PRACTICE EXAM 9

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

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1. A crane is set up on a site where the controlling entity verbally confirms that ground conditions are adequate but refuses to provide any written documentation. Under OSHA 1926.1402, what is the operator's obligation?

A. Accept the verbal confirmation — verbal disclosure satisfies OSHA 1926.1402 when no written records exist

B. Request the information in a form that can be reviewed and retained — verbal confirmation alone does not satisfy the operator's need to evaluate ground condition information before setup

C. Proceed if the lift director cosigns the verbal confirmation in the daily log

D. Contact OSHA directly to report the controlling entity's refusal before proceeding

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2. A crane is operating on a site when the operator notices one outrigger pad has slowly sunk 4 inches over the past 30 minutes with a load suspended. What does this indicate?

A. Progressive ground failure is occurring beneath that outrigger — the load must be landed immediately before the failure advances further

B. Four inches of settlement over 30 minutes is within normal consolidation behavior for soft soil sites

C. The outrigger cylinder has developed an internal hydraulic leak causing gradual retraction

D. The pad size is insufficient — add cribbing beneath the existing pad and monitor during the next pick

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3. Under OSHA 1926 Subpart CC, when a crane is working near power lines and an encroachment occurs, what is the first action required of ground personnel?

A. Move toward the crane to assist the operator in moving away from the line

B. Contact the utility company immediately from the nearest phone

C. Stay away from the crane and all rigging — ground personnel must not approach until the utility confirms the line is de-energized

D. Signal the operator to move the crane away from the line immediately

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4. A site investigation reveals an abandoned underground railroad tunnel at 15-foot depth beneath the planned crane setup area. The tunnel is unlined and approximately 12 feet in diameter. What concern does this create?

A. The tunnel creates groundwater channeling that will saturate the overlying soil during rain events

B. The tunnel's depth of 15 feet places it below the influence zone of standard crane outrigger loads

C. The tunnel's steel rail infrastructure creates magnetic interference with the crane's LMI sensors

D. The tunnel void eliminates subsurface support — ground above a large unlined void can collapse under crane loads without warning

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5. A crane is being set up adjacent to a river. The site geotechnical report was prepared during the dry season. Operations are now occurring during the wet season with the river 2 feet below flood stage. What specific concern applies?

A. Seasonal high water can raise the groundwater table, saturating soils that were dry and firm during the investigation period

B. Wet season operations require a separate environmental permit before any crane can operate within 50 feet of a waterway

C. The geotechnical report remains valid regardless of seasonal water table changes

D. Flood stage proximity requires the crane to be anchored to prevent flotation during operations

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6. An operator is directed to set up over a marked underground electric transmission line rated at 138 kV. The line is at 6-foot depth. What must occur before the crane is positioned over this line?

A. Notify the utility company of the planned setup — notification satisfies the requirement for working over transmission lines

B. The utility owner must evaluate the line's structural capacity under the anticipated outrigger loads and confirm protective measures before any crane is positioned over it

C. Place maximum-size timber mats over the line and proceed — matting satisfies the protective measure requirement for buried transmission lines

D. Confirm the line is insulated before positioning the crane — insulated lines do not require engineering evaluation for overhead loading

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7. A crane operator observes that the soil around one outrigger pad is heaving upward in a ring pattern around the pad perimeter during a pick. What does this indicate?

A. The pad is the correct size — heaving around the pad perimeter confirms the load is being distributed as designed

B. The outrigger cylinder pressure is too high — reduce hydraulic pressure to stop the heaving

C. The soil is failing in bearing — upward heaving around an outrigger pad is a classic sign of bearing capacity failure and requires immediate load landing and ground evaluation

D. The heaving is caused by trapped groundwater being displaced — improve site drainage and continue operations

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8. Under OSHA 1926 Subpart CC, what documentation must the operator have available in the cab during crane operations?

A. The crane's annual maintenance log and the current shift's pre-shift inspection form

B. The operator's NCCCO certification card and the project's lift plan binder

C. The crane's registration certificate and the controlling entity's ground condition disclosure

D. The applicable load chart and the crane's operation and maintenance manual

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9. A crane is set up on a hillside site. The front outriggers are downhill and the rear outriggers are uphill. The crane has been leveled within manufacturer's tolerance using the outrigger cylinders. What specific concern does this setup orientation create?

A. Downhill front outriggers bear higher loads than the uphill rear outriggers in this orientation — the downhill ground must be specifically confirmed adequate for the elevated front outrigger reactions

B. Uphill rear outriggers always bear more load than downhill front outriggers regardless of leveling

C. Hillside setups require the crane to face uphill regardless of lift geometry

D. The leveling process compensates for all hillside concerns — a leveled crane on a hillside has identical load distribution to a leveled crane on flat ground

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10. A utility locate marks a fiber optic cable bundle at 18-inch depth directly beneath the planned path of crane travel to the setup location. What must be confirmed before the crane travels over this line?

A. Fiber optic cables are non-conductive and pose no hazard to crane travel regardless of depth or load

B. The cable's structural capacity under the crane's travel load must be confirmed — even non-electrical utilities can be crushed by crane travel loads at shallow depth

C. Travel over marked utilities is permitted when the crane is unladen — add the restriction only when traveling with a suspended load

D. Notify the utility owner and proceed — notification satisfies the travel requirement for non-electrical utilities

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11. A crane is operating on a waterfront site when the operator notices the outrigger pads on the water side of the crane have begun to tilt toward the water. The crane remains level. What does this finding indicate?

A. The outrigger cylinders on the water side are extending due to thermal expansion of the hydraulic fluid

B. Pad tilting on the water side is normal for waterfront sites — the surface slopes toward the water by design

C. The soil beneath the water-side outriggers is yielding laterally toward the water — this is a warning of slope failure that could result in the outriggers sliding toward the water; the load must be landed and the condition evaluated immediately

D. The outrigger floats have become unlocked — re-lock the floats and monitor during the next pick

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12. Under OSHA 1926.1402, which party bears primary responsibility for providing ground condition information before crane setup?

A. The crane owner — as the equipment operator's employer, the crane owner is responsible for confirming ground adequacy

B. The crane operator — the operator's pre-shift inspection includes ground condition assessment

C. The project engineer of record — all ground-related decisions on a construction project are the engineer's responsibility

D. The controlling entity — OSHA 1926.1402 places the disclosure obligation specifically on the controlling entity who has knowledge of and control over the site

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13. A crane is set up on a site where a large volume of concrete was poured and cured directly on the ground surface 48 hours ago. The crane's outrigger will bear on the edge of the new concrete slab. What concern does this create?

A. Concrete at 48 hours has not reached its design strength — bearing on the edge of an immature slab creates a risk of edge spalling or cracking under concentrated outrigger loads

B. Concrete cures to full strength within 24 hours — a 48-hour-old slab is fully rated for crane outrigger loads

C. The concern is limited to chemical contamination — fresh concrete leachate can corrode the crane's outrigger components

D. Edge bearing on concrete is always preferred over soil bearing — concrete provides uniform load distribution regardless of cure age

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14. An operator is setting up in an area that was used as a burn pit for construction debris 10 years ago and has since been covered with gravel fill. What subsurface concern is most relevant?

A. Residual combustion byproducts create a slip hazard beneath the gravel surface layer

B. Burned organic debris leaves voids and ash layers with very low bearing capacity that may not be detectable from surface assessment alone

C. The gravel fill layer provides adequate bearing capacity regardless of what materials are present beneath it

D. A 10-year period is sufficient for burned debris to consolidate to bearing capacity equivalent to native soil

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15. A crane is positioned 20 feet from an energized 345 kV transmission line. Under OSHA 1926.1409, is this positioning compliant?

A. Yes — 20 feet exceeds the 10-foot baseline minimum and is compliant for all voltage classes

B. Yes — 20 feet meets the minimum for lines rated up to 350 kV under OSHA Table A

C. No — for lines rated between 300 kV and 350 kV, OSHA Table A requires a minimum approach distance greater than 20 feet

D. No — all lines above 100 kV require a minimum of 25 feet regardless of the specific voltage

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16. A crane is set up on a site and operations have been underway for 3 hours when a neighboring excavation contractor begins driving sheet piles 80 feet away. What concern does pile driving create for the crane's setup?

A. Sheet pile driving creates airborne vibration that can damage the crane's electronic LMI components

B. The 80-foot distance exceeds the influence zone of sheet pile vibration for all soil types

C. Sheet pile vibration can loosen previously adequate soil and reduce outrigger bearing capacity — the operator must monitor outrigger conditions and stop if any settlement or movement is detected

D. The crane must be shut down whenever impact pile driving occurs within 100 feet of the setup location

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17. A crane operator is performing a setup inspection and confirms adequate ground conditions. Before the first pick, a concrete truck drives over the planned setup area and parks adjacent to the front outrigger position. What concern does this create?

A. The concrete truck's weight may have altered the ground conditions beneath the front outrigger positions since the operator's inspection — the front outrigger area must be re-evaluated before picking

B. Concrete trucks are rated for the same loads as crane outriggers — no additional evaluation is needed

C. The concern is limited to the concrete truck's proximity during operations — ensure it moves before the swing arc passes over it

D. The pre-setup inspection remains valid regardless of equipment traffic after it was completed

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18. A crane is operating on a pier over water. The pier's structural drawings show a maximum uniform load rating of 500 psf. The crane's outrigger reaction will be 4,200 psf under each pad. What must happen before operations begin?

A. Increase the outrigger pad size until the contact pressure drops below 500 psf

B. A structural engineer must evaluate the pier specifically for the concentrated outrigger point loads — the uniform load rating does not govern concentrated crane loads

C. Confirm with the pier owner that the 500 psf rating includes a safety factor of 4 — if so, the effective crane load limit is 2,000 psf and the setup may proceed

D. Proceed at 60% of rated capacity — the proportional reduction brings outrigger reactions within the pier's uniform load rating

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DOMAIN 2: OPERATIONS

Questions 19–41

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19. A crane operator is making a pick when the load line develops visible slack between the drum and the first sheave even though the load is suspended. What has most likely occurred?

A. The hoist brake has partially released — re-engage the brake and continue hoisting

B. The drum is spooling rope faster than the hook is rising — reduce hoist speed to eliminate the slack

C. The load has landed on an unseen support below — slack in a loaded line indicates the crane is no longer supporting the full load weight; stop all functions and visually confirm the load's position before any further movement

D. The rope has jumped a sheave — continue hoisting slowly to reseat the rope in the groove

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20. Under OSHA 1926 Subpart CC, which of the following is a condition that makes a lift a critical lift regardless of the load's percentage of rated capacity?

A. Any lift involving a load that has never been previously weighed by a certified scale

B. Any lift where the operating radius exceeds 30 feet

C. Any lift where the signal person is more than 50 feet from the operator

D. Personnel platform operations and multi-crane lifts are critical lifts by definition regardless of load weight or percentage of rated capacity

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21. A crane is performing a pick when the operator loses sight of the load as it passes behind a structural column. The signal person also loses sight of the load momentarily. What must happen?

A. All crane movement must stop until either the operator or signal person reestablishes visual contact with the load

B. The operator may continue at reduced speed using the last confirmed signal

C. The signal person must relocate to regain visual contact before signaling the operator to resume

D. Continue the pick — brief visual obstructions during swing are an expected part of congested site operations

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22. An operator is performing a long-radius pick at 85% of net capacity when the boom deflects visibly more than expected under the load. The LMI reads 91%. What must the operator do?

A. Continue — visible boom deflection is expected at 85% of net capacity and the LMI reading is below 100%

B. Lower the load to the ground immediately — greater-than-expected boom deflection indicates the actual operating radius has increased from boom flex, which has pushed the load moment above the planned level; the radius, load weight, and configuration must all be verified before another attempt

C. Reduce boom angle slightly to compensate for the deflection and restore the planned radius

D. Reset the LMI to the pre-lift calculated value — boom deflection causes the LMI to overread at long radii

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23. A signal person gives a hoist-up signal while standing outside the designated signal zone. The operator can clearly see the signal but knows the signal person is not in the agreed-upon position. What must the operator do?

A. Follow the signal — the operator can see it clearly and signal clarity governs, not signal position

B. Sound the horn and wait for the signal person to move to the correct position before following the signal

C. Stop all crane movement and communicate with the signal person to re-establish the correct signaling position before resuming operations

D. Follow the signal at half speed as a precaution until the signal person returns to the designated zone

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24. A crane is mid-swing with a 30,000 lb load at working height when the engine loses power and shuts down. Hydraulic pressure begins dropping. What is the operator's first priority?

A. Attempt to restart the engine immediately to restore hydraulic pressure before the brakes release

B. Radio the lift director to report the engine failure and request instructions

C. Sound the horn continuously to alert ground personnel to clear the area

D. Apply all available brakes and engage all locking devices to secure the load and boom in position before any further action

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25. Under OSHA 1926 Subpart CC, what is the requirement for operator qualification documentation at the job site?

A. Qualification documentation must be available at the job site — an operator whose documentation cannot be produced at the site is not considered qualified for that day's operations regardless of actual certification status

B. Qualification documentation must be kept at the employer's main office and faxed to the site within 4 hours of an OSHA request

C. Qualification documentation is only required on site for operators performing critical lifts

D. A verbal confirmation from the employer's safety director satisfies the on-site documentation requirement

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26. A crane operator is asked to make a pick while a second crew is actively working beneath the boom path but outside the load's drop zone. The signal person has not given a stop signal. What must the operator do?

A. Continue — workers beneath the boom path but outside the drop zone are in a permitted area during crane operations

B. Stop and require all personnel beneath the boom path to clear before proceeding — the boom path is part of the crane's hazard zone and personnel must not be beneath it during active lifts

C. Proceed at reduced boom speed to minimize the risk to the workers beneath the path

D. Request the lift director authorize the pick before proceeding with workers beneath the boom

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27. A crane's load line is being inspected when the inspector finds that the rope has a section where individual wires protrude outward from the strand in a random pattern — some broken, some still intact. What condition is this and what action is required?

A. This is called "peening" — it is caused by sheave contact and the rope may continue in service with enhanced monitoring

B. This is called "strand unlaying" — the rope must be re-laid before returning to service

C. This is called "wire popping" or "broken wire protrusion" — it indicates severe internal deterioration and the rope must be removed from service immediately

D. This is called "crown wear" — it is a surface condition that does not affect the rope's core integrity

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28. An operator begins a shift and is told the crane was moved by a second operator at the end of the previous shift after the inspection was completed. What must the current operator do before lifting?

A. Perform a complete pre-shift inspection before lifting — any crane movement after the last inspection may have changed the crane's condition; the current operator's inspection responsibility is not transferred by the previous shift's work

B. Review the previous operator's inspection log and proceed if no deficiencies were noted

C. Perform a focused inspection of the travel components only — the previous inspection covers all non-travel items

D. Confirm with the previous operator by phone that no issues developed during the move before proceeding

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29. Under OSHA 1926 Subpart CC, when may an operator use a hand-held cell phone while operating a crane?

A. During low-activity periods such as when the load is set and the hook is being repositioned

B. When the call is work-related and brief — personal calls are prohibited but work coordination calls are permitted

C. When the crane is in the travel-only mode with no load attached

D. Never — operators are prohibited from using hand-held communication devices while operating covered equipment under OSHA 1926.1417

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30. A crane operator is completing a critical lift when a non-essential crew member approaches and begins giving hand signals to the operator from outside the designated signal person position. The designated signal person is currently not visible to the operator. What must the operator do?

A. Follow the non-essential crew member's signals — any person giving clear signals in an emergency may be followed

B. Stop all crane movement — only the designated signal person's signals may be followed; signals from any undesignated person must not be acted upon regardless of the situation

C. Proceed slowly using the last confirmed signal from the designated signal person

D. Contact the lift director by radio before deciding whether to follow the undesignated signals

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31. A crane operator notices during a pick that the load is swinging in a circular pattern rather than in a straight pendulum arc. What does circular load motion most likely indicate?

A. The tagline crew is pulling the load in the wrong direction — stop and redirect the tagline crew

B. Wind is affecting the load from multiple directions simultaneously — continue and allow the wind to stabilize

C. The load's center of gravity is offset from the rigging attachment point, causing the load to rotate and orbit as it swings — the load must be landed and the rigging repositioned to align with the true center of gravity

D. The crane's swing brake is releasing intermittently — have the swing brake inspected after the pick is complete

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32. Under OSHA 1926.1418, which of the following CORRECTLY describes an operator's right to stop crane operations?

A. An operator may stop operations at any time they believe a safety hazard exists — this right cannot be overridden by the lift director, employer, or any other party, and the operator is protected from adverse employment action for exercising it

B. An operator may stop operations only when the LMI confirms an overload condition — subjective safety concerns must be reported to the lift director who decides whether to stop

C. An operator may stop operations only during the pre-lift phase — once a pick is in progress, the operator must complete the lift cycle before stopping for safety concerns

D. An operator may stop operations when directed by the designated signal person — the operator does not have independent authority to stop without a signal

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33. A crane is performing a pick when the operator feels a slight mechanical vibration through the seat and foot pedals that was not present during previous picks. No load change has occurred. What must the operator do?

A. Continue the pick and report the vibration during the post-shift inspection

B. Stop operations — new mechanical vibration during a lift without a load change indicates a developing mechanical problem that must be investigated before continuing

C. Reduce engine RPM to determine if the vibration is load-related or engine-related before deciding on further action

D. Complete the current pick and investigate the vibration source before beginning the next pick

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34. A crane operator is asked to make a pick in an area where the signal person will be communicating by radio but the operator can see the load and the entire lift path clearly. The planned lift does not involve power lines. Under OSHA 1926 Subpart CC, is a signal person required for this lift?

A. Yes — radio communication with a signal person is always required when the load exceeds 10,000 pounds

B. Yes — a signal person is required for all lifts on multi-employer construction sites regardless of operator visibility

C. Yes — radio communication requires a formally designated signal person regardless of operator visibility

D. No — when the operator has clear unobstructed visibility of the load, the entire travel path, and the set point, and the lift is not near power lines, a signal person is not required by OSHA 1926 Subpart CC

35. A crane operator is performing a pick when the hoist line speed suddenly increases without any change in control input. The load is 8 feet off the ground. What must the operator do?

A. Reduce control input to minimum and allow the speed to stabilize — sudden speed increases are caused by hydraulic pressure spikes that self-correct

B. Increase boom angle to reduce the load on the hoist line and slow the ascent

C. Stop all crane functions immediately — an uncontrolled increase in hoist speed without operator input indicates a loss of hoist control that can result in two-blocking or structural damage; all functions must stop and the cause investigated before any further operation

D. Complete the pick at increased speed and inspect the hoist control system before the next pick

36. A crane is picking a load from a supply barge moored alongside. As the load lifts off the barge, the barge lists 8 degrees toward the crane. The load is now freely suspended. What concern must be addressed before the load is swung to the set point?

A. The barge listing may have caused adjacent loads on the barge to shift into the crane's swing path — the signal person must confirm the swing corridor is clear before any swing movement begins

B. The 8-degree barge list indicates the crane is overloaded — land the load and recheck the capacity calculation

C. The barge list creates a wave that may have disturbed the crane's outrigger pads — inspect all four outriggers before continuing

D. No concern — the load is now freely suspended and the barge's condition no longer affects the lift

37. Under OSHA 1926 Subpart CC, which of the following is required before a crane operator trainee may operate a crane without a certified operator present?

A. The trainee must have logged a minimum of 500 hours of supervised operation on the specific crane type

B. The trainee must obtain full certification from an accredited testing organization — a trainee cannot operate covered equipment without direct certified operator supervision until certification is achieved

C. The trainee must pass the employer's written qualification test with a score of at least 80%

D. The lift director may authorize independent trainee operation for lifts below 50% of rated capacity

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38. A crane operator has been performing lifts for 6 hours in direct summer sun with ambient temperatures of 97°F. The operator begins experiencing dizziness and mild confusion. What must happen?

A. The operator should take a 15-minute break in shade and drink water before resuming operations

B. The operator should reduce pick frequency and avoid critical lifts for the remainder of the shift

C. The lift director should assume temporary operational oversight while the operator recovers

D. The operator must stop operating immediately — dizziness and confusion are symptoms of heat illness that constitute physical impairment; an impaired operator must not operate covered equipment regardless of schedule pressure

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39. A crane is operating when the operator notices the counterweight is swinging slightly side to side independently of the crane's rotation. No swing input has been given. What does this indicate?

A. Counterweight oscillation is caused by wind loading on the boom — it is a normal condition during gusty conditions

B. The counterweight mounting has become loose or a connection has failed — all crane functions must stop and the counterweight mounting inspected immediately

C. The counterweight mounting hardware has developed a deficiency — all crane functions must stop immediately and the counterweight mounting must be inspected before any further operation

D. The counterweight side movement is caused by uneven hydraulic pressure in the swing circuit — adjust the swing brake tension and continue

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40. Under OSHA 1926.1431, before personnel may board a personnel platform for an actual lift, which of the following must be completed?

A. The lift director must confirm in writing that all personnel boarding the platform have completed a safety briefing within the last 30 days

B. A proof test at 125% of the platform's rated capacity must be completed and the platform must be visually inspected for structural distress after the test and before boarding

C. The crane operator must hold a personnel hoisting endorsement issued by NCCCO within the last 3 years

D. The platform must be inspected by a third-party inspector and issued a current inspection certificate before each use

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41. A crane operator completes a pick and the load is set. Before the next pick, the rigger asks the operator to hold the empty hook at working height while rigging is repositioned below. Is this permitted?

A. Yes — holding an empty hook at height is not subject to the suspended load restrictions of OSHA 1926.1417

B. Yes — the operator may hold the empty hook at any height between picks as a standard operational practice

C. No — the operator must lower the hook to within 10 feet of the ground between all pick cycles

D. No — the load block and hook assembly constitute a suspended load; the same operational awareness and readiness requirements apply to an elevated empty hook as to a loaded hook

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DOMAIN 3: TECHNICAL KNOWLEDGE

Questions 42–66

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42. Under ASME B30.5, what is the maximum interval between periodic inspections for a crane in regular service?

A. Six months for cranes in heavy-duty daily service

B. Eighteen months when the crane's frequent inspections have identified no deficiencies

C. Twenty-four months for cranes operating in controlled indoor environments

D. Twelve months regardless of service level, duty cycle, or inspection history

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43. A wire rope sling is being used in a choker hitch. The choke angle — the angle at the point where the rope passes through itself — is measured at 100 degrees. What does ASME B30.9 require regarding this angle?

A. A choke angle of 100 degrees is within the standard choker rating — no adjustment is needed

B. A choke angle below 120 degrees is prohibited under ASME B30.9 for wire rope slings in choker configuration

C. A choke angle below 120 degrees requires an additional capacity reduction beyond the standard choker factor — the sling's effective capacity is further reduced at angles below 120 degrees

D. Choke angles only affect synthetic slings — wire rope choker angles do not require capacity adjustment

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44. A rigger is preparing a vertical hitch pick with a wire rope sling. The sling's tag shows a vertical hitch rating of 12,000 lb. The planned load is 11,400 lb. The pick point on the load has a radius of curvature of 0.5 inches. What concern does the pick point geometry create?

A. A 0.5-inch radius of curvature is a very sharp bend for the sling — the D:d ratio at the contact point may be so low that the sling's effective capacity is reduced below the 11,400 lb load; the sling manufacturer's minimum D:d ratio must be confirmed for the contact geometry

B. A 0.5-inch contact radius is within acceptable limits for all wire rope slings rated above 10,000 lb

C. The concern is only relevant for synthetic slings — wire rope slings are unaffected by contact point geometry

D. Use a shackle to connect the sling to the load — shackles eliminate the contact radius concern by providing a standardized connection geometry

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45. Under OSHA 1926.1415, which of the following CORRECTLY describes the requirement for the anti-two-block device?

A. No — the ATB device must prevent two-blocking from occurring — an alarm-only device that does not automatically stop the hoist is not compliant under OSHA 1926.1415

B. The ATB device must provide both an audible or visual alarm and an automatic function that stops the hoist before two-blocking occurs — both functions are required and failure of either requires the crane to be removed from service

C. The ATB device must be tested weekly and the results documented in the crane's maintenance log

D. The ATB device is required only for cranes performing personnel hoisting — standard material hoisting cranes may use a proximity alarm only

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46. A crane hook is being inspected when the inspector finds that the hook has been painted over and the original load rating stamp is no longer legible. What action is required?

A. Estimate the hook's rating from its physical dimensions and shank diameter using the ASME B30.10 rating table

B. Request the rating information from the crane manufacturer's technical support line and proceed while waiting for the response

C. Remove the hook from service — a hook whose rating cannot be confirmed must not be used; the rating must be verified through documentation or replaced with a hook of known and legible rating

D. Use 75% of the block's rated capacity as a conservative hook rating until the original stamp can be verified

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47. A rigger selects a four-leg wire rope bridle for a symmetric load. After rigging, one leg is found to have 30% less tension than the other three when the load is picked. The load hangs level. What does the unequal tension indicate?

A. One leg is carrying less than its share — the load is hanging level because three legs are compensating; the under-tensioned leg may be damaged or kinked, reducing its effective stiffness; the load must be set down and the sling inspected

B. A 30% tension variation among legs is within normal tolerance for four-leg bridles

C. The low-tension leg has a lower D:d ratio at the attachment point — increase the attachment angle on that leg to equalize tension

D. The level load confirms equal load distribution — tension variation without load tilt is an instrument reading error

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48. Under ASME B30.26, which of the following is a required marking on a below-the-hook lifting beam?

A. No — the marked safe working load and the manufacturer's identification are required markings on below-the-hook lifting beams under ASME B30.20; ASME B30.26 governs rigging hardware, not lifting beams

B. The safe working load and the manufacturer's identification must be legibly marked on the beam

C. The beam's weight, safe working load, and the date of the most recent load test must all be marked on the beam body

D. Only the safe working load is required — manufacturer identification is optional for beams manufactured before 2010

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49. A crane operator is asked to use a wire rope sling that has been stored outdoors uncovered for 18 months. The sling shows surface rust but no broken wires or deformation. What must happen before this sling is used?

A. Surface rust on wire rope slings is cosmetic — the sling may be used after a visual inspection confirms no broken wires

B. Wire brush the rust from the sling surface and apply lubricant before use — cleaned and lubricated slings are returned to full rated capacity

C. Use the sling at 80% of its rated capacity — surface rust reduces effective capacity by approximately 20%

D. A qualified person must inspect the sling and determine whether the corrosion has reduced the rope's cross-section or internal integrity before the sling is returned to service

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50. Under OSHA 1926.1427, which of the following is NOT a recognized operator qualification pathway?

A. Certification by a nationally accredited testing organization such as NCCCO

B. Completion of an employer program that has been audited by a nationally accredited organization

C. A minimum of 3,000 hours of documented crane operating experience confirmed by a licensed professional engineer

D. Completion of a U.S. Department of Labor registered apprenticeship program that meets the requirements of OSHA 1926.1427

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51. A wire rope has been in service for 14 months. During the periodic inspection, the rope passes all ASME B30.5 removal criteria. The inspector notes the rope has 8 broken wires distributed across 6 lay lengths. What is the significance of this finding?

A. Eight broken wires distributed across 6 lay lengths means no single lay length exceeds the removal threshold — but the total number of breaks indicates accelerating deterioration; the inspector must document the finding and establish enhanced monitoring frequency for this rope

B. Eight broken wires distributed across 6 lay lengths exceeds the ASME B30.5 removal threshold — remove the rope immediately

C. Eight broken wires across 6 lay lengths is within all ASME B30.5 criteria — no monitoring adjustment is needed beyond the standard inspection schedule

D. The rope must be removed — any rope with more than 6 total broken wires regardless of distribution must be retired under ASME B30.5

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52. A crane is equipped with a load moment indicator and a rated capacity limiter. What is the functional difference between the two devices?

A. The LMI monitors load moment and displays it as a percentage of rated capacity; the rated capacity limiter automatically prevents the crane from lifting beyond its rated capacity by cutting power to the hoist and boom functions when the limit is approached

B. The LMI and rated capacity limiter are different names for the same device — all modern cranes use one integrated system to perform both functions

C. The LMI is required by OSHA; the rated capacity limiter is an optional manufacturer upgrade not addressed by OSHA 1926 Subpart CC

D. The LMI governs material hoisting; the rated capacity limiter is specifically required for personnel hoisting applications only

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53. Under ASME B30.9, what is the minimum D:d ratio recommended for wire rope slings running over a hook or shackle?

A. 5:1 — the minimum D:d ratio for all wire rope sling applications

B. 10:1 — the minimum D:d ratio for rotation-resistant rope slings only

C. The minimum recommended D:d ratio for wire rope slings over hooks or shackles is typically specified by the sling manufacturer based on rope construction — ASME B30.9 requires the user to follow the manufacturer's recommendation; operating below the minimum D:d ratio reduces the sling's effective capacity

D. 3:1 — the minimum D:d ratio applies only to fixed termination points, not to hooks or shackles

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54. A crane's wire rope has been subjected to a known shock load event during the previous shift. The rope shows no external broken wires or kinking. Under ASME B30.5, what is required?

A. The rope may continue in service — no external damage means no internal damage; wire rope is rated to withstand occasional shock loading

B. Reduce the rope's working load limit by 25% for the remainder of its service life to account for the shock loading event

C. The rope must be replaced — any rope subjected to a known shock load must be retired regardless of external appearance

D. A qualified person must inspect the rope specifically for the effects of shock loading — internal wire breaks from shock loading are not always externally visible; the rope must be evaluated before returning to service

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55. Under OSHA 1926 Subpart CC, which of the following CORRECTLY describes the qualified rigger standard?

A. A qualified rigger is a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve rigging problems — the qualification is task-specific and must be confirmed by the employer for each type of rigging performed

B. A qualified rigger must hold current NCCCO Rigger Level I or Level II certification to perform rigging on covered crane operations

C. A qualified rigger must have a minimum of 2 years of documented rigging experience on construction projects

D. A qualified rigger must be designated in writing by the project safety officer before performing any overhead rigging

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56. A rigger is preparing to use an alloy chain sling and finds that one link in the sling has been bent out of its original plane by approximately 15 degrees. No crack is visible. What action is required?

A. No action — a 15-degree link deformation without cracking is within the acceptable deformation tolerance for Grade 80 alloy chain

B. Remove the chain sling from service — any deformation of a chain link from its original geometry is a removal-from-service condition under ASME B30.9 regardless of whether cracking is visible

C. Use the sling at 70% of its rated capacity — deformed links reduce the chain's effective capacity proportionally

D. Have the link re-formed by a certified chain repair shop and proof-tested before returning to service

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57. A crane operator's employer-program qualification was completed 4 years ago. The operator has been operating the same crane type continuously since qualification. Under OSHA 1926.1427, what does the employer need to confirm regarding this operator's ongoing qualification status?

A. The operator must re-qualify every 3 years — a 4-year gap without re-qualification is a direct compliance violation

B. The operator must pass an annual written test to maintain employer-program qualification status

C. The employer must confirm the qualification program evaluated operator effectiveness — if the program includes no re-evaluation component and 4 years have elapsed, the employer should review whether ongoing compliance is being maintained

D. No re-evaluation is required — once qualified under an employer program, the qualification is permanent for the same crane type

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58. A crane's frequent inspection identifies that the boom hoist limit switch is functional but the travel stop position has drifted — the switch now activates 2 degrees before the manufacturer's maximum boom angle rather than at the maximum. What is the significance of this finding?

A. A limit switch activating 2 degrees before the rated maximum is conservative — the adjustment reduces available capacity slightly but creates additional safety margin

B. The drifted limit switch position means the operator cannot access the full boom angle range — this may reduce capacity at configurations near maximum angle; report as a deficiency and have the limit switch adjustment verified by maintenance

C. The drifted activation point is a calibration deficiency — the crane must be removed from service until the limit switch is reset to the manufacturer's specified activation point

D. Limit switch drift is a normal result of mechanical wear — no action is required until the switch activates more than 5 degrees before the rated maximum

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59. Under ASME B30.20, a below-the-hook lifting device is found to have a rated capacity tag but no engineering documentation. The tag shows the device was manufactured 12 years ago. What does ASME B30.20 require before this device can be used?

A. Traceable engineering documentation confirming the device's design basis, rated capacity, and testing history must be available before the device is used — a tag alone is not sufficient; without documentation the marked capacity has no confirmed engineering basis

B. A visual inspection by a qualified rigger is sufficient — if the device appears structurally sound, the tag rating applies

C. The device may be used at 50% of its marked capacity — the age reduction factor for devices over 10 years old limits capacity to 50% without current documentation

D. Contact the manufacturer for replacement documentation — if the manufacturer confirms the rating in writing, the device may be used while awaiting formal documentation

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60. A crane's periodic inspection reveals that the main boom's pivot pins show wear of 3% below the manufacturer's minimum diameter specification. What is required?

A. Pins at 3% below minimum diameter must be replaced before the crane returns to service — worn pivot pins affect the boom's structural geometry and load path

B. Monitor the pin wear at each subsequent periodic inspection — action is required only when wear reaches 5% below minimum specification

C. Reduce all picks to 80% of rated capacity to compensate for the reduced pin diameter

D. The pins must be replaced before the next periodic inspection — continued operation is acceptable until the next annual interval

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61. A rigger builds a four-leg chain sling bridle for a pick. During the lift, one leg goes slack while the load remains level and the other three legs remain taut. What must happen?

A. The slack leg is carrying less load — the other three legs are sharing the full load; reduce the pick weight and continue with the three-taut-leg configuration

B. Re-tension the slack leg by adjusting the master link position before continuing

C. Set the load down immediately — a slack leg in a four-leg bridle means the load is being carried by three legs rather than four; those three legs may be overloaded beyond their rated capacity for the actual load distribution

D. A slack leg during a pick is normal when the load's center of gravity is offset — continue and reposition the rigging after the load is set

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62. Under ASME B30.9, when must a synthetic web sling be inspected?

A. Before each use — every synthetic web sling must be inspected before each lift regardless of how recently the previous inspection was performed

B. Daily at the start of each shift — a single shift inspection covers all uses of the sling during that shift

C. Weekly for slings in regular service and monthly for slings in occasional use

D. Before each shift and after any pick where the load exceeded 80% of the sling's rated capacity

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63. A crane operator is reviewing the load chart and finds that the chart has a footnote stating: "Do not use these ratings for pick and carry operations." The operator needs to travel 25 feet with a suspended load. What does this footnote require?

A. Pick and carry is permitted for distances less than 50 feet — the footnote applies only to extended travel operations

B. The operator must find the separate pick and carry section of the load chart — travel with a suspended load uses different chart values than stationary picks; if no pick and carry section exists, travel with a suspended load is not authorized for this crane

C. The lift director may authorize pick and carry operations in writing when the travel distance is less than 30 feet

D. Pick and carry is permitted at 50% of the stationary rated capacity regardless of chart footnotes

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64. A crane is performing operations when the operator notices hydraulic fluid dripping from a fitting at the base of the boom hoist cylinder at a rate of approximately 1 drop every 3 seconds. What is the required action?

A. Monitor the drip rate during subsequent picks — action is required only if the rate increases to 1 drop per second or faster

B. Tighten the fitting and check fluid level — if tightening stops the drip and fluid level is normal, continue operations

C. Reduce all picks to 75% of rated capacity until the fitting can be properly repaired

D. Report the hydraulic leak as a deficiency and remove the crane from service — any active hydraulic leak at a cylinder fitting is a deficiency under OSHA 1926.1412 that must be evaluated by maintenance before the crane continues operations

65. Under ASME B30.5, which condition requires the boom to be inspected by a qualified person before the crane returns to service?

A. The boom has been used at more than 85% of rated capacity on three consecutive picks

B. The boom has been extended to its maximum rated length for the first time on a new project

C. The boom has been subjected to a side load, an overload, or any unusual operating condition that may have caused structural damage

D. The boom has been in service for more than 6 months since its last periodic inspection

66. A rigger is asked to rig a load using a synthetic round sling. The sling's tag shows a vertical hitch rating of 15,000 lb. The planned load is 14,200 lb. The load has sharp edges at the pick point. What must the rigger do before proceeding?

A. Proceed — the sling is rated above the load weight and synthetic round slings are designed for contact with irregular surfaces

B. Use edge protection at the sharp edge contact point — synthetic round slings are susceptible to cutting at sharp edges and must be protected regardless of the load weight relative to the sling's rating

C. Switch to a wire rope sling — synthetic round slings are prohibited at any sharp edge contact point under ASME B30.9

D. Wrap the sharp edge with duct tape — field-applied tape satisfies the edge protection requirement for synthetic slings

DOMAIN 4: LOAD CHARTS

Questions 67–90

67. A crane's gross capacity at 30-foot radius with a 90-foot boom on full outriggers is 42,000 lb. The hook block weighs 1,100 lb. Two wire rope slings weigh 240 lb each. Four shackles weigh 35 lb each. The payload is 39,200 lb. What is the net capacity and can this lift proceed?

A. Net capacity = 40,240 lb; payload of 39,200 lb exceeds net capacity; the lift cannot proceed

B. Net capacity = 40,240 lb; payload of 39,200 lb is within net capacity by 1,040 lb; the lift can proceed

C. Net capacity = 40,480 lb; shackle weights are not deducted from gross capacity; the lift can proceed

D. Net capacity = 39,760 lb; payload of 39,200 lb is within net capacity; the lift can proceed

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68. A crane's load chart shows gross capacity of 71,000 lb at 15-foot radius and 54,000 lb at 20-foot radius for the same configuration. The planned pick radius is 17 feet. What gross capacity value governs this pick?

A. 71,000 lb — the 15-foot row governs because 17 feet is closer to 15 than to 20

B. 62,500 lb — the interpolated value between the two rows at the proportional midpoint

C. 54,000 lb — the 20-foot row value governs for any radius between 15 and 20 feet

D. Either value — the operator may choose the more favorable row when the actual radius falls between two listed radii

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69. A crane picks a load at 25-foot radius with a net capacity of 48,000 lb. The total hook load is 44,500 lb — 92.7% of net capacity. During the swing, the load drifts to 28-foot radius. The chart at 28 feet shows 39,200 lb gross and 37,240 lb net. The total hook load of 44,500 lb now exceeds net capacity at 28 feet. What must happen?

A. Continue the swing at reduced speed — the 28-foot radius is temporary and the load will return to 25 feet when the swing stops

B. Increase boom angle during the swing to reduce the radius back to 25 feet before the load moment becomes critical

C. Document the radius exceedance and complete the lift — the brief overload during swing is within dynamic operational tolerance

D. Stop all crane movement immediately — the crane is in a rated capacity exceedance condition; the load must be brought to the nearest safe landing without further increasing the radius before any post-incident inspection is conducted

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70. A crane is configured with a 75-foot main boom and a 30-foot fixed jib. The jib tip load chart shows a maximum rated capacity of 8,200 lb at 55-foot tip radius. Block weight is 450 lb and rigging weighs 380 lb. The payload is 7,200 lb. What is the net capacity and can this lift proceed?

A. Net capacity = 7,370 lb; payload of 7,200 lb is within net capacity by 170 lb; the lift can proceed with verified load weight and precise radius confirmation

B. Net capacity = 7,820 lb; payload of 7,200 lb is within net capacity; the lift can proceed

C. Net capacity = 7,370 lb; the 170 lb margin is insufficient — a minimum 500 lb margin is required for jib tip picks

D. Net capacity = 8,200 lb; block and rigging are not deducted from jib tip chart values — the chart already accounts for standard rigging weights

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71. A crane's load chart shows the following values at 20-foot radius: 60-foot boom at 68,000 lb gross, 75-foot boom at 58,000 lb gross, 90-foot boom at 47,000 lb gross. The crane is rigged with the 75-foot boom. Block weighs 1,200 lb and rigging weighs 980 lb. The payload is 54,500 lb. Can this lift proceed?

A. No — the payload of 54,500 lb plus deductions (2,180 lb) gives a total hook load of 56,680 lb which exceeds the 75-foot boom gross capacity of 58,000 lb; net capacity is 55,820 lb; since 54,500 lb is below 55,820 lb, the lift can actually proceed

B. Yes — gross capacity with the 75-foot boom is 58,000 lb; deductions: block (1,200) + rigging (980) = 2,180 lb; net capacity = 55,820 lb; payload of 54,500 lb is within net capacity; the lift can proceed

C. Yes — but the operator should use the 60-foot boom for a greater safety margin at this radius

D. No — the 90-foot boom's lower capacity indicates the site configuration limits all boom lengths to 47,000 lb gross at this radius

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72. A crane's load chart note states: "Block weight of 1,400 lb is included in all listed gross capacities." The operator is using a 950 lb block. The gross capacity at the planned configuration is 52,000 lb. Rigging weighs 760 lb. The payload is 49,800 lb. What is the correct net capacity calculation?

A. Deduct block (950) + rigging (760) from 52,000 — total deductions 1,710 lb; net capacity = 50,290 lb; lift proceeds

B. Deduct rigging (760) only and add the 450 lb difference back to gross — net capacity = 51,690 lb; lift proceeds

C. Add the 450 lb difference between the assumed 1,400 lb block and the actual 950 lb block back to the gross capacity: effective gross = 52,450 lb; deduct rigging (760); net = 51,690 lb; payload of 49,800 lb is within net capacity; the lift can proceed

D. Deduct rigging (760) from 52,000; net capacity = 51,240 lb; the block is already accounted for and no block deduction applies; payload of 49,800 lb is within net capacity

73. A crane is operating in the over-rear configuration. The over-rear load chart shows 67,000 lb gross at 22-foot radius. The 360-degree chart shows 51,000 lb at the same configuration. During the planned lift, the load must swing 45 degrees to the side to reach the set point. What capacity governs during the side-quadrant portion of the swing?

A. The over-rear capacity of 67,000 lb governs throughout the entire lift as long as the lift starts in the over-rear position

B. The over-rear capacity governs for the pick and the 360-degree capacity governs only for the final set

C. The 360-degree capacity governs for the portion of the swing that passes through any quadrant other than the rear — 51,000 lb governs during any swing movement that takes the load outside the rear quadrant

D. The operator may choose which capacity governs based on the load's primary position during the lift

74. A crane is configured on full outriggers with a structural limit of 95,000 lb and a stability limit of 118,000 lb at 18-foot radius. The planned total hook load is 91,000 lb. Which limit governs and can the lift proceed?

A. The structural limit of 95,000 lb governs — it is the lower value; total hook load of 91,000 lb is within the structural limit; the lift can proceed

B. The stability limit of 118,000 lb governs — stability is always the primary governing factor at short radii

C. Both limits must be satisfied — confirm the total hook load is below both values before proceeding

D. Neither limit governs independently — the operator must use the average of both limits as the effective rated capacity

75. A crane is performing a critical lift at 94% of net capacity. The lift plan was approved at this percentage. Three minutes into the swing, the lift director instructs the operator to hold the load at its current height for 20 minutes while an adjacent work crew clears the set area. What concern must be managed during this hold?

A. No concern — a properly functioning crane on adequate ground can hold any load within rated capacity for any duration

B. Hoist brake drift must be monitored continuously during the extended hold — if any downward load movement is detected, the load must be landed immediately regardless of the reason for the hold

C. The 20-minute hold exceeds OSHA's maximum 15-minute suspended load hold limit — the load must be set immediately

D. Notify the crane manufacturer before holds exceeding 10 minutes at above 90% of net capacity — manufacturer authorization is required

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76. A crane's load chart shows the 85-foot boom provides 38,000 lb gross at 28-foot radius. After deducting block (900 lb) and rigging (680 lb), net capacity is 36,420 lb. The payload is 35,800 lb — 98.3% of net capacity. Before this pick proceeds, what verification is specifically required?

A. The lift director must sign the pre-lift calculation confirming the 98.3% figure before the operator may proceed

B. The LMI must be confirmed functional — at 98.3% of net capacity, LMI failure is a stop-work condition

C. Every input must be verified from confirmed sources — payload weight from a certified scale, operating radius by direct measurement, all rigging weights confirmed individually, and crane configuration verified against the chart section

D. A second qualified operator must independently verify the capacity calculation before the pick proceeds

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77. Two cranes are performing a tandem lift with Crane A assigned 55% and Crane B assigned 45% of the total load. Total load including all rigging is 108,000 lb. Crane A's net capacity is 62,000 lb. Crane B's net capacity is 50,500 lb. During the lift, an unexpected load shift increases Crane A's share by 7,000 lb. What is Crane A's new load and what must happen?

A. Crane A's new share = 59,400 + 7,000 = 66,400 lb; this exceeds Crane A's net capacity of 62,000 lb; all crane movement must stop and the load must be set to a safe surface before the lift is replanned

B. Crane A's new share = 66,400 lb; the 4,400 lb exceedance is within the 10% dynamic tolerance for tandem lifts; continue and monitor

C. Crane A's new share = 66,400 lb; direct Crane B to take more load by increasing its boom angle

D. Crane A's new share = 66,400 lb; reduce Crane A's hoist speed to redistribute the load without stopping

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78. A crane operator has confirmed net capacity of 44,000 lb at 24-foot radius for a planned pick. Before the pick, the rigger adds a 300 lb safety sling to the rigging assembly that was not in the original calculation. What must the operator do before picking?

A. Recalculate net capacity with the additional 300 lb deduction — new net capacity = 43,700 lb; confirm the payload is within the revised figure before picking

B. Proceed — a 300 lb addition to rigging is within the estimation tolerance of a pre-lift calculation

C. Request the lift director authorize the pick with the additional rigging before proceeding

D. Replace the safety sling with a lighter one that does not affect the original calculation

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79. A crane is performing a series of picks ranging from 22 to 30-foot radius. The operator confirms net capacity at 30-foot radius is 33,500 lb. The total hook load for all picks in the series is 30,800 lb. Is the 30-foot confirmation sufficient for all picks in the series?

A. No — the operator must also confirm capacity at the minimum planned radius of 22 feet to bracket the full range

B. Yes — confirming capacity at the maximum planned radius is sufficient when the hook load remains constant; capacity increases at shorter radii so all shorter-radius picks are automatically within capacity

C. Yes — but only if the LMI is confirmed functional before the series begins

D. No — each individual pick within the series requires its own radius measurement and chart confirmation

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80. A crane's load chart has a note stating "ratings shown are for standard counterweight configuration only." The crane is operating with the manufacturer's optional heavy counterweight package installed. What must the operator confirm before using the standard chart values?

A. The heavy counterweight increases the crane's tipping resistance — the standard chart values are conservative and may be used without modification

B. The heavy counterweight configuration requires the lift director's authorization before any picks are made using the standard chart values

C. The operator must use the chart section specifically developed for the heavy counterweight configuration — the standard chart values were not developed for the heavy counterweight and may not accurately represent the crane's capacity or stability in that configuration

D. The heavy counterweight configuration requires a load test before operations begin — the standard chart is suspended until the load test confirms the crane's capacity

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81. A crane's load chart shows 29,000 lb gross at 35-foot radius for the 70-foot boom and 22,500 lb gross at the same radius for the 85-foot boom. The crane is rigged with the 85-foot boom. A pick requires 20,000 lb net capacity. Block weighs 800 lb and rigging weighs 620 lb. Can this lift proceed?

A. Yes — using the 70-foot boom chart, gross capacity is 29,000 lb; deductions total 1,420 lb; net capacity is 27,580 lb; the lift can proceed

B. No — the 85-foot boom gross capacity of 22,500 lb less deductions (1,420 lb) gives net capacity of 21,080 lb; required net of 20,000 lb is within net capacity; the lift can proceed

C. Yes — the operator may use the 70-foot boom chart values since they are more favorable

D. No — net capacity with the 85-foot boom is 21,080 lb which is below the required 20,000 lb net; the lift cannot proceed

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82. A crane operator completes a pre-lift check confirming the total hook load is 78% of gross rated capacity at 20-foot radius. Before the pick, the rigger crew repositions the load 4 feet further away, making the actual pick radius 24 feet. The operator notes the change and picks without rechecking the chart. What is the error?

A. The operator must recalculate the load chart capacity at 24-foot radius — the prior confirmation at 20 feet is not valid at 24 feet; rated capacity decreases as radius increases and the 4-foot change may have significantly altered the capacity available

B. The error is procedural only — the operator should have been notified of the repositioning before it occurred

C. A 4-foot radius increase from 20 to 24 feet is within the 20% operational tolerance and does not require a new capacity check

D. The error is minor — re-checking is only required when the radius increase crosses into a new chart row

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83. A crane is lifting at 88% of net capacity when the LMI alarm activates at 90%. The operator had pre-calculated 88% before the pick. What is the most likely cause of the 2-point discrepancy?

A. The LMI over-reads by 2% at all times — the instrument requires recalibration

B. The operating radius has increased slightly from boom deflection under load — even a small radius increase raises the load moment above the pre-lift calculated value; the operator must stop and investigate before continuing

C. The 2% difference is within the LMI's acceptable field accuracy tolerance — continue the lift

D. The load is heavier than estimated — set the load and re-weigh before the next pick

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84. A crane is configured with 50% outrigger extension. The 50% extension chart shows 28,000 lb gross at 22-foot radius. The operator needs 31,000 lb net capacity. The full extension chart shows 41,000 lb gross at the same radius. What must happen before the full extension chart can be used?

A. The lift director must authorize the configuration change in writing before outriggers are extended

B. The load must be on the ground, all outriggers physically extended to full extension, the crane re-leveled within tolerance, and tires confirmed off the ground before the full extension chart values apply

C. Extend the outriggers to full while the load is suspended — the full extension values apply immediately upon physical extension

D. Confirm the full extension chart capacity and proceed — re-leveling is only required when the level changes by more than 1 degree during extension

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85. A crane's load chart shows a maximum rated radius of 50 feet for the current configuration. The operator needs to pick at 48-foot radius and set at 50-foot radius. During the pick, the boom deflects and the actual radius increases to 52 feet. What must happen?

A. Continue — the 2-foot exceedance from boom deflection is an expected dynamic condition that does not constitute a rated capacity exceedance

B. Increase boom angle slightly to reduce the radius back within the 50-foot maximum before continuing

C. Document the unplanned radius exceedance and complete the set — documentation satisfies the incident reporting requirement

D. Stop all crane movement — operating at 52 feet when the chart maximum is 50 feet is a rated capacity exceedance; all movement must stop, the load must be landed safely, and a post-incident inspection completed before the crane returns to service

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86. A crane's load chart shows the following gross capacities at 25-foot radius: on rubber 21,000 lb, 25% outrigger extension 28,000 lb, 50% extension 36,000 lb, full extension 47,000 lb. The crane is confirmed on full outriggers. Block weighs 950 lb and rigging weighs 720 lb. The payload is 44,000 lb. Can this lift proceed?

A. Full extension gross capacity is 47,000 lb; deductions: block (950) + rigging (720) = 1,670 lb; net capacity = 45,330 lb; payload of 44,000 lb is within net capacity; the lift can proceed

B. The on-rubber capacity of 21,000 lb governs — it is the most conservative value and must be used regardless of actual outrigger configuration

C. The full extension chart applies but the net capacity of 45,330 lb is too close to the payload for a non-critical lift — increase outrigger extension beyond full before proceeding

D. Average the four chart values for a blended capacity — blended capacity = 33,000 lb; the lift cannot proceed

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87. A crane operator plans a pick at 32-foot radius and a set at 38-foot radius. The operator confirms net capacity at both radii and finds both are adequate. During the swing from pick to set, the load passes through a maximum radius of 41 feet due to load drift. The chart at 41 feet shows lower capacity than the total hook load. What is the consequence?

A. The planned radii were confirmed — intermediate swing radii are operationally variable and do not create a rated capacity violation

B. The crane operated beyond the confirmed swing path and through a radius where the load exceeded rated capacity — this is a rated capacity exceedance event requiring a post-incident inspection before the crane returns to service

C. The 3-foot drift beyond the set radius is within the 10% operational tolerance for load placement

D. The operator must document the drift and notify the lift director — documentation and notification satisfy the incident response requirement

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88. A crane has a rated gross capacity of 55,000 lb at 20-foot radius. Block weighs 1,050 lb. Rigging weighs 1,380 lb. The payload is 50,000 lb. What percentage of gross capacity does the total hook load represent and does this trigger critical lift requirements?

A. Total hook load = 52,430 lb; 52,430 ÷ 55,000 = 95.3% of gross; this exceeds the 75% threshold; a critical lift plan and pre-lift meeting are required

B. Total hook load = 50,000 lb; rigging and block are not included in the threshold calculation; 50,000 ÷ 55,000 = 90.9%; below the threshold

C. Total hook load = 52,430 lb; 52,430 ÷ 55,000 = 95.3% of gross; this exceeds the 75% threshold; a critical lift plan and pre-lift meeting are required

D. Total hook load = 52,430 lb; net capacity = 52,570 lb; the lift is within net capacity; critical lift requirements are based on net capacity not gross

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89. A crane operator has been confirming capacity at each pick point throughout the day. The final pick of the day requires the crane to operate at a radius not previously used during the shift — 33 feet. The operator has confirmed all other radii during the day but not 33 feet. What must the operator do?

A. Use the closest previously confirmed radius value — if 30-foot radius was confirmed adequate, 33 feet is within range

B. Confirm the operator has adequate fuel and hydraulic fluid before the final pick and proceed — end-of-shift picks follow the same procedure as all other picks

C. Estimate the 33-foot capacity by applying the average rate of capacity decrease observed between the day's other confirmed radii

D. Look up and confirm the gross capacity at 33-foot radius, apply all deductions, and verify the total hook load is within net capacity before picking — previously confirmed radii do not carry over to new radii regardless of how many prior confirmations were performed

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90. A crane is completing the final pick of a critical lift when the lift director announces the set point has been moved 5 feet further from the crane, increasing the set radius from 26 to 31 feet. The operator has confirmed net capacity at 26 feet but not at 31 feet. What must happen before the load is swung to the new set point?

A. Proceed — the lift director has overall authority for critical lift operations and the set point change is within their decision-making scope

B. Confirm capacity at 31-foot radius before swinging — a 5-foot radius increase can significantly reduce rated capacity; the new set radius must be confirmed within net capacity before the load is moved to the new position

C. The set point change requires a formal lift plan revision — stop the lift and lower the load while the plan is updated

D. Confirm the new radius and proceed if the LMI reads below 100% at the new set position — LMI confirmation at the new radius satisfies the chart verification requirement

Answer Key and Explanations

1. B — OSHA 1926.1402 requires the controlling entity to provide ground condition information in a form the operator can evaluate. Verbal confirmation that leaves no record and cannot be reviewed does not satisfy this requirement. The operator must request information in a form that can be retained and evaluated before setup proceeds.

2. A — Progressive outrigger settlement over time under a suspended load is a ground failure indicator, not normal consolidation. Four inches over 30 minutes demonstrates the ground is yielding continuously under the load. The failure can accelerate suddenly. The load must be landed before the condition advances further.

3. C — When a crane contacts or encroaches on an energized power line, the crane may be energized at line voltage. Ground personnel who approach the crane or any rigging provide a path to ground and will be electrocuted. All ground personnel must stay away until the utility confirms the line is de-energized. Moving toward the crane to help is the most dangerous response.

4. D — A 12-foot diameter unlined tunnel creates a large subsurface void with no structural support. The soil above this void can arch temporarily but collapse suddenly under added crane loads. The depth of 15 feet does not place the void outside the influence zone of outrigger loads — an unsupported tunnel of this size requires engineering evaluation before any crane setup in the area.

5. A — A geotechnical report prepared during the dry season reflects soil conditions at that time. Seasonal groundwater rise during the wet season can saturate soils that were dry and firm during the investigation, dramatically reducing their bearing capacity. The wet season conditions must be specifically evaluated — the dry season report cannot be applied without assessment of the current water table.

6. B — A 138 kV transmission line carries extreme voltage. Even non-contact proximity under a loaded crane presents danger. More critically, outrigger loads applied over the line must be supported by the pipe or conduit enclosing it — a structural failure of the line's casing is catastrophic. The utility owner must evaluate the line's structural capacity under the anticipated loads and confirm protective measures before any crane is positioned over it.

7. C — Soil heaving upward in a ring pattern around an outrigger pad is the classic field indicator of bearing capacity failure — the soil under the pad is being pushed laterally and upward as it can no longer support the load. This is not a controlled compression event. The load must be landed immediately and the ground evaluated before any further operations.

8. D — OSHA 1926.1417 requires the applicable load chart and the operation and maintenance manual to be in the cab and accessible to the operator during operations. These documents govern the crane's safe operation and must be immediately available. Certification cards, inspection forms, and project documents are not the specific cab documentation requirement.

9. A — When a crane is leveled on a hillside with front outriggers downhill, the geometry places more of the crane's weight and load moment on the downhill outriggers. The downhill outrigger reactions are higher than the uphill reactions. The ground at the downhill outrigger positions must be specifically confirmed adequate for these elevated reaction forces, not just assessed as equivalent to the uphill positions.

10. B — Fiber optic cables are non-electrical, but they have no ability to resist mechanical crushing loads. At 18-inch depth, a cable bundle can be crushed by a crane's crawler or tire loads during travel. The cable owner must confirm the structural capacity of the conduit or buried cable system under the crane's travel loads before the crane crosses the marked location.

11. C — Outrigger pads that tilt toward the water on a waterfront site indicate the soil beneath those pads is yielding laterally in the direction of least resistance — toward the water. This is an early warning of progressive slope failure toward the waterfront. If uncorrected, the outriggers can slide toward the water taking the crane with them. The load must be landed and the condition evaluated immediately.

12. D — OSHA 1926.1402 places the ground condition disclosure obligation specifically on the controlling entity — the party with knowledge of and authority over the site. Neither the crane owner, the operator, nor the project engineer bears the primary OSHA disclosure obligation. The controlling entity must provide this information before crane setup begins.

13. A — Concrete reaches approximately 70% of its design strength at 7 days and full design strength at 28 days. At 48 hours, a concrete slab has achieved only a fraction of its design strength. Edge bearing — which concentrates load at the slab's weakest section — on an immature slab creates a real risk of edge spalling or cracking. The slab age and the planned edge loading must be evaluated before the crane is positioned.

14. B — Burned organic material leaves ash layers, charcoal deposits, and voids from the combustion of organic matter. These materials have very low bearing capacity and create non-uniform subsurface conditions. Ten years of surface gravel fill does not consolidate or remediate what is beneath. A competent person must evaluate the site's subsurface conditions before crane setup.

15. C — OSHA 1926.1409 Table A establishes minimum approach distances that increase with voltage. For 345 kV, the required minimum exceeds 20 feet. The 10-foot baseline applies only to lines rated at 50 kV or below. Higher voltages require increasing distances calculated from the Table A formula. At 345 kV, 20 feet does not meet the required minimum approach distance.

16. C — Sheet pile driving generates significant ground vibration that can loosen previously consolidated soil and reduce its shear strength. Soil that was confirmed adequate at the start of operations can lose bearing capacity as vibration progressively loosens the grain structure. The operator must monitor outrigger conditions continuously during adjacent pile driving and stop if any settlement or movement is detected.

17. A — The operator's pre-setup inspection confirmed ground conditions as they existed at that time. A loaded concrete truck driving over the planned outrigger positions after the inspection may have altered those conditions — a fully loaded concrete truck can weigh 60,000+ pounds and can compress or disturb

soil that was confirmed adequate in its undisturbed state. The front outrigger area must be re-evaluated before the first pick.

18. B — A pier's uniform load rating governs how distributed loads spread across the structure. Concentrated crane outrigger loads create punching shear forces that are structurally different from distributed loads. A pier rated for 500 psf uniform loading can fail under concentrated outrigger reactions well below that rating. A structural engineer must evaluate the pier specifically for the crane's point loads before operations begin.

19. C — Visible slack in the load line when the load should be suspended indicates the crane is no longer supporting the full load weight. The load has likely landed on an unseen ledge, pipe, or structural element below the operator's line of sight. Continuing to hoist or lower without confirming the load's actual position can cause the load to shift, fall, or damage the unseen support. All functions must stop and the load's position must be visually confirmed.

20. D — OSHA 1926 Subpart CC defines two unconditional critical lift categories: multi-crane lifts and personnel platform operations. These are critical lifts regardless of load weight, load percentage, or any other variable. The 75% of rated capacity threshold is a third, separate trigger — it is not required for multi-crane or personnel platform operations to qualify as critical lifts.

21. A — Any loss of visual contact with the load by both the operator and the signal person simultaneously requires all crane movement to stop. The combination of no operator visibility and no signal person visibility means the crane is moving a suspended load with no one monitoring its position. All movement must stop until visual contact is reestablished by at least one of the two parties.

22. B — Boom deflection beyond expected levels indicates the actual operating radius has increased beyond the pre-lift measurement. The LMI reading of 91% versus the planned 85% confirms the load moment has increased — consistent with a radius increase from boom flex. This is not within normal operating tolerance. The load must be lowered and the actual radius, load weight, and configuration all verified before another attempt.

23. C — The agreed-upon signal zone is part of the established communication protocol for the lift. A signal from outside the designated zone may be given by someone without full situational awareness of the lift. All crane movement must stop and the signal person must return to the correct signaling position before signals are followed. Signal clarity does not override signal position protocol.

24. D — When engine power is lost and hydraulic pressure begins dropping, the priority is to secure the crane before brakes and locks release. Applying all brakes and engaging all locking devices while pressure remains must happen first. Attempting to restart the engine while the load is unsecured and pressure is dropping risks the brakes releasing mid-restart, which is more dangerous than the initial shutdown.

25. A — OSHA 1926.1427 requires qualification documentation to be available at the job site. An operator who cannot produce documentation at the site is not demonstrably qualified for that day's operations under the regulation. The documentation must be physically present — not retrievable by fax or telephone confirmation.

26. B — Workers beneath the boom path are within the crane's hazard zone even if they are outside the load's calculated drop zone. Boom structural failures, rigging failures, and uncontrolled load swings can place loads and components in areas well beyond the load's hanging position. Personnel must not be beneath the active boom path during any lift.

27. C — Wires protruding randomly outward from the strand — some broken, some still attached — indicate severe internal deterioration at that location. The condition is sometimes called wire popping or broken wire protrusion. It signals that the rope's internal structure has broken down to the point that wires are being forced outward by the collapse of internal geometry. Removal from service is required immediately.

28. A — The operator's pre-shift inspection obligation is personal and cannot be transferred. Movement of the crane after the last inspection is sufficient reason to require a complete new inspection — any component could have been affected during the move. Reviewing the previous log or making phone inquiries does not substitute for the current operator's own assessment of the crane's current condition.

29. D — OSHA 1926.1417 explicitly prohibits operators from using hand-held communication devices while operating covered equipment. There are no exceptions for work-related calls, brief calls, or unladen operations. The prohibition is absolute during equipment operation regardless of the call's purpose or duration.

30. B — Only the designated signal person's signals may be followed during crane operations. This is not a discretionary guideline — it is a specific requirement under OSHA 1926.1419. An undesignated person giving signals, regardless of urgency or apparent knowledge, must not be followed. The operator must stop all movement until the designated signal person resumes control.

31. C — Circular load motion — orbiting rather than pendulum swinging — indicates the load is rotating around a point that is not directly below the hook. This occurs when the load's center of gravity is offset from the rigging attachment point. The rotation and orbit will continue and may worsen. The load must be set and the rigging repositioned to align the attachment point with the true center of gravity.

32. A — OSHA 1926.1418 gives the operator unconditional authority to stop operations at any time they believe a safety hazard exists. This right is not limited to LMI-confirmed overloads, pre-pick phases, or signal person direction. It cannot be overridden by the lift director or employer. The operator is specifically protected from adverse employment action for exercising this authority.

33. B — New mechanical vibration during a lift without a load change is an indicator of a developing mechanical problem. Vibration can originate from a failing bearing, a loose structural connection, a developing gear failure, or other sources — all of which can worsen rapidly under load. Operations must stop and the source must be identified before continuing.

34. D — OSHA 1926.1419 requires a signal person when the operator cannot see the load, the path of travel, or the set point, or when the lift is near power lines. When the operator has clear, unobstructed visibility of all three elements and the lift path is not near power lines, a signal person is not mandated. The presence of a multi-employer site, load weight, or radio availability do not independently trigger the signal person requirement.

35. C — An uncontrolled increase in hoist speed without operator input indicates the hoist control system has lost normal operation. A runaway hoist can drive the block into the boom tip causing two-blocking and potential structural failure within seconds. All crane functions must stop immediately. No continued movement is acceptable until the cause is identified and the malfunction corrected.

36. A — Once a load is freely suspended, the barge's condition is secondary. The primary concern is what the barge's 8-degree list may have done to adjacent loads or equipment stored on the barge — a significant list can shift adjacent materials into the planned swing path. The signal person must specifically confirm the swing corridor is clear of any repositioned materials before the swing begins.

37. B — OSHA 1926.1427 does not establish a supervised hours threshold that allows a trainee to operate independently. A trainee must obtain full certification from an accredited testing organization before operating covered equipment without direct certified operator supervision. No employer authorization, hours threshold, or lift director approval substitutes for the certification requirement.

38. D — Dizziness and confusion are clinical symptoms of heat illness that constitute physical and cognitive impairment. OSHA 1926.1417 requires operators to be fit for duty — an operator experiencing these symptoms is impaired and must not operate covered equipment. A short break and water intake are appropriate first aid responses but do not restore fitness for duty until symptoms are fully resolved and the operator is medically cleared.

39. C — A counterweight that moves independently of the crane's rotation has lost its fixed connection to the rotating superstructure. The counterweight mounting hardware has developed a deficiency — a loose pin, a failed weld, or a cracked bracket. Under continued operations, the counterweight can shift suddenly, dramatically changing the crane's stability. All crane functions must stop immediately and the mounting must be inspected before any further operation.

40. B — OSHA 1926.1431 requires a proof test at 125% of the platform's rated capacity before personnel board. Following the proof test, the platform must be visually inspected for any structural distress before boarding is authorized. Both steps are mandatory — the proof test alone without the post-test inspection does not satisfy the requirement.

41. B — An elevated empty hook and block assembly is a suspended load. The block, hook, and any attached rigging hardware have significant weight and represent a drop hazard if any component fails. OSHA 1926.1417's operational requirements for suspended loads apply to the elevated hook assembly — the operator must maintain the same awareness and readiness as during a loaded pick.

42. D — ASME B30.5 and OSHA 1926.1412 both establish 12 months as the maximum interval between periodic inspections. No duty cycle modifier, indoor environment provision, or clean inspection history extends this interval. The 12-month requirement is absolute regardless of the crane's service conditions or inspection record.

43. C — ASME B30.9 establishes that choker hitches have a reduced rated capacity compared to vertical hitches, and that this reduction increases further when the choke angle falls below 120 degrees. At angles below 120 degrees, the sling's effective capacity is further reduced beyond the standard choker factor. The rigging must be adjusted to achieve a choke angle at or above 120 degrees, or the sling must be confirmed rated for the additional tension.

44. A — Wire rope slings have a minimum D:d ratio requirement — the ratio of the diameter of curvature the rope bends around (D) to the rope's own diameter (d). A 0.5-inch radius contact point creates a very sharp bend for any standard wire rope sling diameter. The actual D:d ratio at the contact must be confirmed against the sling manufacturer's minimum before the sling is used at this pick point. Operating below the minimum D:d ratio reduces the sling's effective capacity below its rated value.

45. B — OSHA 1926.1415 requires the ATB device to provide both a warning and an automatic function that stops the hoist before two-blocking occurs. An alarm-only device is not compliant. The automatic stop function is not optional. If either the alarm or the automatic stop fails, the crane must be removed from service until both functions are restored and verified.

46. C — A hook whose load rating cannot be confirmed must not be used for lifting. The rating stamp is the primary field-verifiable confirmation of the hook's capacity. Painting over this marking eliminates that confirmation. Dimensional estimates, manufacturer phone calls, and percentage reductions from related components are not recognized substitutes. The hook must be replaced with one of known and legible rating.

47. A — In a four-leg bridle, if one leg has less tension than the others while the load hangs level, the three taut legs are compensating by carrying more than their planned share. The under-tensioned leg may have a kink, a reduced cross-section, or internal damage that reduces its stiffness — causing it to elongate more under load and shed tension to the other legs. The load must be set and the low-tension sling inspected before continuing.

48. B — ASME B30.20 requires below-the-hook lifting devices to be marked with the safe working load and the manufacturer's identification. These markings must be legible on the device itself. The beam's weight marking requirement and the load test date requirement in option C exceed what ASME B30.20 mandates for standard marking — the SWL and manufacturer ID are the required markings.

49. D — Surface rust on wire rope is not automatically cosmetic — corrosion can penetrate between wires and strands, reducing the rope's metallic cross-section and internal integrity. A rope stored outdoors uncovered for 18 months may have significant internal corrosion that is not visible externally. A qualified person must inspect the sling and evaluate whether the corrosion has compromised the rope's structural integrity before it is returned to service.

50. C — OSHA 1926.1427 recognizes three qualification pathways: accredited third-party certification, audited employer programs, and qualifying apprenticeship programs. Hours of experience confirmed by a licensed engineer is not a recognized pathway regardless of the number of hours documented. No engineer certification substitutes for the regulatory qualification pathways.

51. A — Eight broken wires distributed across six lay lengths means no single lay length triggers the numerical removal threshold. However, eight total breaks in 14 months of service indicates the rope is deteriorating at an accelerating rate. The inspector must document the finding, establish enhanced monitoring frequency, and plan for rope replacement at the next opportunity. The rope passes today's removal criteria but its deterioration trend requires heightened attention.

52. A — The LMI monitors the real-time load moment and displays it as a percentage of rated capacity — it is an informational and warning device. The rated capacity limiter is an active intervention device —

it automatically cuts power to the hoist and boom functions when the rated capacity limit is approached, preventing the operator from physically completing an overload. These are functionally distinct devices with different roles in the crane's safety system.

53. C — ASME B30.9 does not specify a universal minimum D:d ratio for slings over hooks or shackles. The standard requires the user to follow the sling manufacturer's recommendation for minimum D:d ratio based on the specific rope construction. Rope constructions with more strands and finer wires can tolerate tighter bends than fewer-strand, heavier-wire constructions. The manufacturer's data is the governing reference.

54. D — Shock loading can cause internal wire breaks at the point of peak dynamic stress without any external indication — the outer wires remain intact while internal wires have fractured. ASME B30.5 requires that a rope subjected to a known shock load be inspected by a qualified person specifically for the effects of that event before returning to service. Visual confirmation of no external damage is not sufficient — internal damage must be assessed.

55. A — OSHA 1926 Subpart CC defines a qualified rigger as a person who, by recognized degree, certificate, professional standing, or by extensive knowledge, training, and experience, has demonstrated the ability to solve or resolve rigging problems. The qualification is task-specific — a rigger qualified for one type of rigging may not be qualified for another. The employer must confirm the qualification for each type of rigging performed.

56. B — Any deformation of a chain link from its original geometry is a removal-from-service condition under ASME B30.9. Alloy chain links are manufactured to precise geometry that distributes load through the link uniformly. Deformation changes this geometry and introduces stress concentrations that can cause brittle fracture without visible cracking or progressive warning. The absence of visible cracking does not make a deformed link acceptable for continued service.

57. C — OSHA 1926.1427 requires employer programs to evaluate operator effectiveness. A program that qualified an operator once and has had no follow-up evaluation component in four years may not be demonstrating ongoing compliance with this requirement. The employer must review the program's structure and confirm whether periodic re-evaluation is included and whether it has been conducted within a reasonable timeframe.

58. C — A limit switch that activates before the manufacturer's specified maximum angle is a calibration deficiency — the device is not functioning at its designed setpoint. Operating with a limit switch that activates at the wrong position means the crane's protective system is not functioning as designed. The crane must be removed from service until the limit switch is reset to the correct activation point by maintenance.

59. A — ASME B30.20 requires that below-the-hook lifting devices have traceable engineering documentation confirming their design basis, rated capacity, and testing history. A tag alone — regardless of age — is not sufficient. Without documentation, there is no engineering basis for the marked capacity. The device must not be used until documentation is obtained and confirmed.

60. A — Pivot pins worn 3% below the manufacturer's minimum diameter specification must be replaced before the crane returns to service. Worn pivot pins affect the structural geometry and load transfer at the

boom pivot — critical points where the entire load moment passes through the connection. Operating with undersized pivot pins is a deficiency that must be corrected, not monitored.

61. C — A four-leg bridle is designed for all four legs to share the load. When one leg goes slack, the three remaining taut legs are carrying 100% of the load — each carrying more than the one-quarter share they were rated for. The three legs may be individually overloaded beyond their rated capacity for the actual load without the operator being aware. The load must be set down and the rigging reconfigured before continuing.

62. A — ASME B30.9 requires synthetic web slings to be inspected before each use. This is not a shift-based or frequency-based requirement — it is a per-use requirement. Every time a synthetic web sling is picked up for a lift, it must be inspected before that specific lift regardless of when it was last inspected.

63. B — A load chart footnote stating "do not use these ratings for pick and carry operations" means the listed capacity values were developed for stationary picks only. Travel with a suspended load generates different dynamic forces and stability conditions than stationary lifting. The operator must find the crane's separate pick and carry chart section. If no pick and carry section exists in the load chart, travel with a suspended load is not authorized for this crane.

64. D — An active hydraulic leak at a cylinder fitting is a deficiency under OSHA 1926.1412 that must be reported and evaluated. Hydraulic leaks can worsen suddenly — a fitting that drips at one drop per three seconds can fail completely without further warning. The crane must be removed from service and the fitting repaired and verified by maintenance before operations resume.

65. C — ASME B30.5 requires boom inspection by a qualified person after any side load, overload, or unusual operating condition that may have caused structural damage. These events subject the boom to forces and moments outside normal operating design parameters. Structural damage from these events may not be externally visible without close inspection — particularly internal chord yielding or connection cracking.

66. A — Synthetic round slings can be used at sharp edge contact points provided adequate edge protection is applied. ASME B30.9 does not prohibit synthetic round slings at sharp edges — it requires protection. Edge guards, corner protectors, or other physical barriers must be placed between the sling and any sharp edge before the pick proceeds regardless of the load weight relative to the sling's rating.

67. B — Total deductions: block (1,100) + slings (2 × 240 = 480) + shackles (4 × 35 = 140) = 1,720 lb. Net capacity = 42,000 − 1,720 = 40,280 lb. Payload of 39,200 lb is within net capacity by 1,080 lb. The lift can proceed. All components below the hook including shackles must be deducted.

68. C — Any actual radius between two chart rows requires use of the greater radius row's lower capacity value. A 17-foot actual radius falls between the 15-foot and 20-foot rows. The 20-foot row value of 54,000 lb governs. Interpolation between rows is not a permitted methodology. Using the 15-foot row because 17 is closer to 15 than 20 is not a recognized approach.

69. D — The total hook load of 44,500 lb exceeds the net capacity of 37,240 lb at 38-foot radius by 7,260 lb. This is a significant rated capacity exceedance — not a minor dynamic variation. The duration of the exceedance is irrelevant. All crane movement must stop, the load must be brought to the nearest safe

landing position without further increasing the radius, and a post-incident inspection must be completed before the crane returns to service.

70. A — Total deductions: block (450) + rigging (380) = 830 lb. Net capacity = 8,200 − 830 = 7,370 lb. Payload of 7,200 lb is within net capacity by 170 lb. The lift can proceed — but the margin is very narrow. Payload weight must be certified and the jib tip radius must be precisely confirmed. Answer C's "500 lb minimum margin" requirement does not exist in OSHA or ASME standards.

71. B — The 75-foot boom is installed — its chart section governs. Gross capacity: 58,000 lb. Deductions: block (1,200) + rigging (980) = 2,180 lb. Net capacity = 55,820 lb. Payload of 54,500 lb is within net capacity by 1,320 lb. The 60-foot boom's higher value and the 90-foot boom's lower value are irrelevant — the installed boom length governs.

72. C — The chart note states the block weight of 1,400 lb is already embedded in the gross capacity values. The operator is using a lighter 950 lb block — 450 lb lighter than assumed. This means the actual total weight below the hook is 450 lb less than the chart assumed. The effective gross capacity for this lighter block is 52,000 + 450 = 52,450 lb. Deducting rigging (760 lb) gives net capacity of 51,690 lb. Payload of 49,800 lb is within net capacity.

73. D — Directional load chart values apply only within the specific quadrant for which they were developed. The over-rear capacity of 67,000 lb is valid only when the load remains within the rear quadrant. The moment the swing moves the load into a side or front quadrant, the 360-degree capacity of 51,000 lb becomes the governing value. The operator must confirm the total hook load is within 51,000 lb gross for the portion of the swing passing through any non-rear quadrant.

74. A — When both structural and stability limits are listed for the same configuration, the lower value is the rated capacity. The structural limit of 95,000 lb is lower than the stability limit of 118,000 lb — it governs. The total hook load of 91,000 lb is within the 95,000 lb structural limit. The lift can proceed. Using the stability limit of 118,000 lb would overload the crane's structure even though tipping stability would not be reached.

75. B — There is no OSHA time limit for suspended load holds. A mechanically sound crane can hold a suspended load indefinitely in theory. However, hoist brake drift from internal hydraulic leakage is a real concern during extended holds. At 94% of net capacity, any downward movement of the load is a critical event. The hoist brake must be monitored continuously during the hold and the load landed immediately if any movement is detected.

76. C — At 98.3% of net capacity, no margin exists for estimation error in any input. Every variable must be confirmed from a verified source: payload weight from a certified scale, operating radius by direct measurement at the time of the pick, each rigging component weight individually confirmed, and the crane configuration verified against the chart section being used. Lift director sign-off and secondary operator verification are not the regulatory requirements — input verification is.

77. D — Crane A's planned share: 108,000 × 0.55 = 59,400 lb. After the 7,000 lb shift: 59,400 + 7,000 = 66,400 lb. Crane A's net capacity is 62,000 lb. Crane A is now 4,400 lb over its net capacity. This is a rated capacity exceedance on one crane in an active tandem lift. All crane movement must stop immediately and the load must be brought to a safe surface before the lift is replanned to prevent recurrence.

78. A — Any change to the rigging assembly after the capacity calculation has been confirmed requires recalculation. The 300 lb safety sling is an additional deduction from gross capacity. New net capacity = 44,000 − 300 = 43,700 lb. The payload must be confirmed within this revised figure before picking. No rigging addition, regardless of how small, may be made after the capacity confirmation without recalculating.

79. B — Confirming net capacity at the maximum planned radius of 30 feet is sufficient for all shorter-radius picks in the series when the hook load remains constant throughout. Load chart capacity increases as operating radius decreases for the same configuration. If the load is confirmed within net capacity at 30 feet, all picks at shorter radii in the series are automatically within net capacity for the same hook load.

80. C — The standard chart section was developed for the standard counterweight configuration. The heavy counterweight package changes the crane's center of gravity, stability geometry, and structural loading in ways the standard chart does not reflect. The crane may have higher or lower capacity in some configurations with the heavy counterweight — the only accurate reference is the chart section specifically developed for that counterweight configuration.

81. D — The locked answer is D, but D is incorrect as written. The correct answer is **B**. Gross capacity with the 85-foot boom at 35-foot radius is 22,500 lb. Deductions: block (800) + rigging (620) = 1,420 lb. Net capacity = 22,500 − 1,420 = 21,080 lb. Required net capacity is 20,000 lb. Since 21,080 lb exceeds 20,000 lb, the lift can proceed using the 85-foot boom chart. See editorial note — credit B.

82. A — The capacity confirmation at 20-foot radius is not valid at 24-foot radius. Load chart capacity decreases as operating radius increases. A 4-foot increase from 20 to 24 feet can represent a significant capacity reduction depending on the crane's capacity curve at that configuration. Every radius change requires a new capacity confirmation from the chart before picking at the new radius.

83. B — A 2-point LMI reading above the pre-lift calculation is most likely caused by the operating radius being slightly greater than the pre-lift measurement — boom deflection under load increases the actual radius marginally. Even a small radius increase raises the load moment above the pre-lift calculated value. The operator must stop and investigate whether the radius has increased before continuing.

84. C — Changing from 50% to full outrigger extension is a configuration change that affects stability geometry and rated capacity. This change must be made with the load on the ground. After physical extension to full, the crane must be re-leveled within the manufacturer's tolerance and all four tires confirmed off the ground before the full extension chart values can be applied. Extending while loaded or skipping the re-leveling step means the full extension conditions have not been confirmed.

85. D — The crane's maximum rated radius for this configuration is 50 feet. Operating at 52 feet — even momentarily and from boom deflection — means the crane operated without a defined rated capacity. This is equivalent to an overload event. All movement must stop, the load must be landed safely, and a post-incident inspection must be completed before the crane returns to service regardless of the cause of the exceedance.

86. A — The crane is confirmed on full outriggers — the full extension chart applies. Gross capacity: 47,000 lb. Deductions: block (950) + rigging (720) = 1,670 lb. Net capacity = 47,000 − 1,670 = 45,330

lb. Payload of 44,000 lb is within net capacity by 1,330 lb. The lift can proceed. The on-rubber value does not govern when outriggers are fully extended — the actual setup configuration governs.

87. B — The crane swung through 41-foot radius where the total hook load exceeded rated capacity. This is a rated capacity exceedance event regardless of the cause — load drift, tagline failure, or wind. The fact that the planned pick and set radii were confirmed within capacity does not eliminate the exceedance that occurred at the intermediate radius. A post-incident inspection is required before the crane returns to service.

88. C — Total hook load = payload (50,000) + block (1,050) + rigging (1,380) = 52,430 lb. 52,430 ÷ 55,000 = 95.3% of gross capacity. This significantly exceeds the 75% critical lift threshold. A written critical lift plan and pre-lift meeting are required before this pick proceeds. The critical lift threshold is calculated using total hook load as a percentage of gross rated capacity — not payload alone and not net capacity.

89. D — Previously confirmed radii do not carry over to new radii regardless of how many prior confirmations were performed during the shift. Each new radius requires its own chart lookup and confirmation. The gross capacity at 33-foot radius must be looked up, all deductions applied, and the total hook load confirmed within net capacity before the pick proceeds.

90. D — The 5-foot radius increase from 26 to 31 feet can represent a significant capacity reduction. The capacity confirmed at 26 feet does not apply to 31 feet. Before swinging the load to the new set point, the operator must look up gross capacity at 31-foot radius, apply all deductions, and confirm the total hook load is within net capacity at the new set radius. The lift director's set point change authority does not eliminate the operator's obligation to confirm capacity at the new radius.