessment cannot reveal this condition.

3. D. Reduce lifts to bring required bearing pressure within the confirmed 2,500 psf capacity When confirmed soil capacity is below the manufacturer's requirement, the operator cannot simply proceed at the planned configuration. One approach is proportionally reducing the crane's load to bring the bearing pressure within the confirmed capacity — but this requires engineering calculation, not field estimation. The controlling entity must be notified and a qualified person must determine whether load reduction, ground improvement, or alternative setup locations are appropriate.

4. B. A qualified person who evaluates available information and applies engineering principles OSHA 1926.1402 places the ground condition assessment responsibility on the controlling entity, who must rely on a qualified person when formal investigation data is unavailable. A qualified person applies knowledge and experience to evaluate what information exists and make a reasoned determination. The site superintendent's verbal assurance alone — without engineering evaluation — does not constitute a qualified determination of ground adequacy.

5. A. Engineering evaluation of structural capacity and protective measures required A natural gas main is a high-consequence utility — a rupture under crane load creates an immediate fire and explosion risk. Before any crane operates over an active gas main, the pipe's structural capacity under the anticipated outrigger loads must be evaluated by an engineer, and protective measures must be confirmed. A setup that has not undergone this evaluation cannot proceed regardless of the pipe's depth.

6. C. The boring engineer must confirm whether the 60-foot-distant data is representative of the actual setup location A soil boring 60 feet from the setup location provides information about conditions at that boring location — not necessarily at the setup location. Soil can vary significantly over short distances due to fill boundaries, buried features, or natural geological variation. The geotechnical engineer who prepared the report must evaluate whether the boring data is representative of the actual crane pad location before it can be used as the basis for setup.

7. B. Tidal saturation eliminates effective bearing capacity in near-surface soil layers Soils repeatedly saturated by tidal action develop elevated pore water pressure and very low effective stress — the conditions that create bearing capacity. In the saturated zone, cohesion is negligible and friction angle is reduced. Under sustained point loads from crane outriggers, these soils can experience bearing failure with little warning. Wave-induced vibration further reduces shear strength through liquefaction-like mechanisms in loose saturated sands.

8. D. OSHA Table A rate is 4 inches per 10 kV above 50 kV — 15 feet for 200 kV OSHA 1926.1409 Table A specifies that above 50 kV, the minimum approach distance increases by 4 inches for every 10 kV above 50 kV. For a 200 kV line: $10 \text{ ft} + (150 \div 10) \times 4 \text{ inches} = 10 \text{ ft} + 60 \text{ inches} = 10 \text{ ft} + 5 \text{ ft} = 15 \text{ ft}$ minimum. The OSHA table must always be consulted for the specific voltage class — the calculation must be applied to the confirmed line voltage, not estimated.

9. A. A current utility locate must be performed regardless of when the previous locate was done Utility locates reflect underground infrastructure as it existed at the time of the locate. Infrastructure can change — new utilities can be installed, existing utilities rerouted, and emergency repairs made — without any surface indication. A locate from a prior year cannot account for changes that occurred after that date. A current locate is required before each new crane setup operation regardless of when the previous locate was performed.

10. C. Localized lush vegetation can indicate elevated subsurface moisture, buried utilities, or disturbed fill Vegetation that is significantly more lush and taller than surrounding growth in a defined localized area suggests something different is happening at that location at the root level. A leaking utility provides moisture and nutrients. Disturbed fill retains moisture differently than compacted native soil. Elevated organic content can indicate a former waste area. Any of these conditions suggests the soil at that location may differ materially from the surrounding area and requires investigation before outrigger placement.

11. D. Evaluate whether water main break could have saturated soil within the crane's influence zone A water main break 200 feet away can transmit large volumes of water through subsurface soil pathways quickly — especially in sandy or gravelly soils with high permeability. Whether this water has reached the crane's operating area depends on soil type, drainage pathways, and elapsed time. The operator must consider whether the crane's outrigger influence zone could have been affected and have the condition assessed if there is any reasonable possibility of saturation.

12. B. Gradual continuous outrigger movement with load suspended indicates active ground failure A quarter-inch settlement that stabilizes immediately is a seating event — a common occurrence during initial load application as the soil and pad system reaches equilibrium. Continuous, ongoing downward movement over 20 minutes is fundamentally different — it indicates the ground is progressively failing

to support the load. Each increment of ongoing settling brings the crane closer to sudden collapse. The load must be landed before the condition progresses to catastrophic failure.

13. C. Stop, keep all personnel away, contact utility to de-energize — do not move the crane without utility authorization When a crane encroaches on the minimum approach distance of an energized power line, movement of any kind — including moving away from the line — risks completing a circuit through the crane's ground contact or rigging. All crane movement must stop. Ground personnel must stay away from the crane and away from any rigging, load, or outriggers that could provide a ground path. The utility must be contacted to de-energize the line before any movement is authorized.

14. A. Surface deflection near a loaded outrigger indicates potential sub-base failure — evaluate before continuing Asphalt surface deflection under foot near a loaded outrigger is an early warning indicator that the sub-base beneath the asphalt is deforming under load. Asphalt itself is thin and flexible — its behavior reflects what is happening in the aggregate base and subgrade below. If the sub-base is inadequate, the surface will eventually crack and punch through. The load must be landed and the sub-base condition evaluated before any further lifting.

15. D. Loose sand governs the surface bearing capacity — engineer must confirm adequacy for the shallow layer Having dense gravel at 6-foot depth is beneficial for long-term settlement, but the outrigger load must pass through the loose sand layer to reach it. The loose sand's shear strength governs the surface bearing capacity — outrigger pads sized for 2,500 psf must be evaluated against the loose sand's actual capacity, not the dense gravel's capacity. The engineer must confirm whether the pad design adequately addresses the weak shallow layer.

16. B. A hazard exists — minimum approach distance must be maintained in three dimensions Power line proximity is not a two-dimensional horizontal measurement. When the boom tip height exceeds the line elevation, the boom tip is above the line — and approach distance must be maintained vertically, laterally, and in all three-dimensional directions. A boom tip at 85 feet height could be physically closer than 10 feet to a line at 40 feet even at 38-foot horizontal distance, depending on the exact geometry. All three-dimensional components of the approach distance must be assessed.

17. C. The crane must not set up or operate without utility location information OSHA 1926 Subpart CC does not provide an exception for unknown utility conditions. If underground utility information cannot be confirmed, operations cannot begin. The absence of utility locate data is not a condition to be managed with written waivers or ground-penetrating radar alone — the required information must be obtained through the utility notification system before any crane setup proceeds in the area.

18. A. The 8-foot setback from a 12-foot-high sandy loam riverbank may be inadequate — geotechnical evaluation required Crane outrigger loads applied near the crest of a riverbank increase the shear stress in the bank slope. If this increased stress exceeds the bank's shear strength, slope failure occurs — potentially taking the crane with it. The required setback depends on the bank's geometry, slope angle, soil type, moisture content, and the crane's outrigger reaction loads. Sandy loam near a riverbank is particularly susceptible to this failure mode. A geotechnical engineer must evaluate the specific configuration before setup proceeds.

19. B. The current operator must perform their own pre-shift inspection before operating The pre-shift inspection is the current operator's personal responsibility before operating the crane — it cannot be accepted from a previous shift. Ten hours have elapsed since the previous inspection. The crane may have been accessed, the environment may have changed, fluid levels may have dropped, and animal or weather-related damage may have occurred. The inspection requirement is tied to each shift's operator, not to elapsed time since the last inspection.

20. D. Lower the load — 7% discrepancy means actual hook load exceeds what was planned A 7-percentage-point gap between the projected LMI reading and the actual reading at lift-off is significant. It means the actual load moment is higher than the pre-lift calculation indicated. Possible causes include a heavier-than-estimated load, a greater actual operating radius than measured, underestimated rigging weight, or boom deflection under load. None of these can be diagnosed or corrected while the load is suspended — the load must be returned to the ground and each variable verified before another attempt.

21. C. Do not hoist — hold all functions and allow the load to pendulum to a stop Hoisting a load that is already swinging changes the pendulum geometry — it shortens the effective pendulum length, which actually increases the swing speed for the same arc. It also introduces vertical momentum that can shift the load's swing path unpredictably. The correct response is to hold all crane functions and allow the freely suspended load to pendulum to natural rest through damping. Only when the load is fully stable can any further movement be safely evaluated.

22. A. An operator may refuse any pick they personally observe to be unsafe — this refusal is explicitly protected OSHA 1926.1418 protects the operator's right to refuse any unsafe pick — not just those confirmed by an LMI reading. The operator's personal observation of any condition that impairs safe crane operation is sufficient grounds for refusal. This includes unsafe site conditions, inadequate rigging, excessive load weight, and any other factor the operator directly observes. Adverse employment action for exercising this right is a direct OSHA violation.

23. B. Decline — all crane movement requires signals from the designated signal person Moving the hook slightly is still crane movement and is governed by the same signaling requirements as any other crane function. Verbal requests from crew members — regardless of their role, experience, or intent — do not authorize crane movement. The designated signal person must give an authorized signal before any movement occurs. This applies to empty hook repositioning exactly as it applies to loaded picks.

24. D. Stop immediately — an audible structural sound during initial load application requires investigation A popping or cracking sound from the boom area at the moment of load application is an emergency indicator. It may represent yielding of a structural component, a pin seating under unanticipated stress, or the beginning of a structural failure. Any of these conditions can deteriorate rapidly under continued load. All crane functions must stop immediately. The load must be lowered if possible, the crane secured, and a qualified person must inspect the boom and all structural connections before any further operations.

25. C. Multi-crane lifts and personnel platform operations are critical lifts by definition regardless of load percentage OSHA 1926 Subpart CC defines three categories of critical lifts, two of which are unconditional — multi-crane lifts and personnel platform operations are critical lifts regardless of the load

percentage of rated capacity. Only the third category — lifts exceeding 75% of rated capacity — is tied to a capacity threshold. The other two triggers do not require the 75% threshold to be reached.

26. B. Refuse and stop operations until the area is cleared OSHA 1926.1425 establishes that personnel may not be in the fall zone or directly beneath a suspended load during crane operations. This prohibition has no exception for worker experience, awareness, or lift director authorization. The lift director's instruction to proceed does not override a specific OSHA prohibition. The operator must refuse to swing over the workers and operations must stop until the area is cleared and confirmed by the designated signal person.

27. A. Alert all personnel and use the emergency lowering system to land the load safely When the hoist function fails with an 18,000-pound load suspended 18 feet above a concrete floor, the first priority is protecting ground personnel and safely landing the load before the situation deteriorates further. The emergency lowering system exists precisely for this scenario and should be used without delay. Diagnostic attempts, manufacturer calls, or waiting for lift director authorization while a load hangs above workers are all inappropriate delays of the immediate priority.

28. D. Permitted per the limit — but the actual effect of wind on this specific load must be assessed The manufacturer's 30 mph wind limit is developed for a generic load profile. A large flat-surface load — a panel, a wall section, a sign — presents far more wind resistance than the manufacturer's generic assumptions. The wind force on a high-resistance load at 28 mph can exceed what the crane's stability calculation assumed for that wind speed. Both the manufacturer's stated limit and the actual load's wind characteristics must be considered before proceeding.

29. C. Stop operations — rope displaced off the drum flange requires inspection before further picks Wire rope resting against the drum housing rather than properly spooled on the drum can be pinched, kinked, or abraded at the contact point with the housing structure. Even a brief contact can damage the rope's outer wires or create a permanent set that concentrates stress at that location. Operations must stop, the rope must be properly inspected and repositioned, and the displaced section must be evaluated before the crane resumes lifting.

30. A. Re-confirm the load chart capacity at the new operating radius before picking Moving the crane 2 feet closer to the load changed the operating radius from 32 to 30 feet. The capacity check was performed at 32 feet — that value does not automatically apply to 30 feet. While capacity typically increases at shorter radii, the specific value at 30 feet must be confirmed against the chart before the pick. Assuming shorter radius means adequate capacity without verifying the actual chart value is not compliant practice.

31. B. Re-measure actual operating radius and confirm current outrigger conditions When the 12th identical pick feels heavier and the LMI confirms a higher reading, something has changed from the first 11 picks. The most likely causes are outrigger settling that has increased the operating radius, or gradual boom angle change from accumulated hydraulic pressure loss. Both result in a larger actual operating radius than at the start of the sequence — which increases the load moment and reduces the available capacity margin. The radius and outrigger conditions must be re-confirmed before the sequence continues.

32. D. A 6% cross-slope may exceed the manufacturer's travel limitations — assess before proceeding Crane stability during travel depends on the dynamic relationship between the crane's center of gravity and its travel base. A cross-slope tilts the crane laterally, shifting the center of gravity toward the downhill side. At maximum transport boom angle, the boom's mass contribution to this lateral shift is significant. Manufacturer travel specifications for slope limits must be checked before proceeding on a 6% cross-slope in any boom travel configuration.

33. C. Platform must be visually inspected for deformation or distress before personnel board The proof test at 125% of rated capacity subjects the platform to loads beyond its working load limit. Even if the platform passes the test without visible failure, the proof test may have caused deformation at welds, cracking in structural members, or other evidence of overstress. OSHA 1926.1431 requires a post-test visual inspection before personnel are authorized to board. A platform that deformed during the proof test is not suitable for personnel — the test revealed a deficiency rather than confirming capacity.

34. B. Signal person must have complete visibility of the load and all clearance points simultaneously A blind lift through a narrow gap requires the signal person to maintain full situational awareness of the load's position relative to all four clearance boundaries simultaneously. If no single position allows this complete view, additional signal persons must be stationed at each clearance zone — each responsible for their specific clearance point and communicating with each other and the primary signal person throughout the lift.

35. A. The operator may never leave the cab while a load is suspended OSHA 1926.1417 is unconditional — the operator must not leave the cab while any load is suspended. There are no exceptions for restroom breaks, tandem lift arrangements, or temporary landing zones during multi-stage lifts. All loads must be fully landed, all rigging tension completely released, and all controls secured before the operator may leave the cab. Operational inconvenience does not create an exception to this requirement.

36. D. Engage all brakes, assess load position, use emergency lowering if available, and identify the overheating cause before restarting A thermal shutdown is the crane's protection system responding to an overheating condition — not an inconvenient interruption. Restarting the engine immediately bypasses the protection the shutdown provided and could cause engine damage or fire. The load must be safely managed using emergency lowering systems. The overheating cause must be identified and corrected before the engine is restarted — the thermal protection will trigger again if the underlying cause has not been addressed.

37. C. Both actual operating radius and actual total hook load must be confirmed An 8% discrepancy between the calculated and actual LMI reading at lift-off has three probable causes: the actual radius is greater than measured (possible from boom deflection or measurement error), the total hook load is greater than calculated (possible from underestimated rigging or a heavier-than-certified payload), or both variables have contributed smaller errors that combined to create the 8% discrepancy. Each variable must be independently verified against the actual field condition, not the pre-lift estimate.

38. A. The operator must refuse any signal they believe will result in a dangerous condition OSHA 1926.1418 and fundamental crane safety principles establish that the operator is the final safety authority over crane movement. The operator must follow signals from the designated signal person — except when following the signal would create a dangerous condition. In that case, the operator has both the authority

and the responsibility to refuse the signal. The operator does not wait for the signal person to recognize the danger — the operator stops immediately when they identify the hazard.

39. B. Remove the crane from service — a cracked outrigger float requires evaluation before further operations The outrigger float is a primary structural load-bearing component — it is the crane's contact with the ground under potentially hundreds of thousands of pounds of outrigger reaction force. A crack through the float plate changes the float's structural behavior, redistributes load in unintended ways, and can propagate rapidly under dynamic crane loading. The crane must be removed from service and the float evaluated and replaced before any further lifting.

40. D. Monitor brake drift continuously during the extended hold — land the load if any downward movement occurs There is no OSHA time limit for suspended load holds — a mechanically sound crane with properly functioning brakes can hold a load safely. However, the hoist brake system must be monitored continuously during any extended hold. Internal hydraulic leakage past hoist brake seals can cause slow, progressive lowering over time. If any downward movement of the load is detected during the hold, the load must be landed immediately — regardless of the reason for the hold.

41. C. Never — the LMI supplements but does not replace the load chart as the capacity reference The LMI provides real-time load moment information as a percentage of rated capacity for the current configuration. It is a supplemental safety device — not a load chart substitute. The operator's obligation is to independently confirm the specific rated capacity value for the current configuration from the load chart before each pick. The LMI reading confirms whether the load moment is within the chart's rated limit — it does not relieve the operator of the duty to know what that limit is from the chart itself.

42. D. Unilateral peening indicates excessive fleet angle — rope has been contacting the sheave groove side When a wire rope runs at an excessive fleet angle, it approaches the sheave groove at an angle rather than entering directly. This causes the rope to press against one side of the groove, concentrating contact force on the outer wires on that side. Repeated contact compresses and flattens those wires — a condition called peening. This is visible as flattened, work-hardened wires on one side of the rope only. The fleet angle geometry must be corrected and the damaged rope replaced.

43. A. Checking hooks, shackles, and load block components for visible deformations, cracks, or wear ASME B30.5 frequent inspection requirements include examination of hooks for deformation, cracks, and throat opening changes; inspection of load block sheaves, pins, and housing for damage; and verification that all safety latches and retention devices are functional. These are items that can change rapidly with use — the frequent inspection is specifically designed to catch these conditions before they cause a failure during a pick.

44. B. A bolt-type anchor shackle — though the rigging should be redesigned to eliminate angular loading For applications involving angular loading, the bolt-type anchor shackle's symmetrical bow geometry provides better resistance to side loading than a screw-pin type — the bolt and nut cannot unscrew under angular force the way a screw pin can. However, this does not make angular loading acceptable practice. Shackles are designed to carry load in-line through the bow. The rigging should be redesigned to eliminate the angular load condition — the shackle selection is a secondary mitigation, not a permanent solution.

45. C. The sling must be removed from service — without a legible tag, rated capacity cannot be confirmed A synthetic web sling's working load limit tag is not a convenience — it is the only field-verifiable confirmation of the sling's rated capacity, construction, and application limits. Without a legible tag, there is no reliable way to confirm what the sling is rated for in any hitch configuration. ASME B30.9 requires removal from service when the identification tag is missing or illegible. The sling cannot be used until a replacement tag is provided by the manufacturer with verifiable documentation.

46. A. ASME B30.9 covers all sling types including synthetic round slings ASME B30.9 is the comprehensive sling standard covering wire rope slings, chain slings, metal mesh slings, synthetic web slings, and synthetic round slings used for overhead lifting. All of these sling types are governed under this single standard. Synthetic round slings are not classified as below-the-hook lifting devices (B30.20) or rigging hardware (B30.26) — they are slings and are therefore governed by B30.9.

47. D. A periodic inspection equivalent is required after more than three months of inactivity ASME B30.5 and OSHA 1926.1412 both establish that cranes idle for more than three months require an inspection before returning to service that is commensurate with a periodic inspection — not just the normal pre-shift check. During extended storage, hydraulic seals can dry and crack, wire ropes can develop corrosion, structural joints can develop galvanic corrosion, and fluids can degrade. The returning-from-idle inspection must address all items that could have deteriorated during the inactive period.

48. B. The operator is not qualified during those 15 days — the employer must not permit operation An expired NCCCO certification is not a valid certification regardless of the reason for the expiration or the status of any pending recertification application. OSHA 1926.1427 requires that operators hold valid certification for the crane type they operate. There is no grace period provision in the regulation. The employer must not permit the operator to operate covered equipment during the certification gap — the employer bears the regulatory violation if they allow it.

49. A. Minimum design factor of 10 for rotation-resistant rope in personnel hoisting OSHA 1926.1414 establishes separate minimum design factors based on rope construction and application. For non-rotation-resistant rope in personnel hoisting, the minimum design factor is 7. For rotation-resistant rope in personnel hoisting, the minimum design factor is 10 — a significantly higher requirement that reflects the greater complexity and the higher consequences of failure in personnel hoisting with this rope type.

50. C. A stiff, slow-return latch must be repaired — it may not fully seat after sling contact The safety latch's function depends on the spring's ability to return the latch to the closed position quickly and completely after a sling passes through the hook throat. A weakened spring that closes slowly may not fully reseat against the hook tip after a sling enters the hook throat — particularly when the crane swings or the load shifts during a pick. A latch that appears closed but is not fully engaged provides no retention protection. The latch spring must be replaced before the hook returns to service.

51. D. Heat damage is an absolute removal condition regardless of broken wire count ASME B30.5 establishes heat damage as a category of rope condition that triggers mandatory removal independently of broken wire counting. Heat damage — indicated by discoloration, loss of lubrication, annealing of the steel, or deformation of the wire surface — permanently changes the wire's metallurgical properties in ways that dramatically reduce its tensile strength and fatigue resistance. These changes cannot be detected

by broken wire counting alone and cannot be reversed. Removal is mandatory upon confirmed heat exposure.

52. B. Different termination types have different efficiency ratings — the assembly must be rated for the lowest efficiency Swaged sleeves typically achieve higher efficiency (closer to 100% of nominal rope breaking strength) than wedge sockets, which typically achieve 75-80% efficiency. In a four-leg bridle where two legs have swaged sleeves and two have wedge sockets, the legs are not equivalent in effective capacity. The overall sling assembly capacity must be calculated based on the lowest-efficiency termination type present. The rigging engineer or manufacturer must confirm the assembly's rated capacity for the mixed-termination configuration.

53. C. Employer programs must be audited by a nationally recognized accreditation body to qualify operators OSHA 1926.1427 permits employer-developed qualification programs as one pathway to operator qualification — but only when those programs have been audited by a nationally recognized accreditation body. Without the required audit, the program's content quality is irrelevant to regulatory compliance. Operators qualified under an unaudited employer program are not considered qualified under OSHA 1926.1427 regardless of how rigorous the program's written and practical evaluation components are.

54. A. The employer is responsible for determining and confirming qualified rigger status OSHA 1926 Subpart CC places the obligation to confirm qualified rigger status on the employer. The employer must determine that the individual designated as a qualified rigger has the specific knowledge, training, and experience to rig loads safely for the type of lifting involved. This determination cannot be delegated to the lift director, signal person authority, or assumed from a general certification. The employer bears regulatory responsibility for this determination on each project.

55. D. Remove the block from service — a cracked sheave is a structural failure in the block assembly A crack that extends 180 degrees around the sheave rim is not a monitor-and-continue condition — it is a structural failure that has already progressed halfway around the sheave's load-bearing circumference. Under load, this crack can propagate rapidly to complete separation, releasing the rope and dropping the load without warning. The entire block must be removed from service, the sheave replaced, and the assembly inspected before returning to service.

56. B. Rated capacity is configuration-specific; maximum capacity is the highest rated value across all configurations These two terms describe different things. Rated capacity is the maximum load the crane may safely lift in its current specific configuration — it changes as boom length, counterweight, radius, and outrigger extension change. Maximum capacity is the highest single rated capacity value that appears anywhere in the load chart across all configurations. Maximum capacity applies only to the specific configuration under which it was achieved — it is not a general operating limit applicable to all configurations.

57. C. A qualified person must direct the assembly and disassembly of the specific crane type OSHA 1926.1403 requires that crane assembly and disassembly be directed by a qualified person with specific knowledge of the procedures for the crane type being assembled or disassembled. This is a type-specific requirement — a qualified person for lattice boom truck crane A&D may not be qualified to direct tower

crane A&D. The site safety officer, project contractor, or crane owner does not satisfy this requirement unless they personally meet the qualified person standard for that specific crane type.

58. D. Rope inspection results must be recorded and retained throughout the rope's service life ASME B30.5 requires that wire rope inspection results be documented and those records maintained for as long as the rope remains in service. This continuous record allows the rope's condition history to be tracked — identifying whether damage indicators are new or developing — and provides the basis for evaluating whether progressive deterioration warrants removal before any single inspection criterion is met. Records cannot be purged as long as the rope continues in service.

59. A. The minimum design factor for standard non-rotation-resistant rope in material hoisting is 5 OSHA 1926.1414 establishes a minimum design factor of 5 for wire rope used as the main load line on construction cranes for standard material hoisting with non-rotation-resistant rope. This differs from the personnel hoisting requirement — for personnel hoisting, the minimum design factor increases to 7 for non-rotation-resistant rope and 10 for rotation-resistant rope. The 5:1 factor applies to routine material hoisting applications.

60. B. Compliant if the lift plan was updated before the lift began to reflect radio communication OSHA 1926.1419 permits any signal method — including radio communication — provided it is established and understood by all involved personnel before operations begin. If the lift plan was revised before the lift to specify radio communication between the lift director and operators as the signaling method, and all involved personnel were briefed on this change, the deviation from the originally planned signal person method is compliant. What is not acceptable is changing the method mid-lift without updating the plan and re-briefing all personnel.

61. C. This depends on whether the employer's program includes re-evaluation requirements OSHA 1926.1427's employer program provisions require the program to evaluate operator effectiveness — which implies some form of ongoing assessment. A program that evaluated an operator once four years ago and never followed up may not be demonstrating the ongoing compliance the regulation requires. The employer must review their specific program against the regulation's requirements to confirm whether periodic re-evaluation is included and whether it has been conducted. A gap of four years without any follow-up evaluation warrants close scrutiny.

62. A. The ATB device must provide both an alarm and an automatic hoist stop before two-blocking occurs OSHA 1926.1415 requires that cranes be equipped with an anti-two-block device that both warns the operator and automatically stops the hoist before two-blocking occurs. Both functions are required — an alarm-only device that does not automatically stop the hoist is not compliant. If either function fails — the alarm or the automatic stop — the crane must be removed from service until both functions are restored and verified. This is confirmed in Exams 2 and 3 and remains a consistently tested regulatory requirement.

63. D. Employer penalty exposure includes serious and potentially willful violation classifications OSHA violations for knowingly employing a non-qualified crane operator are assessed as serious violations — and can be elevated to willful violations if the employer was aware of the non-qualification and continued operations regardless. Willful violations carry significantly higher civil penalties than serious violations. Additionally, insurance coverage for any incident during non-qualified operation may

be denied, and the employer may face third-party liability in addition to OSHA penalties. Individual credential holders do not bear the primary regulatory liability — employers do.

64. B. A 6% or greater diameter reduction is an ASME B30.5 removal criterion ASME B30.5 specifies that wire rope showing a reduction in nominal diameter of 6% or more from its catalog dimension must be removed from service. Diameter reduction indicates that the rope's internal structure is deteriorating — typically from internal wire breakage, core failure, or severe external wear — in ways that broken wire counting on the rope's outer surface cannot capture. The rope's actual load-carrying capacity is reduced below its rated capacity when significant diameter reduction has occurred.

65. C. Synthetic web slings are degraded by UV exposure, chemicals, heat, and sharp-edge abrasion Synthetic web slings made from polyester or nylon fibers have specific environmental limitations that wire rope and chain slings do not share. Sustained UV exposure degrades the polymer fibers. Chemical contact — from acids, alkalis, or solvents — can cause rapid degradation without visible surface indication. Heat above 194°F for polyester or 180°F for nylon reduces fiber strength. Sharp-edge contact can cut load-bearing fibers without apparent outer damage. These limitations make synthetic web slings unsuitable for environments where these conditions cannot be controlled.

66. A. Structural repairs must be reviewed by the manufacturer or qualified engineer before return to service OSHA 1926.1412 requires that structural modifications or repairs to crane components be reviewed and authorized by the crane manufacturer or a qualified engineer before the crane returns to service. This is not a checklist item the operator or site safety officer can self-certify. Boom chord repairs, gusset plate repairs, and other structural work require engineering verification that the repair restores the structural integrity the load chart depends on. Without this review, there is no valid basis for assuming the original load chart values remain applicable.

67. D. 49,544 lb — see editorial note; correct calculation yields 49,344 lb The correct calculation: Gross capacity (54,000) minus block (1,100) minus spreader beam (2,400) minus six slings ($6 \times 150 = 900$) minus eight shackles ($8 \times 32 = 256$) = total deductions of 4,656 lb. Net capacity = $54,000 - 4,656 = 49,344$ lb. Answer D (49,544 lb) is the closest option and should be credited due to a shackle weight discrepancy in the question. Every component below the hook must be individually deducted.

68. C. Block is already embedded in the chart value — deduct rigging only; net = 40,420 lb; lift proceeds When the chart note states that gross capacities include the hook block weight, the published capacity value already has the block weight factored in. The operator does not additionally deduct the block — it has already been accounted for in the chart's development. Only the 580-pound rigging weight requires additional deduction: $41,000 - 580 = 40,420$ lb net capacity available for payload. Since 40,420 lb exceeds the 39,200 lb payload, the lift can proceed.

69. B. The structural limit of 58,000 lb governs — it is the lower value and is the rated capacity Load charts reflect multiple possible limiting conditions at any given configuration. At very short radii and high boom angles, structural limits often govern rather than stability limits. When the structural limit (58,000 lb) is lower than the stability limit (72,000 lb) for the same configuration, the structural limit is the rated capacity — using the higher stability value would overload the crane's structure even if tipping stability is adequate. The lower of the two governing limits is always the rated capacity.

70. D. Boom deflection increased the actual radius — crane is beyond confirmed capacity; lower the load Boom deflection under load is physics — a heavy boom bends, moving the tip outward and increasing the horizontal distance from the center of rotation to the load. This increase in actual radius directly increases the load moment. When the LMI confirms a radius increase from 28 to 30.5 feet and the total hook load now exceeds net capacity at 30.5 feet, the crane is operating beyond its rated capacity for the actual configuration. The load must be lowered to the ground while the situation is investigated.

71. A. The 15-degree column applies — when actual jib offset falls between chart columns, use the lower offset angle's value When the jib is set at an angle not explicitly listed in the load chart, the operator must use the capacity value for the nearest lower listed offset angle. For a 20-degree actual offset, the 15-degree column applies. Interpolating between the 15-degree and 25-degree columns is not a recognized methodology under ASME B30.5. Using the 15-degree column's capacity value is the conservative and compliant approach for a 20-degree actual offset.

72. B. Net capacity with 75-foot boom is 33,050 lb — exceeds required 31,000 lb; lift can proceed The crane is rigged with the 75-foot boom — that is the applicable chart section. Gross capacity: 34,500 lb. Total deductions: block (800) + rigging (650) = 1,450 lb. Net capacity: 34,500 – 1,450 = 33,050 lb. Required net capacity: 31,000 lb. Since 33,050 lb exceeds 31,000 lb, the lift can proceed. Switching to the 60-foot boom for additional margin is not necessary and would require a configuration change that is unjustified when the 75-foot configuration already provides adequate capacity.

73. D. Extend to full, re-level, confirm tires off ground — then full extension values apply With the load on the ground, the outrigger configuration may be safely changed. The sequence is: physically extend all outriggers to full extension, re-level the crane within the manufacturer's tolerance, confirm that all four tires are completely off the ground, and then verify the full extension capacity at the planned pick configuration before lifting. Each of these steps is a required verification — not a formality. The full extension chart column does not apply until every condition it was developed for has been physically confirmed.

74. C — CORRECTED (see editorial notes above) The correct answer is **B**. A load chart section is valid only when the crane's actual counterweight configuration exactly matches the counterweight specification for that chart section. Any difference in installed counterweight — even a small one — invalidates the chart section developed for the different amount. The chart section is not valid for general use across similar configurations — it was developed for the specific counterweight it specifies.

75. A. 99.5% of net capacity — every input must be precisely verified at this margin level Total hook load (64,500 lb) ÷ net capacity (64,800 lb) = 99.5%. This lift is within rated capacity but the margin of 300 pounds is functionally zero. At this margin, any error in any input — load weight, operating radius, rigging weight, or configuration — can push the actual hook load above net capacity. Every variable must come from a certified, verified source. No estimation is acceptable. The payload weight must come from a certified scale. The operating radius must be directly measured. All rigging weights must be individually confirmed.

76. C. The chart note means rated capacity does not apply to drag picks — the lift must be replanned Load chart ratings are developed assuming freely suspended loads — the crane supports only the vertical weight of the load and rigging. Dragging a load horizontally introduces friction forces and horizontal

components that increase the effective load on the crane above the hanging weight and apply lateral forces to the boom and rigging not accounted for in the stability calculation. The chart note explicitly restricts the rated capacity to free vertical picks. The lift must be replanned to eliminate the drag requirement or the additional forces must be professionally engineered.

77. B. Stop all crane movement — Crane A has exceeded rated capacity; land the load cooperatively

A tandem lift where one crane has exceeded its rated capacity is an emergency condition regardless of the cause. The 8,000-pound load shift from rotation has pushed Crane A to 103% of net capacity. This is a rated capacity exceedance — not a monitoring situation. All crane movement must stop immediately. The lift director must coordinate a controlled set to a safe surface using both cranes moving in a directed sequence. The lift plan must be revised to prevent load rotation on subsequent attempts — longer taglines, rotation control devices, or revised rigging geometry.

78. D. The footnote is a manufacturer restriction — a 25-minute hold at maximum radius may violate it

Load chart footnotes are part of the rated capacity conditions — they are not advisory suggestions. A manufacturer's note restricting extended holds at maximum radius reflects a real engineering concern — likely related to hydraulic brake fatigue, structural fatigue at sustained maximum load moment, or thermal effects on brake components during long holds. A 25-minute hold at the maximum rated radius may exceed the conditions the manufacturer designed for. The lift plan must be revised so the hold occurs at a shorter, less demanding radius, or the manufacturer must specifically confirm that a 25-minute hold at 40-foot radius is acceptable for this crane.

79. A. Actual net payload capacity is 55,110 lb — lift remains within capacity with reduced margin

With the actual spreader bar weight of 3,800 lb: total deductions = block (1,200) + rigging (890) + spreader bar (3,800) = 5,890 lb. Actual payload capacity = 61,000 – 5,890 = 55,110 lb. Payload of 55,000 lb is within the actual net capacity by 110 lb — compared to the planned 510 lb margin. The lift is still within rated capacity but the margin has been reduced by nearly 80%. The discovery must be documented and the remaining lift steps must be executed with awareness of the reduced margin.

80. B. Temporary radius reduction during swing is not an independent capacity concern when pick and set are confirmed

The operator confirmed capacity at both the 55-foot pick radius and the 58-foot set radius. The temporary increase in boom angle to avoid an obstruction reduced the radius to 42 feet — which increases the capacity margin. There is no concern about operating at reduced radius with a load that was confirmed within capacity at a greater radius. The operator should verify the boom angle increase did not create any clearance concerns with overhead obstructions, and should confirm the actual path taken remained within all confirmed capacity check points.

81. D. The load must travel entirely within the rear quadrant — any lateral swing outside the rear quadrant invalidates the over-rear rating

The over-rear load chart value was developed for lifting and traveling directly over the rear of the carrier — it reflects the stability geometry specific to that direction of loading. The moment the swing path moves laterally into the side or front quadrants, the stability geometry changes and the over-rear capacity no longer governs — the 360-degree value of 71,000 lb becomes the applicable limit. If the full 83,000-pound total hook load cannot be confirmed to stay entirely within the rear quadrant throughout every phase of the lift, the 360-degree capacity governs and the lift cannot proceed.

82. C. The crane must be confirmed in the exact configuration for which the structural limit was developed Structural limit ratings are derived from engineering analysis of the crane's structural capacity at a precisely defined configuration — specific boom length, specific counterweight, specific outrigger extension, specific boom angle range. Any deviation from the exact specified configuration invalidates the structural limit rating because the structural loading has changed from what the analysis was based on. The operator must verify that the crane matches the structural limit configuration precisely before using the structural limit capacity value.

83. A. Confirm chart capacity at 30 feet, deduct new rigging assembly, verify net capacity supports payload This pick requires two new capacity checks: the radius has changed from 24 to 30 feet, and the rigging assembly has changed from a two-leg bridle to a four-leg bridle with a different weight. The 24-foot capacity confirmation does not carry over to a 30-foot pick. The two-leg bridle weight does not apply to the four-leg bridle. A fresh calculation is required: look up gross capacity at 30 feet, deduct block (950 lb) plus the new four-leg bridle (1,380 lb), confirm the resulting net capacity supports the 38,000 lb payload.

84. B. Critical lift plan required — total hook load of 71,500 lb is 75.3% of rated capacity Total hook load: payload (68,000) + block (1,400) + rigging (2,100) = 71,500 lb. Percentage of rated capacity: $71,500 \div 95,000 = 75.3\%$. This exceeds the 75% threshold that triggers formal critical lift requirements under OSHA 1926 Subpart CC. A written critical lift plan and pre-lift meeting are required before this pick proceeds. The threshold is applied to the total hook load — all components hanging below the hook — not to the payload alone.

85. C. No rated capacity exists for the 80-foot boom at 35-foot radius — the lift cannot be made in this configuration The absence of a chart value for the 80-foot boom at 35-foot radius means the manufacturer has not established a rated capacity for that configuration — not that the value was omitted from the printed chart. This absence typically indicates the 80-foot boom cannot achieve a plumb pick at 35-foot radius due to minimum boom angle geometry. The operator cannot use the 70-foot boom values, cannot contact the manufacturer for a non-existent value, and cannot proceed. The boom length must be changed or the crane repositioned.

86. A. Confirm capacity at the maximum planned radius of 30 feet — if the load is within capacity there, shorter radii are automatically within capacity Load chart capacity increases as operating radius decreases for the same boom configuration. If the planned load weight is confirmed within net capacity at the maximum planned radius of 30 feet, the same load at any shorter radius in the range will also be within net capacity — because the capacity is higher at shorter radii. This approach is valid when the load weight remains constant across the series. If any pick in the series involves a different load weight, a new capacity check at the specific radius for that load is required.

87. D. Reeving change is a configuration change requiring the load to be on the ground and all steps verified before picking Changing from 3-part to 5-part reeving is not a minor adjustment — it changes the load line's mechanical advantage, line speed, the load-per-part calculation, the drum's spooling requirements, and the applicable load chart section. These changes must be confirmed with the load on the ground and crane functions secured. After reeving is physically complete, the operator must confirm

the drum has adequate line for the additional parts, verify the 5-part chart section applies to the configuration, and confirm capacity before picking.

88. B. Crane A: 45,360 lb within 54,000 lb capacity; Crane B: 62,640 lb within 67,000 lb capacity — lift can proceed Crane A's assigned share: $108,000 \times 0.42 = 45,360$ lb. Crane A's net capacity: 54,000 lb. $45,360 < 54,000$ — within capacity. Crane B's assigned share: $108,000 \times 0.58 = 62,640$ lb. Crane B's net capacity: 67,000 lb. $62,640 < 67,000$ — within capacity. Both cranes are within their individual net capacities under the specified load sharing plan. OSHA does not require equal load sharing or a minimum percentage reserve — it requires that each crane's assigned share not exceed its individual net capacity. Both conditions are satisfied.

89. C. The 2-foot exceedance beyond chart maximum is a rated capacity overage event requiring post-incident inspection The load chart's maximum rated radius for this configuration is 60 feet. Operating at 62 feet — even momentarily and unintentionally — means the crane operated in a configuration for which no rated capacity exists. This is equivalent to an overload event. The crane must stop, the load must be safely landed, and a competent person must complete a post-incident inspection before any further lifting. The absence of visible damage does not confirm the crane was unaffected — internal damage to structural members is not always externally visible.

90. D. Rated capacity decreases significantly with increasing radius — 78% at one radius can become 100% or more at 10 feet greater radius This is one of the most important concepts in load chart interpretation. Rated capacity is not a fixed percentage that travels with the crane from one radius to another — it is a configuration-specific value that changes substantially as radius increases. A crane at 78% of rated capacity at 22-foot radius may be at 95% or more of rated capacity at 32-foot radius for the same load. The prior percentage reading is meaningless at a new radius. The operator must always look up the specific capacity value for the new radius and confirm it supports the total hook load before picking.