# PRACTICE EXAM 7: T4 SIMULATION (50 QUESTIONS)

1. A heavy-duty Class 8 tractor arrives at the shop with a complaint that "the air pressure gauge reads 60 PSI even after running the engine for 20 minutes." The proper first action is to:

A. Inspect for major air leaks and verify compressor and governor operation systematically

B. Replace the compressor as the most likely failure component during the same service

C. Apply battery voltage to the air system for diagnostic testing during the service event

D. Continue operation since 60 PSI is sufficient for normal vehicle operation conditions

2. Technician A says a heavy-duty truck air brake system that builds pressure normally to 80 PSI but cannot reach cut-out indicates a stuck-open governor. Technician B says the symptom indicates an air leak that opens at higher pressure exceeding compressor capacity at that pressure range. Who is correct?

A. Technician A only

B. Both Technician A and Technician B

C. Technician B only

D. Neither Technician A nor Technician B

3. The proper diagnostic priority when a heavy-duty truck shows a complaint of "compressor cycles every 30 seconds during normal operation" is:

A. Replace the compressor as preventive maintenance during the same service event

B. Inspect for air leaks systematically before component replacement during service

C. Apply battery voltage to the compressor for diagnostic testing during service

D. Listen with a stethoscope at the compressor housing during operation only

4. A fleet maintenance manager reviews three heavy-duty tractors with the same complaint of "automatic slack adjusters not maintaining proper stroke after 100,000 miles of service." All three trucks have over 600,000 miles. The most likely common cause is:

A. Failed automatic slack adjusters on all three units affecting all wheel positions equally

B. Worn brake lining causing excessive demand on the slack adjuster mechanisms

C. Air system pressure issues affecting slack adjuster operation during normal use

D. Worn brake lining beyond service specification combined with high-mileage adjuster wear

5. The proper procedure for verifying heavy-duty truck air brake system leak rate per FMVSS 121 with brakes applied is to:

A. Apply 50 PSI to the system and measure pressure decay over 5 minutes total

B. Replace the brake chambers as preventive maintenance during the same service

C. Build pressure to cut-out, fully apply brakes, shut off engine, and measure pressure decay over 1 minute

D. Apply battery voltage to the system for diagnostic testing during the test

6. The most accurate description of automatic traction control (ATC) function during normal vehicle operation is:

A. Applies individual brake pressure when wheel slip is detected during acceleration events

B. Applies parking brake force during normal driving operation conditions during service

C. Provides additional clamping force during heavy load operation conditions during service

D. Cools the brake system during extended operation conditions during normal operation

7. The LEAST likely consequence of operating a heavy-duty truck with a damaged glad hand seal on the trailer connection is:

A. Air leak at the connection during normal operation conditions during service

B. Failure to maintain proper pressure to the trailer brake circuit during operation

C. CVSA out-of-service determination during roadside inspection events during operation

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

8. The proper procedure for verifying heavy-duty truck spring brake chamber operation includes:

A. Apply battery voltage to the chamber for diagnostic testing during service

B. Verify air pressure release engages parking brakes and pressure restoration releases them

C. Listen for chamber operation with a stethoscope during normal vehicle operation

D. Replace the chamber as preventive maintenance regardless of condition

9. A heavy-duty truck arrives with a complaint that the brake pedal "feels normal but stopping distance has increased over the past 50,000 miles." The most likely cause is:

A. Worn ring and pinion gears in the rear drive axle assembly during operation

B. A failed coolant temperature sensor reading falsely cold to the engine ECM

C. Progressive brake lining wear or adjustment drift requiring foundation brake service

D. Excessive transmission fluid level above the maximum fill mark indication

10. The proper procedure when a heavy-duty truck driver reports that "the air pressure gauge needle moves around during normal driving" is to:

A. Verify gauge accuracy with a calibrated test gauge and inspect for pressure fluctuations

B. Replace the gauge as the most likely failure component during the same service event

C. Apply battery voltage to the gauge for diagnostic testing during service operations

D. Continue operation since gauge needle movement has minimal effect on safety

11. The most likely cause of a heavy-duty truck air brake system that shows excessive cycling during periods of low brake demand is:

A. Worn ring and pinion gears in the rear drive axle assembly during operation

B. A failed coolant temperature sensor reading falsely cold to the engine ECM

C. Air leakage in the supply system or excessive demand from accessories during operation

D. Excessive transmission fluid level above the maximum fill mark indication

12. The proper diagnostic approach when a heavy-duty truck shows a complaint of "ABS warning lamp illuminates only on rough roads" is to:

A. Continue operation since rough-road ABS warnings have minimal effect on operation

B. Replace the ABS controller as the most likely failure component during service

C. Apply battery voltage to the ABS controller for diagnostic testing during service

D. Connect scan tool to capture fault codes during the trigger condition and inspect sensor mounting

13. The most accurate description of the role of the J1939 data bus in heavy-duty ABS operation is:

A. Provides communication between ABS controller, engine ECM, and other vehicle modules

B. Provides direct mechanical control of brake actuators during normal operation

C. Replaces all hydraulic and pneumatic control during ABS operation conditions

D. Controls all electrical systems on the truck through a single data bus during operation

14. Technician A says the proper torque value for heavy-duty truck wheel lug nuts is determined by visual estimation. Technician B says the proper torque value is determined by manufacturer service information for the specific application. Who is correct?

A. Both Technician A and Technician B

B. Technician B only

C. Technician A only

D. Neither Technician A nor Technician B

15. The proper procedure when a heavy-duty truck shows a leak at the spring brake chamber air supply fitting is to:

A. Apply silicone sealer to the area to stop the leak during the same service visit

B. Continue operation since spring brake chamber leakage has minimal effect on operation

C. Apply battery voltage to the fitting for diagnostic testing during service operations

D. Cage the spring brake, replace the fitting or chamber, and verify leak repair before return to service

16. The most likely consequence of installing a heavy-duty truck brake chamber without verifying chamber type and size matching specification is:

A. No effect on brake performance regardless of chamber type and size during operation

B. Improved brake performance from upgraded chamber capability during normal operation

C. Improper braking force balance, brake imbalance, and possible CVSA out-of-service status

D. Improved sealing performance from elimination of inspection requirements during operation

17. The proper measurement procedure for heavy-duty truck wheel bearing endplay is to:

A. Use a dial indicator to measure axial movement at the wheel during inspection per TMC RP 618

B. Apply battery voltage to the wheel for diagnostic testing during measurement

C. Listen for endplay-related noise with a stethoscope at idle during operation

D. Estimate endplay visually using shop lighting during the inspection process

18. The LEAST likely cause of a heavy-duty truck ABS system that fails to enter ABS active mode during heavy braking on slick surfaces is:

A. Failed ABS controller unable to command modulator operation during application

B. Wheel speed sensor air gap exceeding specification at multiple wheel positions

C. Damaged tone rings producing inconsistent signals at multiple wheel positions

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

19. The most accurate description of heavy-duty AMT operating relationship to ABS during normal driving is:

A. AMT operation does not interact with ABS during normal vehicle operation conditions

B. ABS communicates wheel speed data to AMT TCM via J1939 for shift logic decisions

C. AMT controls ABS modulator operation during normal vehicle operation conditions

D. ABS replaces AMT shift control during normal vehicle operation conditions

20. The proper service procedure when reusing brake chamber clamp bolts during heavy-duty service is:

A. Reuse all bolts regardless of condition since brake chamber clamp bolts are not torque-to-yield

B. Apply maximum torque during installation to compensate for any thread wear

C. Inspect threads, replace any damaged bolts, and torque to specification per service info

D. Apply anti-seize compound to all threads to ensure proper torque retention

21. A heavy-duty foundation brake produces a clicking noise during application that disappears once the brake is fully applied. The most likely cause is:

A. Insufficient transmission lubricant level affecting normal engagement operations

B. Worn cam roller allowing partial S-cam rotation during the application sequence

C. Damaged gear teeth preventing complete engagement during the shift

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

22. The proper measurement procedure for heavy-duty foundation brake S-cam wear is to:

A. Apply battery voltage to the S-cam for diagnostic testing during measurement

B. Listen for S-cam wear with a stethoscope during normal brake application

C. Estimate wear visually using shop lighting during the inspection process

D. Use precision measurement of the cam profile compared to manufacturer service specifications

23. The most accurate description of heavy-duty truck brake balance verification is:

A. Performed through graduated brake applications during a controlled road test

B. Required after every brake adjustment during routine service procedures

C. Performed annually as preventive maintenance regardless of symptoms during operation

D. Required only after major brake system replacement during service operations

24. A heavy-duty truck removed from service shows premature brake lining wear. The proper inspection procedure includes verification of:

A. External paint condition and decal placement during the inspection process

B. Engine compatibility with the foundation brake during the procedure

C. Brake adjustment, slack adjuster operation, return spring condition, and operator habits

D. Vehicle type compatibility with the foundation brake application during operation

25. Technician A says heavy-duty foundation brake drums should be replaced when they show heat checks during inspection. Technician B says foundation brake drums can continue in service if heat checks are minor and within manufacturer specification. Who is correct?

A. Technician A only

B. Both Technician A and Technician B

C. Technician C only

D. Neither Technician A nor Technician B

26. The most likely cause of a heavy-duty foundation brake that shows accelerated drum wear at one wheel position only is:

A. Worn ring and pinion gears in the rear drive axle assembly during operation

B. A failed coolant temperature sensor reading falsely cold to the engine ECM

C. Excessive transmission fluid level above the maximum fill mark indication

D. Dragging brake from failed slack adjuster, return spring, or seized cam roller at that position

27. The proper torque application for heavy-duty truck brake drum mounting hardware is:

A. Per manufacturer service information specific to the brake drum assembly model and bolt grade

B. Maximum torque applied without measurement during the installation procedures

C. Standard automotive torque specifications for similar hardware diameter applications

D. Visual estimation based on hardware size during the installation procedures

28. The proper diagnostic priority when a heavy-duty truck shows a complaint of "brake pedal pulsation only during light brake application" is to:

A. Replace all brake drums as preventive maintenance during the same service event

B. Apply battery voltage to the brake system for diagnostic testing during service

C. Inspect brake drums for thickness variation, runout, and surface condition

D. Continue operation since pulsation during light application has minimal effect on safety

29. The proper procedure for verifying heavy-duty truck brake chamber diaphragm integrity during routine service is to:

A. Apply battery voltage to the diaphragm for diagnostic testing during service

B. Listen for diaphragm operation with a stethoscope during normal brake application

C. Replace all brake chamber diaphragms as preventive maintenance during service

D. Apply pressure and check for external air leakage with soap solution at multiple positions

30. The LEAST likely cause of a heavy-duty foundation brake that shows uneven lining wear between leading and trailing shoes is:

A. Damaged or worn cam roller affecting shoe contact during application events

B. Failed shoe return spring affecting shoe retraction during release operations

C. S-cam wear affecting shoe spreading geometry during application events

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

31. The proper service action when a heavy-duty truck shows a complaint of "brake fade during long downhill descents" is to:

A. Continue operation since brake fade is normal during heavy braking conditions

B. Replace all brake chambers as preventive maintenance during the same service

C. Verify brake adjustment, lining condition, drum condition, and engine brake operation

D. Apply battery voltage to the brake system for diagnostic testing during service

32. The most accurate description of heavy-duty truck brake balance test procedure is:

A. Test brake force distribution between axles using graduated applications during road test

B. Test only steer axle brake performance during normal operation conditions during service

C. Test only drive axle brake performance during normal operation conditions during service

D. Test only trailer brake performance during normal operation conditions during service

33. The proper procedure for inspecting heavy-duty truck brake hose condition during service is:

A. Apply battery voltage to the hoses for diagnostic testing during service

B. Listen for hose damage with a stethoscope during normal brake application

C. Replace all brake hoses as preventive maintenance regardless of condition

D. Inspect for cracks, swelling, abrasion, and leakage at all connection points

34. The most likely cause of a heavy-duty truck foundation brake that shows excessive heat at one wheel position after a normal driving cycle is:

A. Worn ring and pinion gears in the rear drive axle assembly during operation

B. Dragging brake from failed slack adjuster, return spring, or seized cam roller at that position

C. A failed coolant temperature sensor reading falsely cold to the engine ECM

D. Excessive transmission fluid level above the maximum fill mark indication

35. The proper diagnostic approach when a heavy-duty truck shows a complaint of "brake pedal sinks slowly during steady pressure on hydraulic-equipped applications" is to:

A. Replace the master cylinder as the most likely failure component during service

B. Apply battery voltage to the master cylinder for diagnostic testing during service

C. Inspect for internal master cylinder seal bypass and external system leakage

D. Continue operation since slow pedal sink has minimal effect on brake performance

36. The most likely cause of a heavy-duty truck spring brake chamber that fails to release after the operator pulls the dash valve at one wheel position only is:

A. Damaged or restricted air supply line to the affected wheel spring brake chamber

B. A failed coolant temperature sensor reading falsely cold to the engine ECM

C. Worn ring and pinion gears in the rear drive axle assembly during operation

D. Excessive transmission fluid level above the maximum fill mark indication

37. The proper procedure when a heavy-duty truck shows a complaint of "parking brake will not hold the truck on a steep grade" is to:

A. Continue operation since hold-grade ability has minimal effect on safety during operation

B. Apply additional foundation brake force to compensate during parking operations

C. Apply battery voltage to the parking brake system for diagnostic testing during service

D. Verify spring brake force, foundation brake adjustment, and lining condition systematically

38. Technician A says caging a spring brake chamber requires the manual caging bolt provided with the chamber. Technician B says any standard caging bolt can be used regardless of chamber manufacturer. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Technician C only

D. Neither Technician A nor Technician B

39. The LEAST likely consequence of operating a heavy-duty truck with a parking brake that fails to fully release during normal driving operation is:

A. Brake drag, then heat buildup, then accelerated lining wear, then potential drum damage

B. Reduced fuel economy from continuous brake drag during normal operation

C. A failed coolant temperature sensor reading falsely cold to the engine ECM

D. Premature brake lining wear at the affected wheel position during operation

40. The proper service action when a heavy-duty truck spring brake chamber shows external air leakage at the chamber body is to:

A. Continue operation since spring brake chamber leakage has minimal effect on operation

B. Apply silicone sealer to the leakage area during the same service visit

C. Apply battery voltage to the chamber for diagnostic testing during service operations

D. Cage the spring, replace the chamber, and verify leak repair before return to service

41. The most likely cause of a heavy-duty hydraulic brake system that shows brake pedal that drops slowly with the engine off and steady foot pressure is:

A. Internal master cylinder seal bypass allowing fluid leakage past the seal

B. Excessive transmission fluid level above the maximum fill mark indication

C. A failed coolant temperature sensor reading falsely cold to the engine ECM

D. Worn ring and pinion gears in the rear drive axle assembly during operation

42. The proper diagnostic priority when a heavy-duty hydraulic brake system shows external fluid leakage at multiple wheel cylinder positions is:

A. Continue operation since multiple-cylinder leakage has minimal effect on brake performance

B. Replace one wheel cylinder at a time to determine which is the actual failed component

C. Investigate brake fluid contamination as common cause of seal damage at all cylinders

D. Apply battery voltage to the wheel cylinders for diagnostic testing during service

43. The LEAST likely cause of a hydraulic brake system that produces a hard pedal with reduced braking force during application is:

A. Severely worn or contaminated brake lining reducing friction coefficient at the wheels

B. Brake booster failure reducing pedal-to-line pressure assist during application

C. Restricted brake hose limiting fluid flow to one or more wheel cylinders during application

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

44. The most accurate description of air-over-hydraulic brake system operation is:

A. Mechanical linkage transfers pedal force directly to the wheel cylinders during application

B. Air pressure powers a hydraulic actuator that develops fluid pressure for wheel cylinders

C. Vacuum boost provides primary force to the wheel cylinders during normal operation

D. Pneumatic pressure applies directly to wheel cylinders without hydraulic conversion

45. The proper diagnostic priority when an ABS system fails to communicate with a scan tool during diagnostic service is to:

A. Replace the ABS controller as the most likely failure component during service

B. Apply battery voltage to the ABS controller for diagnostic testing during service

C. Verify ABS controller power, ground, and J1939 data bus communication integrity

D. Continue operation since communication failure has minimal effect on ABS function

46. The most likely cause of an ABS system fault that affects all wheel speed sensor inputs simultaneously is:

A. ABS controller power, ground, or J1939 data bus communication problem during operation

B. Mechanical failure of all wheel speed sensors at the same time during operation

C. A failed coolant temperature sensor reading falsely cold to the engine ECM

D. Worn ring and pinion gears in the rear drive axle assembly during operation

47. Technician A says ABS modulator valves are activated by the ABS controller when wheel slip is detected during brake application. Technician B says ABS systems can apply brakes without driver pedal input during automatic stability control events. Who is correct?

A. Technician A only

B. Technician B only

C. Technician C only

D. Both Technician A and Technician B

48. The LEAST likely cause of an ABS system that activates during normal light brake applications when no wheel slip is occurring is:

A. Failed wheel speed sensor producing inconsistent signal during normal operation

B. A failed coolant temperature sensor reading falsely cold to the engine ECM

C. Damaged tone ring producing inconsistent signal at one wheel position during operation

D. ABS controller calibration error following recent service procedures during operation

49. The proper service action when a heavy-duty truck ABS system shows a fault code that returns immediately after clearing during diagnostic service is to:

A. Continue clearing the fault code repeatedly until it remains cleared during service

B. Investigate the underlying cause rather than continuing to clear without correction

C. Apply battery voltage to the ABS controller for diagnostic testing during service

D. Replace the ABS controller as the most likely failure component during service

50. The most accurate description of FMVSS 121 application to heavy-duty truck air brake systems is:

A. Specifies federal air brake performance, response, and stopping distance requirements

B. Specifies engine performance requirements for heavy-duty applications during service

C. Specifies transmission shift requirements for AMT applications during normal operation

D. Specifies wheel bearing torque requirements for heavy-duty applications during service

# ANSWER KEY AND EXPLANATIONS

1. A — Inspect for major air leaks and verify compressor and governor operation systematically. An air pressure gauge reading of 60 PSI after 20 minutes of operation indicates the system cannot reach normal operating pressure. The proper first action is systematic inspection of major air leaks plus verification of compressor and governor operation to identify whether the cause is excessive leakage, inadequate output, or governor signaling unload prematurely.

2. C — Technician B only. A system that builds normally to 80 PSI but cannot reach cut-out indicates a leak that opens or worsens at higher pressure, exceeding compressor delivery capacity at that pressure. A stuck-open governor would prevent any pressure build-up at all, not allow normal build-up to a partial pressure level.

3. B — Inspect for air leaks systematically before component replacement during service. Frequent compressor cycling indicates pressure loss between cut-out and cut-in occurring faster than normal. Systematic leak inspection before component replacement identifies whether leakage in the supply system or excessive accessory demand is the actual problem, preventing unnecessary parts replacement.

4. D — Worn brake lining beyond service specification combined with high-mileage adjuster wear. Three high-mileage units (over 600,000 miles) showing identical slack adjuster issues indicate combined wear: brake lining wear has reached or exceeded service specification, and the slack adjusters themselves have accumulated wear from extended service. Both conditions must be addressed during service.

5. C — Build pressure to cut-out, fully apply brakes, shut off engine, and measure pressure decay over 1 minute. The FMVSS 121 leak test with brakes applied requires building system pressure to cut-out, fully applying brakes, shutting off the engine, and measuring pressure decay over 1 minute. The applied-brake test verifies sealing of the entire service brake circuit including chambers; the maximum acceptable rate is 3 PSI per minute on single tractors.

6. A — Applies individual brake pressure when wheel slip is detected during acceleration events. Automatic Traction Control (ATC) applies individual brake pressure when wheel slip is detected during acceleration, transferring torque from the slipping wheel to wheels with traction. This function is part of the modern ABS system architecture and requires functional ABS components to operate properly.

7. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect glad hand seal operation. The other choices all describe direct consequences of a damaged glad hand seal: air leak at the connection, failure to maintain trailer brake circuit pressure, and CVSA out-of-service determination during inspection.

8. B — Verify air pressure release engages parking brakes and pressure restoration releases them. Spring brake chamber operation verification includes verifying that air pressure release engages parking brakes (spring force applied) and that pressure restoration releases them (air pressure overcomes spring force). The dual verification confirms both engagement and release functions of the chamber.

9. C — Progressive brake lining wear or adjustment drift requiring foundation brake service. Increased stopping distance over 50,000 miles indicates progressive brake performance degradation from adjustment drift or lining wear. The gradual nature of the change matches the progressive wear pattern of foundation brake components; sudden changes would indicate different causes.

10. A — Verify gauge accuracy with a calibrated test gauge and inspect for pressure fluctuations. Air pressure gauge needle movement during driving may indicate either gauge inaccuracy or actual pressure fluctuations from system issues. Verification with a calibrated test gauge identifies whether the symptom is the gauge or actual system pressure variation requiring further investigation.

11. C — Air leakage in the supply system or excessive demand from accessories during operation. Excessive cycling during low brake demand indicates pressure loss between cut-out and cut-in occurring faster than normal, either from system leakage or excessive accessory air consumption (suspension air bags, seat air, transmission air shifts). The cause must be identified to address the underlying problem.

12. D — Connect scan tool to capture fault codes during the trigger condition and inspect sensor mounting. Rough-road ABS warnings often indicate wheel speed sensor mounting issues that become apparent under chassis flex conditions. Scan tool fault code capture during the trigger condition plus sensor mounting inspection identifies the specific affected sensor for targeted repair.

13. A — Provides communication between ABS controller, engine ECM, and other vehicle modules. The J1939 data bus provides communication between ABS controller, engine ECM, and other vehicle modules during operation. Wheel speed data, vehicle speed, and stability control commands flow across the bus to coordinate system operation. The bus is communication only; mechanical control comes from modulators and other actuators.

14. B — Technician B only. Wheel lug nut torque values come from manufacturer service information specific to the application, stud size, and grade. Visual estimation cannot achieve the precision required for proper stud loading. Manufacturer specifications account for all variables to ensure proper retention without component damage.

15. D — Cage the spring brake, replace the fitting or chamber, and verify leak repair before return to service. Spring brake chamber air supply fitting leaks require caging the spring brake (for safety), replacing the failed fitting or chamber, and verifying leak repair before returning the truck to

service. The caging is essential for safe service work; the leak repair must be confirmed to ensure proper parking brake function.

16. C — Improper braking force balance, brake imbalance, and possible CVSA out-of-service status. Installing a brake chamber without verifying type and size matching specification can produce improper braking force balance because chamber sizes determine force output at the slack adjuster. Mismatched chambers produce brake imbalance that affects vehicle stability and may trigger CVSA out-of-service determination during inspection.

17. A — Use a dial indicator to measure axial movement at the wheel during inspection per TMC RP 618. Wheel bearing endplay is measured using a dial indicator at the wheel during inspection per TMC RP 618. The indicator displays total axial movement when the wheel is pushed and pulled; the reading is compared to specification (typically 0.001 to 0.005 inch) to verify proper bearing adjustment.

18. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect ABS active mode operation. The other choices all describe direct causes of failed ABS active mode: failed controller cannot command modulators, excessive air gap prevents wheel speed signal generation, and damaged tone rings produce inconsistent signals.

19. B — ABS communicates wheel speed data to AMT TCM via J1939 for shift logic decisions. Modern AMT systems use wheel speed data from the ABS system communicated via J1939 to inform shift logic decisions. The ABS provides wheel speed information that the TCM uses for vehicle speed determination and shift point selection during normal driving.

20. C — Inspect threads, replace any damaged bolts, and torque to specification per service info. Reusing brake chamber clamp bolts during service requires thread inspection, replacement of damaged bolts, and torque to specification per service information. Damaged threads cannot maintain proper torque and may strip during installation, compromising chamber retention during operation.

21. B — Worn cam roller allowing partial S-cam rotation during the application sequence. Clicking during application that disappears at full application indicates worn cam roller allowing partial S-cam rotation during the engagement sequence. The roller eventually catches and the cam rotates fully, but the partial rotation produces the clicking sound during the early application phase.

22. D — Use precision measurement of the cam profile compared to manufacturer service specifications. S-cam wear measurement uses precision measurement of the cam profile (typically with a micrometer or specialized gauge) compared to manufacturer service specifications. The measurement determines whether the cam meets service criteria or requires replacement; visual inspection alone cannot quantify wear accurately.

23. A — Performed through graduated brake applications during a controlled road test. Brake balance verification is performed through graduated brake applications (light, medium, heavy) during a controlled road test. The pattern of brake response at different application levels identifies imbalance between axles or sides; this dynamic test cannot be replicated in static shop testing.

24. C — Brake adjustment, slack adjuster operation, return spring condition, and operator habits. Premature brake lining wear inspection requires verification of brake adjustment (out-of-spec adjustment causes drag), slack adjuster operation (failed adjusters cause issues), return spring condition (failed springs cause drag), and operator habits (aggressive braking causes wear). All four contribute to lining wear rates.

25. B — Both Technician A and Technician B. Heat checks indicate excessive thermal stress on the drum surface. Major heat checks require drum replacement; minor heat checks within manufacturer specification can continue in service per service information. The decision depends on the specific heat check pattern, depth, and location compared to manufacturer specifications.

26. D — Dragging brake from failed slack adjuster, return spring, or seized cam roller at that position. Accelerated drum wear at one wheel position indicates that brake is doing more work than designed, typically from a dragging condition that keeps the brake partially applied. The drag generates heat and wear that progresses faster than normal at that wheel only.

27. A — Per manufacturer service information specific to the brake drum assembly model and bolt grade. Brake drum mounting hardware torque values come from manufacturer service information specific to the drum assembly model and bolt grade. Standard automotive specifications and visual estimation are inadequate for heavy-duty equipment because incorrect torque can cause drum separation or improper foundation brake function.

28. C — Inspect brake drums for thickness variation, runout, and surface condition. Brake pedal pulsation during light application indicates uneven contact between brake friction material and drum surfaces, typically from thickness variation, runout, or surface condition issues at one or more wheel positions. The inspection identifies the specific drum requiring service or replacement.

29. D — Apply pressure and check for external air leakage with soap solution at multiple positions. Brake chamber diaphragm integrity verification during routine service applies pressure to the chamber and checks for external air leakage using soap solution at multiple positions around the chamber. Diaphragm damage produces air leakage; soap solution provides visible confirmation of leak source location.

30. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect foundation brake shoe wear patterns. The other choices all describe direct causes of uneven leading-trailing shoe wear: cam roller damage, return spring failure, and S-cam wear all affect shoe contact geometry during application.

31. C — Verify brake adjustment, lining condition, drum condition, and engine brake operation. Brake fade during long downhill descents typically indicates inadequate brake capacity from worn or contaminated lining, glazed or oversized drums, or improper adjustment. The engine brake should also be evaluated because proper engine braking reduces foundation brake load during descent, preventing fade.

32. A — Test brake force distribution between axles using graduated applications during road test. Brake balance test procedure tests brake force distribution between axles using graduated applications during a road test. The procedure identifies whether the steer axle, drive axles, and trailer axles provide proportional braking effort; imbalance between any of these affects vehicle stability during braking.

33. D — Inspect for cracks, swelling, abrasion, and leakage at all connection points. Brake hose inspection requires checking for cracks (from age and flex cycles), swelling (from internal damage), abrasion (from contact with other components), and leakage at connection points. All four conditions can compromise hose integrity and brake system safety.

34. B — Dragging brake from failed slack adjuster, return spring, or seized cam roller at that position. Excessive heat at one wheel position after a normal driving cycle indicates that brake is doing more work than designed, typically from a dragging condition. The drag generates heat continuously during driving; common causes include failed slack adjuster, failed return spring, or seized cam roller.

35. C — Inspect for internal master cylinder seal bypass and external system leakage. Hydraulic brake pedal that sinks slowly during steady pressure indicates fluid bypassing internal master cylinder seals or leaking externally. Inspection of both internal seal condition and external system integrity identifies the specific cause for targeted repair.

36. A — Damaged or restricted air supply line to the affected wheel spring brake chamber. Single-wheel parking brake release failure typically indicates damaged or restricted air supply line to that specific spring brake chamber. The other wheels release normally because their supply paths are intact; the affected wheel cannot receive the air pressure needed to overcome the spring force.

37. D — Verify spring brake force, foundation brake adjustment, and lining condition systematically. Parking brake hold-grade ability depends on adequate spring brake force at the chamber, proper foundation brake adjustment, and adequate lining condition. If any of these is compromised, the parking brake cannot hold the truck on a grade. Systematic verification identifies the specific cause requiring service.

38. B — Technician A only. Caging a spring brake chamber requires the manual caging bolt provided with the chamber because manufacturers specify caging bolt dimensions and thread specifications for safe operation. Standard caging bolts may not properly engage the chamber's caging mechanism, creating safety risks during disassembly. The chamber-specific caging bolt ensures proper compression.

39. C — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but are unrelated to parking brake drag during operation. The other choices all describe direct consequences: brake drag heat buildup, accelerated lining wear, reduced fuel economy, and premature lining wear at the affected position.

40. D — Cage the spring, replace the chamber, and verify leak repair before return to service. Spring brake chamber external leakage at the chamber body requires caging the spring (for safety), replacing the failed chamber, and verifying leak repair before returning the truck to service. The caging is essential for safe service work; the leak repair must be confirmed to ensure proper parking brake function.

41. A — Internal master cylinder seal bypass allowing fluid leakage past the seal. Hydraulic brake pedal that drops slowly with engine off and steady foot pressure indicates fluid bypassing internal master cylinder seals. The bypass allows fluid to leak past the seal slowly under steady pressure, producing the gradual pedal drop. External fluid loss would show visible leakage or low reservoir level.

42. C — Investigate brake fluid contamination as common cause of seal damage at all cylinders. Multiple-cylinder external leakage simultaneously suggests a common cause rather than independent failures. Fluid contamination (moisture, debris, or chemical incompatibility) damages all wheel cylinder seals, causing leakage at multiple locations. Investigation of the contamination source addresses the underlying cause.

43. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect hydraulic brake pedal feel. The other choices all directly cause hard pedal with reduced braking force: worn lining reduces friction, brake booster failure reduces pressure assist, and restricted hose reduces fluid flow.

44. B — Air pressure powers a hydraulic actuator that develops fluid pressure for wheel cylinders. Air-over-hydraulic systems use compressed air to power a hydraulic actuator (sometimes called a hydraulic boost or air-pack), which develops fluid pressure for the wheel cylinders. This combination provides the high force capability of air systems with the actuation method of hydraulic brakes.

45. C — Verify ABS controller power, ground, and J1939 data bus communication integrity. ABS scan tool communication failure typically indicates power, ground, or J1939 data bus issues preventing the controller from responding to scan tool requests. Verification of these connections before component replacement identifies whether the controller or supporting circuits are the actual problem.

46. A — ABS controller power, ground, or J1939 data bus communication problem during operation. Multiple wheel speed sensor faults simultaneously indicate a common cause rather than multiple sensor failures. Common causes include power or ground problems affecting all sensor circuits, or J1939 data bus communication issues preventing the controller from processing sensor inputs.

47. D — Both Technician A and Technician B. ABS modulator valves are activated by the ABS controller when wheel slip is detected during brake application, modulating fluid or air pressure to prevent wheel lockup. Modern ABS systems also include automatic stability control that can apply brakes without driver pedal input to maintain vehicle stability during emergency conditions.

48. B — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect ABS activation. The other choices all describe direct causes of inappropriate ABS activation: failed wheel speed sensor produces inconsistent signals, damaged tone ring produces inconsistent signals, and controller calibration error affects activation logic.

49. B — Investigate the underlying cause rather than continuing to clear without correction. ABS fault codes that return immediately after clearing indicate the underlying fault is still active. Continuing to clear without correction wastes service time and may mask conditions that need attention. The proper approach is to investigate why the fault is setting and correct the actual cause.

50. A — Specifies federal air brake performance, response, and stopping distance requirements. FMVSS 121 (Federal Motor Vehicle Safety Standard 121) establishes federal requirements for air brake system performance, response time, stopping distance, and component specifications on commercial trucks. The standard mandates leak rates, low-pressure warning thresholds, and other safety-critical parameters.

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