

PRACTICE EXAM 23: STEAMFITTER / PIPEFITTER RED SEAL SIMULATION (130 QUESTIONS)

This practice exam contains 130 four-option multiple-choice questions. Allow up to four hours, work from the conditions stated in each stem, and review every explanation after scoring. The published passing standard is 70 percent; confirm current administration details with the official Red Seal information before sitting the examination.

1. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A pressure gauge has a damaged lens and an unreadable zero. How should it be treated?
 - A. Remove it from service and obtain a suitable verified instrument
 - B. Tap it until the pointer returns to zero
 - C. Use it only for low-pressure work
 - D. Read it from the side to avoid the damaged lens

2. At the biomass district-heating project, during material receiving, with a revised work package, During a shift change, the incoming crew receives different line information. What should happen?
 - A. Use the newer worker's memory as the deciding source
 - B. Continue while both crews compare notes later
 - C. Choose the line that is easiest to access
 - D. Pause the handover and reconcile the information before work continues

3. At the biomass district-heating project, during layout, with a crowded mechanical room, A spool must be moved manually through a narrow opening. Which approach is safest?
 - A. Pull harder while one worker guides by hand
 - B. Lift from the nearest flange without checking balance

- C. Plan the route, use suitable handling aids, and control pinch points
- D. Roll it across the floor and stop it with a foot

4. At the biomass district-heating project, during fabrication, with a newly isolated line, A small solvent spill occurs in the work area. What is the appropriate first response?

- A. Wash it into the nearest floor drain
- B. Cover it with insulation scraps
- C. Ignore it if the vapour is not immediately visible
- D. Stop the source if safe, control ignition, and follow the spill procedure

5. At the biomass district-heating project, during fit-up, with a late field change, A portable grinder vibrates after a wheel change. What should the worker do?

- A. Stop, isolate the tool, and inspect the wheel and installation
- B. Press harder to stabilize the tool
- C. Continue until the wheel wears smooth
- D. Remove the guard to improve balance

6. At the biomass district-heating project, during installation, with a night-shift handover, A chemical label is missing from a small transfer container. Which action is correct?

- A. Identify it by smell and colour
- B. Do not use it until the contents are positively identified and labelled
- C. Pour it into a larger labelled container
- D. Ask another worker to guess the contents

7. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A permit requires a gas test before work starts. When should the result be accepted?

- A. When the authorized tester confirms the required conditions and records them

- B. When the area has been ventilated for five minutes
- C. When a worker says the air feels normal
- D. When the permit is signed without measurements

8. At the biomass district-heating project, a layout note calls for a 3.5-inch offset. What is the length in millimetres?

- A. 35
- B. 8.89
- C. 889
- D. 88.9

9. At the biomass district-heating project, during troubleshooting, with a restricted access route, A drain is opened and the discharge is hotter and faster than expected. What should happen?

- A. Place a hand near the stream to judge temperature
- B. Tighten the valve while standing in front of it
- C. Move clear, control the release, and reassess the isolation and energy state
- D. Continue removing the next component

10. At the biomass district-heating project, during maintenance, with a replacement component, A new worker is assigned to a lift area. Which briefing is most important?

- A. Tell the worker to watch the hook only
- B. Review the load path, exclusion zone, signals, and stop command
- C. Ask the worker to stand wherever space is available
- D. Give the worker a copy of the drawing without explanation

11. At the biomass district-heating project, during turnover, with a first-time crew member, Before work begins, the crew must establish an energy-control boundary. Which action is most important first?

- A. Begin dismantling at the nearest joint
- B. Ask the operator whether the line feels inactive
- C. Place warning tape after the component is opened
- D. Identify every energy source and the approved isolation method

12. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A worker is selecting protection for cutting and grinding. Which choice best matches the task?

- A. Use gloves only because the tool has a guard
- B. Use hearing protection only when the area is occupied
- C. Use task-appropriate eye, face, hearing, hand, and body protection
- D. Use a dust mask as a substitute for all other protection

13. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A container of unfamiliar thread sealant is found at the workplace. What should the worker do?

- A. Read the current safety data sheet and confirm compatibility
- B. Use it if the colour matches the usual product
- C. Mix it with the old sealant to improve coverage
- D. Apply it first and check the label after testing

14. At the biomass district-heating project, during material receiving, with a revised work package, A hot-work task is planned near insulated piping. Which control is most defensible?

- A. Start quickly before nearby crews return
- B. Confirm authorization, remove or protect combustibles, and provide fire watch
- C. Wet the insulation and proceed without a permit
- D. Rely on the welding hood to control surrounding hazards

15. At the biomass district-heating project, during layout, with a crowded mechanical room, A worker is asked to enter a vessel to retrieve a tool. What is the correct response?

- A. Enter briefly because the tool is visible
- B. Send the smallest worker through the opening
- C. Stop and follow the confined-space entry and rescue procedure
- D. Use a fan without completing the entry assessment

16. At the biomass district-heating project, during fabrication, with a newly isolated line, A work area has cutoffs, wire, and oily rags around a walking route. What is the best action?

- A. Remove the debris and restore a clear, controlled work area
- B. Step over it until the installation is complete
- C. Move it beside the nearest emergency exit
- D. Cover it with cardboard to prevent trips

17. At the biomass district-heating project, during fit-up, with a late field change, A stainless component is stored against carbon-steel grinding debris. What control is needed?

- A. Brush the debris away after installation
- B. Separate and protect the material from contamination
- C. Use carbon-steel wire wheels to clean it
- D. Install it first and inspect only the outside

18. At the biomass district-heating project, during installation, with a night-shift handover, An insulated valve cannot be removed without dismantling adjacent piping. What does this indicate?

- A. The valve is acceptable because it does not leak
- B. The insulation should be permanently sealed around it
- C. The adjacent pipe should be cut during every service
- D. The installation lacks required maintenance access or removable provisions

19. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A joint is scheduled for concealment, but its required inspection is incomplete. What should happen?

- A. Photograph the joint and conceal it
- B. Delay concealment until the inspection and disposition are complete
- C. Apply extra coating to protect the joint
- D. Ask the next trade to inspect it later

20. At the biomass district-heating project, during start-up, with a wet-weather condition, A temporary jack is supporting a spool during fit-up. When may it be released?

- A. After permanent supports and the approved load path are complete
- B. As soon as the first bolt is tight
- C. After the pipe is insulated
- D. When the spool appears stable by eye

21. At the biomass district-heating project, during troubleshooting, with a restricted access route, A plan drawing and an isometric show different pipe elevations. What should govern the work?

- A. Use whichever elevation produces the shorter spool
- B. Average the two elevations in the field
- C. Use the controlled documents and resolve the discrepancy before fabrication
- D. Follow the older drawing if it has more dimensions

22. At the biomass district-heating project, during maintenance, with a replacement component, An isometric shows a valve above a branch, but the elevation is unclear. What is the best check?

- A. Scale the isometric with a ruler
- B. Install the valve at the most accessible height
- C. Infer the elevation from the pipe colour
- D. Compare plan, elevation, section, and field reference points

23. At the biomass district-heating project, during turnover, with a first-time crew member, A cut piece has lost its material identification. What should happen before installation?

- A. Use it if the outside diameter matches
- B. Install it in a low-pressure branch
- C. Segregate it and restore traceability through the approved process
- D. Compare its weight with a known piece

24. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, During fit-up, a spool aligns only when the pipe is forced sideways. What is correct?

- A. Tighten the bolts to pull the faces together
- B. Stop and correct the route, dimensions, or support arrangement
- C. Heat the flange until the misalignment disappears
- D. Leave the temporary force in place after testing

25. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A flange pair has uneven gaps before bolting. What should be checked first?

- A. Increase bolt torque on the widest gap
- B. Add a second gasket to fill the space
- C. Use the bolts to draw the piping into position
- D. Alignment, face condition, gasket fit, and support before tightening

26. At the biomass district-heating project, during material receiving, with a revised work package, A long straight run is anchored at both ends without a movement review. What concern is raised?

- A. Thermal movement may create excessive stress or load connected equipment
- B. The pipe will always become self-supporting
- C. The anchors will eliminate all pressure drop
- D. The line will automatically drain toward the centre

27. At the biomass district-heating project, during layout, with a crowded mechanical room, A pipe passes through a rated wall. What installation detail is essential?

- A. Pack the opening tightly with ordinary insulation
- B. Weld the pipe directly to the wall sleeve
- C. Leave the opening open for future movement
- D. Provide the specified sleeve, clearance, and firestopping arrangement

28. During fabrication at the biomass district-heating project, a drain rises 0.21 m over a 6 m horizontal run. What is the slope in percent?

- A. 126
- B. 2857.14
- C. 3.5
- D. 621

29. At the biomass district-heating project, during fit-up, with a late field change, A valve's flow arrow conflicts with the intended service direction. What should be done?

- A. Reverse the line flow during operation
- B. Stop and verify the valve selection and orientation before testing
- C. Remove the arrow label
- D. Install the valve and rely on the handle position

30. At the biomass district-heating project, during installation, with a night-shift handover, A grooved coupling is being installed on a pipe end. Which check is most important?

- A. Confirm groove dimensions, gasket condition, alignment, and bolt engagement
- B. Tighten one bolt fully before the other
- C. Lubricate the pipe exterior with any available oil
- D. Use the coupling to correct an angled cut

31. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A threaded connection has sealant extending into the bore. What is the concern?

- A. Excess sealant can enter the system and restrict or contaminate the service
- B. The sealant will always dissolve harmlessly
- C. The joint becomes stronger when the bore is filled
- D. The excess proves the threads are fully engaged

32. At the biomass district-heating project, during start-up, with a wet-weather condition, A component rated below the line class is found in a spool. What is the correct response?

- A. Install it on the low side of the valve
- B. Use it only during the pressure test
- C. Hold the spool and obtain an approved replacement or disposition
- D. Paint it with the higher class identification

33. At the biomass district-heating project, during troubleshooting, with a restricted access route, A field measurement differs from the current drawing at a nozzle. What is the best next step?

- A. Trim the spool to fit without updating the drawing
- B. Move the nozzle with a chain hoist
- C. Use the measurement only if the pipe still connects
- D. Record the discrepancy and obtain controlled clarification

34. At the biomass district-heating project, during maintenance, with a replacement component, A gravity drain line is routed without the specified slope. What risk is created?

- A. The line will drain faster because it is level
- B. Liquid can collect, reducing drainage and increasing corrosion or freezing risk
- C. The valve will provide the missing slope
- D. Insulation will force the liquid toward the outlet

35. At the biomass district-heating project, during turnover, with a first-time crew member, A stainless component is stored against carbon-steel grinding debris. What control is needed?

- A. Brush the debris away after installation
- B. Use carbon-steel wire wheels to clean it
- C. Install it first and inspect only the outside
- D. Separate and protect the material from contamination

36. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, An insulated valve cannot be removed without dismantling adjacent piping. What does this indicate?

- A. The installation lacks required maintenance access or removable provisions
- B. The valve is acceptable because it does not leak
- C. The insulation should be permanently sealed around it
- D. The adjacent pipe should be cut during every service

37. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A joint is scheduled for concealment, but its required inspection is incomplete. What should happen?

- A. Photograph the joint and conceal it
- B. Apply extra coating to protect the joint
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38. At the biomass district-heating project, during material receiving, with a revised work package, A temporary jack is supporting a spool during fit-up. When may it be released?

- A. As soon as the first bolt is tight
- B. After permanent supports and the approved load path are complete
- C. After the pipe is insulated
- D. When the spool appears stable by eye

39. At the biomass district-heating project, during layout, with a crowded mechanical room, A plan drawing and an isometric show different pipe elevations. What should govern the work?

- A. Use whichever elevation produces the shorter spool
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- C. Average the two elevations in the field
- D. Follow the older drawing if it has more dimensions

40. At the biomass district-heating project, during fabrication, with a newly isolated line, An isometric shows a valve above a branch, but the elevation is unclear. What is the best check?

- A. Scale the isometric with a ruler
- B. Install the valve at the most accessible height
- C. Compare plan, elevation, section, and field reference points
- D. Infer the elevation from the pipe colour

41. At the biomass district-heating project, during fit-up, with a late field change, A cut piece has lost its material identification. What should happen before installation?

- A. Use it if the outside diameter matches
- B. Install it in a low-pressure branch
- C. Compare its weight with a known piece
- D. Segregate it and restore traceability through the approved process

42. At the biomass district-heating project, during installation, with a night-shift handover, During fit-up, a spool aligns only when the pipe is forced sideways. What is correct?

- A. Stop and correct the route, dimensions, or support arrangement
- B. Tighten the bolts to pull the faces together
- C. Heat the flange until the misalignment disappears
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43. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A flange pair has uneven gaps before bolting. What should be checked first?

- A. Increase bolt torque on the widest gap
- B. Add a second gasket to fill the space
- C. Alignment, face condition, gasket fit, and support before tightening
- D. Use the bolts to draw the piping into position

44. At the biomass district-heating project, during start-up, with a wet-weather condition, A long straight run is anchored at both ends without a movement review. What concern is raised?

- A. Thermal movement may create excessive stress or load connected equipment
- B. The pipe will always become self-supporting
- C. The anchors will eliminate all pressure drop
- D. The line will automatically drain toward the centre

45. At the biomass district-heating project, during troubleshooting, with a restricted access route, A pipe passes through a rated wall. What installation detail is essential?

- A. Pack the opening tightly with ordinary insulation
- B. Provide the specified sleeve, clearance, and firestopping arrangement
- C. Weld the pipe directly to the wall sleeve
- D. Leave the opening open for future movement

46. At the biomass district-heating project, during maintenance, with a replacement component, A blind lift will pass behind a wall. Which control is most important?

- A. Increase the lifting speed
- B. Remove the exclusion zone
- C. Let each worker give signals as needed
- D. Use agreed communication and spotting

47. At the biomass district-heating project, during turnover, with a first-time crew member, A suspended load is ready to land on dunnage. What should happen before lowering?

- A. Place hands under the load to guide it
- B. Remove the tag lines before the load settles
- C. Confirm the landing surface, cribbing, clearances, and hand positions
- D. Lower rapidly to prevent swinging

48. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A hoist is rated for the load, but the hook is side-loaded. What is the concern?

- A. Side loading improves hook capacity
- B. It can damage the hook or hoist
- C. The hook rating applies in every direction
- D. The load will correct the hook angle automatically

49. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A lift plan changes because the original attachment point is inaccessible. What should happen?

- A. Attach to the nearest handrail
- B. Use a longer sling without recalculating
- C. Proceed if the load is close to the original weight
- D. Stop and revise the plan or obtain an approved alternative

50. At the biomass district-heating project, during material receiving, with a revised work package, Shock loading occurs when a slack sling suddenly takes the load. Why is it serious?

- A. Dynamic force can exceed the working load
- B. It reduces the load weight
- C. It improves sling seating
- D. It proves the sling has extra capacity

51. At the biomass district-heating project, during layout, with a crowded mechanical room, Before selecting a sling for a spool, which information is essential?

- A. Only the pipe diameter and colour
- B. The nearest hook size
- C. Verified weight, centre of gravity, attachment points, and route
- D. The number of workers available

52. At the biomass district-heating project, during fabrication, with a newly isolated line, As the angle of a two-leg sling becomes flatter, what happens to leg tension?

- A. Leg tension decreases to zero
- B. Leg tension increases
- C. The load becomes self-balancing
- D. The sling rating doubles automatically

53. At the biomass district-heating project, during fit-up, with a late field change, A load begins to rotate as it leaves the floor. What should the crew do?

- A. Add speed to overcome the rotation
- B. Catch the load by hand
- C. Pull harder on one tag line
- D. Stop and reassess the load

54. At the biomass district-heating project, during installation, with a night-shift handover, A sling has a cut and its identification tag is missing. What is correct?

- A. Use it at half the listed load
- B. Remove it from service and obtain identified, suitable equipment
- C. Tie the cut closed with wire
- D. Use it only for the first lift

55. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, Who should direct a lift when one signal system is required?

- A. The designated signal person identified in the lift plan
- B. Any worker closest to the load
- C. The person operating the tag line
- D. The newest worker on the crew

56. At the biomass district-heating project, during start-up, with a wet-weather condition, A tag line is being used near a rotating load. Where should the handler stand?

- A. Directly beneath the load
- B. Between the load and a fixed structure
- C. In a clear position outside the swing and line-of-fire zones
- D. With the line wrapped around a wrist

57. At the biomass district-heating project, during troubleshooting, with a restricted access route, A crane outriggers setup is close to an excavation edge. What must be verified?

- A. Ground capacity, edge stability, and the approved setup distance
- B. Only the crane colour and boom length
- C. Whether the excavation looks dry
- D. Whether the operator can see the load

58. At the biomass district-heating project, during maintenance, with a replacement component, A blind lift will pass behind a wall. Which control is most important?

- A. Increase the lifting speed
- B. Remove the exclusion zone
- C. Let each worker give signals as needed
- D. Use agreed communication and spotting

59. At the biomass district-heating project, during turnover, with a first-time crew member, A suspended load is ready to land on dunnage. What should happen before lowering?

- A. Place hands under the load to guide it
- B. Remove the tag lines before the load settles
- C. Confirm the landing surface, cribbing, clearances, and hand positions
- D. Lower rapidly to prevent swinging

60. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A hoist is rated for the load, but the hook is side-loaded. What is the concern?

- A. Side loading improves hook capacity
- B. The hook rating applies in every direction
- C. The load will correct the hook angle automatically
- D. It can damage the hook or hoist

61. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A steam user is cold while the supply valve is open. What is a logical first check?

- A. Check flow, drainage, strainers, and return
- B. Increase pressure without checking drainage
- C. Close the return line
- D. Remove the insulation immediately

62. At the biomass district-heating project, during material receiving, with a revised work package, A relief valve is isolated by a closed block valve during operation. What is the concern?

- A. The relief valve will open more accurately
- B. The protected equipment may lose its required overpressure protection
- C. The block valve reduces all system pressure
- D. The insulation becomes a secondary relief path

63. At the biomass district-heating project, during layout, with a crowded mechanical room, Why is a drip leg installed on a steam line?

- A. To increase steam velocity at every outlet
- B. To replace the main steam trap
- C. To prevent all thermal expansion
- D. To collect and remove condensate from a low point

64. At the biomass district-heating project, during fabrication, with a newly isolated line, A steam trap discharges continuously with a strong live-steam sound. What should be checked?

- A. Increase the steam pressure immediately
- B. Trap condition, orientation, differential pressure, and downstream return
- C. Close every upstream drain
- D. Remove the strainer permanently

65. At the biomass district-heating project, during fit-up, with a late field change, Water hammer follows rapid opening of a steam valve. What is the best response?

- A. Control the valve, drain condensate, and review warm-up and slope
- B. Open the valve farther to clear the noise
- C. Remove the drip leg
- D. Increase the return pressure

66. At the biomass district-heating project, during installation, with a night-shift handover, A steam strainer is installed with its basket access facing upward. What concern exists?

- A. The strainer will filter twice as well
- B. The steam will become noncondensable
- C. Maintenance may be difficult and debris may remain
- D. The orientation eliminates pressure drop

67. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A condensate return line is flooded after a pressure reduction. What should be investigated?

- A. Only the steam supply temperature
- B. The colour of the insulation
- C. Return pressure, trap operation, slope, check action, and receiver level
- D. The size of the nearest valve handle

68. At the biomass district-heating project, during start-up, with a wet-weather condition, Why are vents useful during steam-line warm-up?

- A. They remove air during controlled warm-up
- B. They replace pressure-relief devices
- C. They increase condensate temperature instantly
- D. They keep all valves locked open

69. At the biomass district-heating project, during troubleshooting, with a restricted access route, A vacuum breaker is installed on a heat exchanger steam side. What does it help prevent?

- A. All pressure excursions above the design limit
- B. Vacuum conditions that can interfere with drainage or damage equipment
- C. Reverse rotation of a condensate pump
- D. Loss of insulation heat transfer

70. At the biomass district-heating project, during maintenance, with a replacement component, A high-pressure steam test boundary includes an unprotected relief path. What is required?

- A. Raise pressure slowly without further review
- B. Use a lower-reading gauge only
- C. Stand closer to watch the fittings
- D. Provide the specified protection before pressurizing

71. At the biomass district-heating project, during turnover, with a first-time crew member, A steam line expands into a guide during warm-up. What should be checked?

- A. Tighten the guide until movement stops
- B. Guide clearance, anchor location, support movement, and the designed expansion path
- C. Remove the nearest support
- D. Add a rigid brace at the hot spot

72. A valve seat at the biomass district-heating project experiences 90 kPa over an effective area of 0.025 m². What force acts on that area?

- A. 2.25
- B. 3.6e+06
- C. 90025
- D. 2250

73. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A steam user is cold while the supply valve is open. What is a logical first check?

- A. Check flow, drainage, strainers, and return
- B. Increase pressure without checking drainage
- C. Close the return line
- D. Remove the insulation immediately

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- A. The relief valve will open more accurately
- B. The block valve reduces all system pressure
- C. The protected equipment may lose its required overpressure protection

D. The insulation becomes a secondary relief path

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- C. To replace the main steam trap
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- A. Increase the steam pressure immediately
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- A. Control the valve, drain condensate, and review warm-up and slope
- B. Open the valve farther to clear the noise
- C. Remove the drip leg
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- A. The strainer will filter twice as well
- B. The steam will become noncondensable

- C. The orientation eliminates pressure drop
- D. Maintenance may be difficult and debris may remain

79. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A condensate return line is flooded after a pressure reduction. What should be investigated?

- A. Only the steam supply temperature
- B. The colour of the insulation
- C. The size of the nearest valve handle
- D. Return pressure, trap operation, slope, check action, and receiver level

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- C. They increase condensate temperature instantly
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- A. All pressure excursions above the design limit
- B. Reverse rotation of a condensate pump
- C. Vacuum conditions that can interfere with drainage or damage equipment
- D. Loss of insulation heat transfer

82. At the biomass district-heating project, during maintenance, with a replacement component, A high-pressure steam test boundary includes an unprotected relief path. What is required?

- A. Raise pressure slowly without further review
- B. Provide the specified protection before pressurizing
- C. Use a lower-reading gauge only
- D. Stand closer to watch the fittings

83. At the biomass district-heating project, during turnover, with a first-time crew member, A steam line expands into a guide during warm-up. What should be checked?

- A. Guide clearance, anchor location, support movement, and the designed expansion path
- B. Tighten the guide until movement stops
- C. Remove the nearest support
- D. Add a rigid brace at the hot spot

84. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, Why is insulation installed after required steam testing and inspection?

- A. Insulation creates the pressure boundary
- B. Testing cannot be performed on bare pipe
- C. It can conceal leaks and inspection points
- D. Insulation prevents all condensate formation

85. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A fuel or process line is opened after isolation. What additional condition must be considered?

- A. Only the outside pipe temperature
- B. Consider residual pressure, vapour, liquid, and purge
- C. Whether the valve handle is painted
- D. The nearest electrical outlet

86. At the biomass district-heating project, during material receiving, with a revised work package, A medical-gas connection is clean but not positively identified. What should happen?

- A. Connect it because the fitting matches
- B. Use colour alone as proof
- C. Test it by opening the source briefly
- D. Hold the connection until the gas identity and destination are verified

87. At the biomass district-heating project, during layout, with a crowded mechanical room, A hydronic pump runs, but the terminal coil has little flow. What should be checked first?

- A. Check valves, air, strainers, rotation, and flow
- B. Increase the setpoint without measuring flow
- C. Insulate the pump casing more heavily
- D. Close the return valve completely

88. At the biomass district-heating project, during fabrication, with a newly isolated line, Why is an expansion tank used in a closed hydronic system?

- A. To remove all suspended solids
- B. To replace the circulating pump
- C. To set the valve fail position
- D. To accommodate fluid volume change as temperature changes

89. At the biomass district-heating project, during fit-up, with a late field change, A hydronic loop contains air after filling. What effect can result?

- A. Higher heat transfer at every coil
- B. Noise, unstable flow, poor heat transfer, and unreliable balancing
- C. Automatic removal of all debris
- D. Permanent elimination of pressure drop

90. At the biomass district-heating project, during installation, with a night-shift handover, A coil connection imposes visible strain on the equipment nozzle. What is correct?

- A. Tighten the flange until the strain disappears
- B. Add a heavier gasket
- C. Correct the piping support or alignment before operating the equipment
- D. Start the pump to pull the pipe into place

91. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A cooling system has a large temperature difference and low flow. What should be investigated?

- A. Restriction, valve position, air, pump condition, and coil cleanliness
- B. Only the room thermostat
- C. The pipe colour and insulation label
- D. The relief valve spring

92. At the biomass district-heating project, during start-up, with a wet-weather condition, What is the purpose of balancing a hydronic system?

- A. To make every branch the same length
- B. To distribute design flow so connected loads receive the intended service
- C. To eliminate the need for controls
- D. To increase pressure drop without limit

93. At the biomass district-heating project, during troubleshooting, with a restricted access route, A process line carries an abrasive slurry. Which selection principle is most important?

- A. Use the lightest pipe that fits the dimension
- B. Select components by colour only
- C. Match material, wall, fittings, and joining method to the service
- D. Use a water-service gasket without review

94. At the biomass district-heating project, during maintenance, with a replacement component, A heat exchanger is installed with the wrong flow direction. What can happen?

- A. The exchanger will always self-correct
- B. The wrong direction improves all heat transfer
- C. The pipe supports eliminate the effect
- D. Performance, control response, and temperature approach can be affected

95. At the biomass district-heating project, during turnover, with a first-time crew member, A control valve hunts while the process temperature varies. What should be checked?

- A. Disable the controller permanently
- B. Close the bypass without measuring
- C. Sensor location, valve authority, actuator response, and operating conditions
- D. Increase the setpoint until hunting stops

96. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A flexible connector is installed in a way that carries pipe weight. What is the concern?

- A. The connector becomes a permanent support
- B. It may be overloaded or move improperly
- C. Flexibility removes the need for anchors
- D. The weight improves vibration isolation

97. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A fuel or process line is opened after isolation. What additional condition must be considered?

- A. Consider residual pressure, vapour, liquid, and purge
- B. Only the outside pipe temperature
- C. Whether the valve handle is painted
- D. The nearest electrical outlet

98. At the biomass district-heating project, during material receiving, with a revised work package, A medical-gas connection is clean but not positively identified. What should happen?

- A. Connect it because the fitting matches
- B. Use colour alone as proof
- C. Test it by opening the source briefly
- D. Hold the connection until the gas identity and destination are verified

99. At the biomass district-heating project, water moves through an effective area of 0.014 m² at 2.5 m/s. What is the flow in L/s?

- A. 5.6
- B. 178.57
- C. 35
- D. 2514

100. At the biomass district-heating project, during fabrication, with a newly isolated line, Why is an expansion tank used in a closed hydronic system?

- A. To remove all suspended solids
- B. To accommodate fluid volume change as temperature changes
- C. To replace the circulating pump
- D. To set the valve fail position

101. At the biomass district-heating project, during fit-up, with a late field change, A hydronic loop contains air after filling. What effect can result?

- A. Higher heat transfer at every coil
- B. Automatic removal of all debris
- C. Permanent elimination of pressure drop
- D. Noise, unstable flow, poor heat transfer, and unreliable balancing

102. At the biomass district-heating project, during installation, with a night-shift handover, A coil connection imposes visible strain on the equipment nozzle. What is correct?

- A. Correct the piping support or alignment before operating the equipment
- B. Tighten the flange until the strain disappears
- C. Add a heavier gasket
- D. Start the pump to pull the pipe into place

103. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A cooling system has a large temperature difference and low flow. What should be investigated?

- A. Only the room thermostat
- B. Restriction, valve position, air, pump condition, and coil cleanliness
- C. The pipe colour and insulation label
- D. The relief valve spring

104. At the biomass district-heating project, during start-up, with a wet-weather condition, What is the purpose of balancing a hydronic system?

- A. To make every branch the same length
- B. To eliminate the need for controls
- C. To distribute design flow so connected loads receive the intended service
- D. To increase pressure drop without limit

105. At the biomass district-heating project, during troubleshooting, with a restricted access route, A process line carries an abrasive slurry. Which selection principle is most important?

- A. Match material, wall, fittings, and joining method to the service
- B. Use the lightest pipe that fits the dimension
- C. Select components by colour only
- D. Use a water-service gasket without review

106. At the biomass district-heating project, during maintenance, with a replacement component, A heat exchanger is installed with the wrong flow direction. What can happen?

- A. The exchanger will always self-correct
- B. The wrong direction improves all heat transfer
- C. The pipe supports eliminate the effect
- D. Performance, control response, and temperature approach can be affected

107. At the biomass district-heating project, during turnover, with a first-time crew member, A control valve hunts while the process temperature varies. What should be checked?

- A. Sensor location, valve authority, actuator response, and operating conditions
- B. Disable the controller permanently
- C. Close the bypass without measuring
- D. Increase the setpoint until hunting stops

108. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A flexible connector is installed in a way that carries pipe weight. What is the concern?

- A. The connector becomes a permanent support
- B. Flexibility removes the need for anchors
- C. The weight improves vibration isolation
- D. It may be overloaded or move improperly

109. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A fuel or process line is opened after isolation. What additional condition must be considered?

- A. Only the outside pipe temperature
- B. Consider residual pressure, vapour, liquid, and purge
- C. Whether the valve handle is painted
- D. The nearest electrical outlet

110. At the biomass district-heating project, during material receiving, with a revised work package, A medical-gas connection is clean but not positively identified. What should happen?

- A. Connect it because the fitting matches
- B. Use colour alone as proof
- C. Hold the connection until the gas identity and destination are verified
- D. Test it by opening the source briefly

111. At the biomass district-heating project, during layout, with a crowded mechanical room, A hydronic pump runs, but the terminal coil has little flow. What should be checked first?

- A. Increase the setpoint without measuring flow
- B. Insulate the pump casing more heavily
- C. Check valves, air, strainers, rotation, and flow
- D. Close the return valve completely

112. At the biomass district-heating project, during fabrication, with a newly isolated line, A solar loop reaches a high temperature while the pump is off. What must be considered?

- A. Only the normal operating temperature
- B. Stagnation temperature, relief protection, expansion, and approved shutdown logic
- C. Removing the relief device
- D. Opening an unapproved drain to atmosphere

113. At the biomass district-heating project, during fit-up, with a late field change, A heat-recovery loop is connected to a process exchanger. What must be confirmed?

- A. Compatibility, flow direction, controls, relief, and the expected operating modes
- B. Only the nominal pipe size
- C. That all branches have identical temperatures
- D. That the exchanger can be bypassed permanently

114. At the biomass district-heating project, during installation, with a night-shift handover, Before starting a renewable-energy skid, what is the best readiness check?

- A. Start the pump and correct defects while running
- B. Remove all guards for visibility
- C. Open every isolation valve regardless of the procedure
- D. Confirm supports, valves, sensors, relief devices, controls, labels, and test records

115. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A solar-thermal loop is exposed to freezing weather during shutdown. What should be verified?

- A. Freeze protection, drain or circulation mode, insulation, and control response
- B. Only the collector colour
- C. The pump speed at full output
- D. That every valve is permanently open

116. At the biomass district-heating project, during start-up, with a wet-weather condition, A geothermal loop shows poor heat transfer after commissioning. What is a logical check?

- A. Increase pressure without measuring flow
- B. Check balance, air, fluid, readings, and controls
- C. Replace every valve immediately
- D. Disable the temperature sensors

117. At the biomass district-heating project, during troubleshooting, with a restricted access route, A heat-pump system enters defrost mode. What should the technician recognize?

- A. The system has necessarily failed
- B. All pumps must be shut off permanently
- C. The system may temporarily reverse or change its normal heat-transfer sequence
- D. The relief valve should be isolated

118. At the biomass district-heating project, during maintenance, with a replacement component, A biomass heating loop includes a storage tank. Why is the tank important?

- A. It replaces all relief protection
- B. It prevents every pressure change
- C. It eliminates the need for temperature sensors
- D. It buffers heat production and system demand

119. At the biomass district-heating project, during turnover, with a first-time crew member, A renewable-energy system has a sensor installed on an unrepresentative pipe section. What risk exists?

- A. Controls may respond to the wrong temperature or operating condition
- B. The sensor will average every system temperature
- C. The pipe insulation will correct the reading
- D. The pump will automatically relocate the sensor

120. At the biomass district-heating project, during shutdown, with an unexpected instrument reading, A restart after a protective trip is requested. What must be checked first?

- A. Only the reset button
- B. Cause, safe condition, reset authority, and the required retest
- C. The colour of the alarm light
- D. Whether the shift is nearly finished

121. At the biomass district-heating project, during pre-job planning, with a scheduled outage, A commissioning team is ready to start equipment, but several protective devices are untested. What should happen?

- A. Start at reduced speed without the devices
- B. Bypass the devices temporarily

- C. Accept the risk because the equipment is new
- D. Hold the start until prerequisites and safety functions are verified

122. At the biomass district-heating project, during material receiving, with a revised work package, What is the purpose of a functional test?

- A. To replace all installation inspections
- B. To make the equipment appear complete
- C. To demonstrate that commands, responses, indications, and protections work as intended
- D. To eliminate the need for turnover records

123. At the biomass district-heating project, during layout, with a crowded mechanical room, A pump runs during start-up, but no flow is indicated. What is the best response?

- A. Increase speed until flow appears
- B. Assume the instrument is wrong
- C. Open every valve without checking the procedure
- D. Stabilize and verify rotation, valves, air, level, and flow

124. At the biomass district-heating project, during fabrication, with a newly isolated line, A control interlock trips during a test. What should the team do?

- A. Reset repeatedly until the test passes
- B. Record the condition, stabilize the system, and investigate before resetting
- C. Disable the interlock for the remaining tests
- D. Delete the alarm from the record

125. At the biomass district-heating project, during fit-up, with a late field change, What should a punch list entry contain?

- A. Only the name of the worker who found it

- B. A general note that work remains
- C. A clear deficiency, location, responsible party, disposition, and status
- D. A photograph without a description

126. At the biomass district-heating project, during installation, with a night-shift handover, An as-built drawing differs from the installed route. What is required?

- A. Update the record so it reflects the accepted field condition
- B. Keep the original because it was approved
- C. Erase the changed route from the field copy
- D. Wait for maintenance to redraw it later

127. At the biomass district-heating project, during pressure testing, with a temporary support arrangement, A test result is outside the expected range but the equipment still runs. What is correct?

- A. Round the result to the expected value
- B. Record the deviation and obtain a technical disposition before acceptance
- C. Accept it because the motor runs
- D. Change the alarm limit without approval

128. At the biomass district-heating project, during start-up, with a wet-weather condition, When should temporary test hoses and jumpers be removed?

- A. After the test and restoration procedure identifies them for removal
- B. Whenever they obstruct a walkway
- C. Before the test result is recorded
- D. Only if the operator notices them

129. At the biomass district-heating project, during troubleshooting, with a restricted access route, A turnover package is missing a pressure-test record. What should happen?

- A. Mark the package complete because the line is operating
- B. Use a nearby test record
- C. Create a result from the design pressure
- D. Hold acceptance until the record is recovered or the test is repeated as required

130. At the biomass district-heating project, during maintenance, with a replacement component, A restart after a protective trip is requested. What must be checked first?

- A. Only the reset button
- B. The colour of the alarm light
- C. Cause, safe condition, reset authority, and the required retest
- D. Whether the shift is nearly finished

Practice Exam 23: Answer Key and Explanations

- 1. A — A —** Remove it from service and obtain a suitable verified instrument. A damaged or unverified gauge cannot provide reliable evidence of system condition. The other choices miss instrument integrity and reliable verification. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.
- 2. D — D —** Pause the handover and reconcile the information before work continues. Conflicting information can change the isolation, service, and hazard assessment. The other choices miss the need for controlled communication and confirmation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.
- 3. C — C —** Plan the route, use suitable handling aids, and control pinch points. Manual handling must control weight, balance, route, and line-of-fire hazards. The other choices miss uncontrolled force and pinch-point exposure. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.
- 4. D — D —** Stop the source if safe, control ignition, and follow the spill procedure. Spill response must protect people, the environment, and ignition control. The other choices miss containment and the approved response procedure. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.
- 5. A — A —** Stop, isolate the tool, and inspect the wheel and installation. Abnormal vibration can indicate damage, imbalance, incorrect fit, or a failing component. The other choices miss continued

operation of a potentially defective tool. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

6. B — B — Do not use it until the contents are positively identified and labelled. Positive identification prevents exposure, incompatibility, and incorrect disposal. The other choices miss guessing the identity of a hazardous product. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

7. A — A — When the authorized tester confirms the required conditions and records them. Permit conditions require measured, authorized, and documented verification. The other choices miss substituting observation for a required test. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

8. D — D — 3.5 inches equals 88.9 millimetres. Multiplying inches by 25.4 converts the given length to millimetres. The other choices miss the correct length conversion factor. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

9. C — C — Move clear, control the release, and reassess the isolation and energy state. Unexpected release indicates that the assumed energy state may be wrong. The other choices miss the line of fire and unverified isolation. Use the current drawing or procedure, perform the approved step, and verify the result.

10. B — B — Review the load path, exclusion zone, signals, and stop command. Everyone in the lift area must understand movement, communication, and stop controls. The other choices miss the shared lift plan and exclusion boundary. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

11. D — D — Identify every energy source and the approved isolation method. Energy control begins with positive identification and an approved isolation plan. The other choices miss the need to identify and control stored energy. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

12. C — C — Use task-appropriate eye, face, hearing, hand, and body protection. Protection must match the hazards produced by the specific tool and material. The other choices miss the complete hazard assessment. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

13. A — A — Read the current safety data sheet and confirm compatibility. The safety data sheet and service specification establish hazards and compatibility. The other choices miss product identity and service compatibility. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

14. B — B — Confirm authorization, remove or protect combustibles, and provide fire watch. Hot work requires controls for ignition, combustibles, sparks, and the surrounding area. The other choices miss the

hot-work permit and surrounding fire hazards. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

15. C — C — Stop and follow the confined-space entry and rescue procedure. Confined-space hazards can include atmosphere, engulfment, access, and rescue limitations. The other choices miss the required assessment and rescue controls. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

16. A — A — Remove the debris and restore a clear, controlled work area. Housekeeping controls slips, trips, fire exposure, and interference with emergency access. The other choices miss the obligation to leave a safe work area. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

17. B — B — Separate and protect the material from contamination. Contamination can damage material performance and service cleanliness. The other choices miss cross-contamination during storage and preparation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

18. D — D — The installation lacks required maintenance access or removable provisions. Correct layout includes operation, inspection, removal, and future maintenance. The other choices miss ignoring the life-cycle access requirement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

19. B — B — Delay concealment until the inspection and disposition are complete. Hold points protect acceptance before the work becomes inaccessible. The other choices miss using a photograph as a substitute for required inspection. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

20. A — A — After permanent supports and the approved load path are complete. Temporary aids do not replace engineered or specified permanent supports. The other choices miss releasing a load before the permanent support system is ready. Use the current drawing or procedure, perform the approved step, and verify the result.

21. C — C — Use the controlled documents and resolve the discrepancy before fabrication. A controlled discrepancy must be resolved before an irreversible layout or cut. The other choices miss revision control and field verification. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

22. D — D — Compare plan, elevation, section, and field reference points. Multiple views and reliable benchmarks establish three-dimensional location. The other choices miss the limits of scaling a drawing. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

23. C — C — Segregate it and restore traceability through the approved process. Traceability proves that the material, schedule, and service are acceptable. The other choices miss appearance as a substitute

for material identity. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

24. B — B — Stop and correct the route, dimensions, or support arrangement. Forced alignment can load joints, equipment nozzles, and supports. The other choices miss using assembly force to hide a layout error. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

25. D — D — Alignment, face condition, gasket fit, and support before tightening. Correct fit-up prevents gasket damage, leakage, and imposed pipe strain. The other choices miss forcing the joint closed. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

26. A — A — Thermal movement may create excessive stress or load connected equipment. Anchors, guides, and expansion arrangements must work as a planned system. The other choices miss ignoring thermal movement and restraint forces. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

27. D — D — Provide the specified sleeve, clearance, and firestopping arrangement. Penetration details protect the wall function while accommodating the pipe system. The other choices miss unapproved materials and loss of the wall rating. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

28. C — C — the slope is 3.5 percent. Slope percentage is calculated as rise divided by run, multiplied by 100. The other choices miss the relationship between rise and run. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

29. B — B — Stop and verify the valve selection and orientation before testing. Flow direction can control valve function, check action, and pressure behaviour. The other choices miss treating orientation as cosmetic. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

30. A — A — Confirm groove dimensions, gasket condition, alignment, and bolt engagement. Grooved joints depend on correct preparation, gasket, alignment, and tightening. The other choices miss using the coupling to compensate for defective preparation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

31. A — A — Excess sealant can enter the system and restrict or contaminate the service. Sealant must support sealing without entering a sensitive flow path. The other choices miss contamination and restriction inside the system. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

32. C — C — Hold the spool and obtain an approved replacement or disposition. Every pressure-boundary component must be suitable for the specified service. The other choices miss rating

substitution without engineering approval. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

33. D — D — Record the discrepancy and obtain controlled clarification. A field change affecting fit or function must be controlled and documented. The other choices miss making an irreversible change from an unapproved discrepancy. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

34. B — B — Liquid can collect, reducing drainage and increasing corrosion or freezing risk. Drainage depends on a continuous route, slope, and accessible low points. The other choices miss assuming a level route will drain reliably. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

35. D — D — Separate and protect the material from contamination. Contamination can damage material performance and service cleanliness. The other choices miss cross-contamination during storage and preparation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

36. A — A — The installation lacks required maintenance access or removable provisions. Correct layout includes operation, inspection, removal, and future maintenance. The other choices miss ignoring the life-cycle access requirement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

37. C — C — Delay concealment until the inspection and disposition are complete. Hold points protect acceptance before the work becomes inaccessible. The other choices miss using a photograph as a substitute for required inspection. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

38. B — B — After permanent supports and the approved load path are complete. Temporary aids do not replace engineered or specified permanent supports. The other choices miss releasing a load before the permanent support system is ready. Use the current drawing or procedure, perform the approved step, and verify the result.

39. B — B — Use the controlled documents and resolve the discrepancy before fabrication. A controlled discrepancy must be resolved before an irreversible layout or cut. The other choices miss revision control and field verification. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

40. C — C — Compare plan, elevation, section, and field reference points. Multiple views and reliable benchmarks establish three-dimensional location. The other choices miss the limits of scaling a drawing. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

41. D — D — Segregate it and restore traceability through the approved process. Traceability proves that the material, schedule, and service are acceptable. The other choices miss appearance as a substitute

for material identity. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

42. A — A — Stop and correct the route, dimensions, or support arrangement. Forced alignment can load joints, equipment nozzles, and supports. The other choices miss using assembly force to hide a layout error. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

43. C — C — Alignment, face condition, gasket fit, and support before tightening. Correct fit-up prevents gasket damage, leakage, and imposed pipe strain. The other choices miss forcing the joint closed. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

44. A — A — Thermal movement may create excessive stress or load connected equipment. Anchors, guides, and expansion arrangements must work as a planned system. The other choices miss ignoring thermal movement and restraint forces. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

45. B — B — Provide the specified sleeve, clearance, and firestopping arrangement. Penetration details protect the wall function while accommodating the pipe system. The other choices miss unapproved materials and loss of the wall rating. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

46. D — D — Use agreed communication and spotting. Blind lifts require reliable communication, visibility through spotters, and a stop command. The other choices miss loss of shared control during a blind movement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

47. C — C — Confirm the landing surface, cribbing, clearances, and hand positions. Landing creates crush, roll, and instability hazards that must be controlled. The other choices miss hands and feet in the landing zone. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

48. B — B — It can damage the hook or hoist. Hoists and hooks are designed for the specified line of pull. The other choices miss an unintended force direction. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

49. D — D — Stop and revise the plan or obtain an approved alternative. A changed attachment point can alter capacity, balance, and structural loading. The other choices miss changing the load path without review. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

50. A — A — Dynamic force can exceed the working load. Dynamic effects can create forces much higher than a steady lift. The other choices miss assuming rated capacity covers impact loading. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

51. C — C — Verified weight, centre of gravity, attachment points, and route. Rigging begins with the load and the complete path to the landing area. The other choices miss the load-path information needed for a safe lift. Use the current drawing or procedure, perform the approved step, and verify the result.

52. B — B — Leg tension increases. A flatter sling angle increases the force in each leg. The other choices miss the effect of sling geometry on tension. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

53. D — D — Stop and reassess the load. Unexpected rotation indicates that the planned load path or balance is not confirmed. The other choices miss continuing an unstable movement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

54. B — B — Remove it from service and obtain identified, suitable equipment. Condition and identification are both necessary to establish lifting capacity. The other choices miss using damaged or unverified rigging. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

55. A — A — The designated signal person identified in the lift plan. One recognized signal source prevents conflicting commands. The other choices miss multiple or ambiguous signals. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

56. C — C — In a clear position outside the swing and line-of-fire zones. Tag lines control orientation only when the handler remains clear of hazards. The other choices miss placing the worker in the load path. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

57. A — A — Ground capacity, edge stability, and the approved setup distance. Ground and edge conditions can affect crane stability and capacity. The other choices miss visual judgment without a setup assessment. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

58. D — D — Use agreed communication and spotting. Blind lifts require reliable communication, visibility through spotters, and a stop command. The other choices miss loss of shared control during a blind movement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

59. C — C — Confirm the landing surface, cribbing, clearances, and hand positions. Landing creates crush, roll, and instability hazards that must be controlled. The other choices miss hands and feet in the landing zone. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

60. D — D — It can damage the hook or hoist. Hoists and hooks are designed for the specified line of pull. The other choices miss an unintended force direction. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

61. A — A — Check flow, drainage, strainers, and return. Poor heat transfer can result from blocked flow, flooded equipment, or return problems. The other choices miss changing pressure before finding the restriction. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

62. B — B — The protected equipment may lose its required overpressure protection. Relief protection must remain available in the configuration required for service. The other choices miss defeating a safety function. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

63. D — D — To collect and remove condensate from a low point. Condensate collects at low points and must be drained before it causes unstable flow. The other choices miss the purpose of low-point condensate management. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

64. B — B — Trap condition, orientation, differential pressure, and downstream return. Continuous discharge can indicate failed internals, incorrect conditions, or return problems. The other choices miss diagnosing from the whole trap arrangement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

65. A — A — Control the valve, drain condensate, and review warm-up and slope. Rapid admission can move accumulated condensate at high velocity. The other choices miss treating water hammer as normal operation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

66. C — C — Maintenance may be difficult and debris may remain. Strainer orientation must support collection, drainage, and service access. The other choices miss ignoring orientation and maintenance. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

67. C — C — Return pressure, trap operation, slope, check action, and receiver level. Flooding can result from backpressure, poor drainage, failed traps, or restricted return. The other choices miss a connected return-system diagnosis. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

68. A — A — They remove air during controlled warm-up. Air removal and gradual heating reduce uneven temperature and unstable operation. The other choices miss the difference between venting and relieving pressure. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

69. B — B — Vacuum conditions that can interfere with drainage or damage equipment. Condensing steam can reduce pressure and create vacuum conditions. The other choices miss confusing vacuum protection with overpressure protection. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

70. D — D — Provide the specified protection before pressurizing. High-pressure tests require a defined boundary and protection appropriate to stored energy. The other choices miss treating slow pressurization as the only control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

71. B — B — Guide clearance, anchor location, support movement, and the designed expansion path. Thermal movement must be directed by the support and restraint arrangement. The other choices miss blocking intended movement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

72. D — D — the force is 2250 newtons. Pressure must be converted to pascals before multiplying by area in square metres. The other choices miss unit conversion and the pressure-area relationship. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

73. A — A — Check flow, drainage, strainers, and return. Poor heat transfer can result from blocked flow, flooded equipment, or return problems. The other choices miss changing pressure before finding the restriction. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

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82. B — B — Provide the specified protection before pressurizing. High-pressure tests require a defined boundary and protection appropriate to stored energy. The other choices miss treating slow pressurization as the only control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

83. A — A — Guide clearance, anchor location, support movement, and the designed expansion path. Thermal movement must be directed by the support and restraint arrangement. The other choices miss blocking intended movement. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

84. C — C — It can conceal leaks and inspection points. Concealment should follow verification of the pressure boundary and accessible inspection points. The other choices miss hiding work before acceptance. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

85. B — B — Consider residual pressure, vapour, liquid, and purge. Isolation does not automatically remove trapped medium or hazardous residue. The other choices miss line-breaking hazards. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

86. D — D — Hold the connection until the gas identity and destination are verified. Wrong-gas connections can be dangerous even when the mechanical fit is correct. The other choices miss positive

identification and cleanliness together. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

87. A — A — Check valves, air, strainers, rotation, and flow. Flow problems require checking the complete circuit before changing controls. The other choices miss a whole-loop diagnosis. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

88. D — D — To accommodate fluid volume change as temperature changes. Fluid expands when heated, so the system needs a controlled volume and pressure response. The other choices miss the purpose of expansion control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

89. B — B — Noise, unstable flow, poor heat transfer, and unreliable balancing. Air interrupts circulation and changes the readings used for performance decisions. The other choices miss air effects in a closed loop. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

90. C — C — Correct the piping support or alignment before operating the equipment. Equipment connections should not carry unintended installation loads. The other choices miss forcing piping into equipment alignment. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

91. A — A — Restriction, valve position, air, pump condition, and coil cleanliness. The combined symptom points toward a flow or heat-transfer problem. The other choices miss isolating the diagnosis to the thermostat. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

92. B — B — To distribute design flow so connected loads receive the intended service. Balancing coordinates branch resistance and available flow across the system. The other choices miss confusing balance with identical piping. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

93. C — C — Match material, wall, fittings, and joining method to the service. Abrasive service can accelerate wear and make ordinary materials unsuitable. The other choices miss service compatibility and wear. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

94. D — D — Performance, control response, and temperature approach can be affected. Heat-transfer equipment relies on the specified flow arrangement. The other choices miss treating orientation as a cosmetic issue. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

95. C — C — Sensor location, valve authority, actuator response, and operating conditions. Control instability can involve sensing, sizing, authority, or process response. The other choices miss changing a

setting without diagnosing the loop. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

96. B — B — It may be overloaded or move improperly. Flexible elements need correct support and alignment to manage movement or vibration. The other choices miss using a connector as a structural support. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

97. A — A — Consider residual pressure, vapour, liquid, and purge. Isolation does not automatically remove trapped medium or hazardous residue. The other choices miss line-breaking hazards. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

98. D — D — Hold the connection until the gas identity and destination are verified. Wrong-gas connections can be dangerous even when the mechanical fit is correct. The other choices miss positive identification and cleanliness together. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

99. C — C — the flow is 35 litres per second. Flow is area multiplied by velocity, followed by conversion from cubic metres per second to litres per second. The other choices miss the required flow relationship and unit conversion. Use the current drawing or procedure, perform the approved step, and verify the result.

100. B — B — To accommodate fluid volume change as temperature changes. Fluid expands when heated, so the system needs a controlled volume and pressure response. The other choices miss the purpose of expansion control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

101. D — D — Noise, unstable flow, poor heat transfer, and unreliable balancing. Air interrupts circulation and changes the readings used for performance decisions. The other choices miss air effects in a closed loop. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

102. A — A — Correct the piping support or alignment before operating the equipment. Equipment connections should not carry unintended installation loads. The other choices miss forcing piping into equipment alignment. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

103. B — B — Restriction, valve position, air, pump condition, and coil cleanliness. The combined symptom points toward a flow or heat-transfer problem. The other choices miss isolating the diagnosis to the thermostat. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

104. C — C — To distribute design flow so connected loads receive the intended service. Balancing coordinates branch resistance and available flow across the system. The other choices miss confusing

balance with identical piping. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

105. A — A — Match material, wall, fittings, and joining method to the service. Abrasive service can accelerate wear and make ordinary materials unsuitable. The other choices miss service compatibility and wear. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

106. D — D — Performance, control response, and temperature approach can be affected. Heat-transfer equipment relies on the specified flow arrangement. The other choices miss treating orientation as a cosmetic issue. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

107. A — A — Sensor location, valve authority, actuator response, and operating conditions. Control instability can involve sensing, sizing, authority, or process response. The other choices miss changing a setting without diagnosing the loop. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

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110. C — C — Hold the connection until the gas identity and destination are verified. Wrong-gas connections can be dangerous even when the mechanical fit is correct. The other choices miss positive identification and cleanliness together. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

111. C — C — Check valves, air, strainers, rotation, and flow. Flow problems require checking the complete circuit before changing controls. The other choices miss a whole-loop diagnosis. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system. This sequence controls the hazard and supports a defensible decision.

112. B — B — Stagnation temperature, relief protection, expansion, and approved shutdown logic. Renewable sources can continue adding energy when circulation is unavailable. The other choices miss off-normal temperature and stored energy. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

113. A — A — Compatibility, flow direction, controls, relief, and the expected operating modes. Recovery systems interact with source, load, and control conditions. The other choices miss system integration rather than size alone. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

114. D — D — Confirm supports, valves, sensors, relief devices, controls, labels, and test records. Start-up should follow completion and readiness verification, not discoverability by operation. The other choices miss pre-start completeness and controlled energization. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

115. A — A — Freeze protection, drain or circulation mode, insulation, and control response. Renewable systems can change mode with ambient conditions and available energy. The other choices miss the complete freeze-protection strategy. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

116. B — B — Check balance, air, fluid, readings, and controls. Performance depends on circulation, heat exchange, fluid condition, and accurate control. The other choices miss a measured system diagnosis. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

117. C — C — The system may temporarily reverse or change its normal heat-transfer sequence. Operating modes can intentionally change flow and temperature to remove frost. The other choices miss confusing a designed mode with a fault. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

118. D — D — It buffers heat production and system demand. Thermal storage helps match source output with changing system demand. The other choices miss the role of storage in system control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

119. A — A — Controls may respond to the wrong temperature or operating condition. Sensor location determines whether the control signal represents the intended condition. The other choices miss measurement location and control response. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

120. B — B — Cause, safe condition, reset authority, and the required retest. Restarting without understanding a trip can repeat the hazard or damage. The other choices miss controlled recovery after a protection event. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

121. D — D — Hold the start until prerequisites and safety functions are verified. Commissioning proves readiness and protection before introducing operating energy. The other choices miss starting incomplete or unprotected equipment. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

122. C — C — To demonstrate that commands, responses, indications, and protections work as intended. Functional tests connect the installed system to its intended operating behaviour. The other choices miss the difference between testing and appearance. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

123. D — D — Stabilize and verify rotation, valves, air, level, and flow. A running motor does not prove that the fluid path or pump performance is correct. The other choices miss independent evidence of actual flow. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

124. B — B — Record the condition, stabilize the system, and investigate before resetting. A protective trip is evidence that requires diagnosis, not concealment. The other choices miss preserving the meaning of a safety response. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

125. C — C — A clear deficiency, location, responsible party, disposition, and status. Turnover depends on deficiencies being traceable and closed or formally accepted. The other choices miss actionable deficiency control. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

126. A — A — Update the record so it reflects the accepted field condition. Future isolation and maintenance depend on accurate system information. The other choices miss documenting the accepted installation. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

127. B — B — Record the deviation and obtain a technical disposition before acceptance. Operation alone does not prove that the system meets design intent. The other choices miss evidence-based acceptance. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

128. A — A — After the test and restoration procedure identifies them for removal. Temporary items can change the operating configuration and must be controlled. The other choices miss restoring the intended line-up. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

129. D — D — Hold acceptance until the record is recovered or the test is repeated as required. Records are evidence that the required acceptance activity occurred. The other choices miss substituting assumption for a traceable record. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.

130. C — C — Cause, safe condition, reset authority, and the required retest. Restarting without understanding a trip can repeat the hazard or damage. The other choices miss controlled recovery after a protection event. Use the current drawing or procedure, perform the approved step, and verify the result. Record the final condition before restoring the system.