PRACTICE EXAM 6: T4 SIMULATION (50 QUESTIONS)

1. A fleet maintenance technician finds three Class 8 tractors arriving with the same complaint of premature air dryer cartridge failure within 6 months of replacement. All three trucks were serviced by the same outside shop. The most likely root cause across all three units is:

A. Defective replacement cartridges from a bad parts batch during the recent service

B. Engine performance issues causing excessive blow-by on the new cartridges simultaneously

C. Compressor wear allowing oil contamination to saturate the new cartridges prematurely

D. Fleet operator routes that exceed cartridge design specifications during normal operation

2. Technician A says heavy-duty Class 8 tractors typically use 14-inch diameter Type 30 brake chambers on the drive axles. Technician B says heavy-duty Class 8 tractors typically use 6-inch diameter Type 6 brake chambers on the drive axles. Who is correct?

A. Technician A only

B. Technician B only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

3. A scan tool data review on a heavy-duty truck ABS system shows wheel speed sensor readings of 0 mph at all four positions during a road test at 55 mph. The most likely cause is:

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

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

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

D. ABS controller power, ground, or J1939 data bus communication problem

4. The proper torque specification for heavy-duty truck wheel lug nuts on most fleet applications is typically:

A. 100 to 150 ft-lbs applied per TMC RP 237 specifications during installation

B. 450 to 500 ft-lbs applied per TMC RP 237 specifications during installation

C. 750 to 800 ft-lbs applied per TMC RP 237 specifications during installation

D. 1,000 to 1,500 ft-lbs applied per TMC RP 237 specifications during installation

5. A heavy-duty truck arrives with a complaint that the brake pedal feels "spongy" during pedal application. The most likely cause on a hydraulic brake system is:

A. Air contamination in the hydraulic system requiring proper bleeding procedures

B. Excessive flywheel runout transmitting through the brake components during operation

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

D. Failed pilot bearing producing chatter during clutch engagement procedures

6. The proper procedure when an air brake system shows excessive moisture in the supply reservoir during routine inspection is to:

A. Continue operation since moisture has minimal effect on air brake system function

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

C. Drain the reservoir and inspect the air dryer cartridge for replacement need

D. Add desiccant material to the reservoir to absorb the moisture during service

7. Heavy-duty truck air brake fluid (hydraulic brake fluid in air-over-hydraulic systems) should be checked:

A. Only when the brake system shows symptoms of operational problems during operation

B. Per manufacturer service interval, typically every PM inspection cycle during operation

C. Only during major service procedures requiring system disassembly during operation

D. Once annually as part of preventive maintenance scheduling during operation

8. The LEAST likely cause of an ABS system fault on one wheel speed sensor only is:

A. Wheel speed sensor wiring damage at the affected wheel during operation

B. Excessive air gap between sensor and tone ring at the affected wheel position

C. Damaged tone ring producing inconsistent signal at the affected wheel position

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

9. The proper way to identify whether a brake pull complaint originates from the foundation brakes versus the air supply system is to:

A. Test the brake balance with graduated brake applications during a controlled road test

B. Apply battery voltage to the brake components for diagnostic verification during service

C. Replace the brake chambers as preventive maintenance to confirm the source during service

D. Listen with a stethoscope on engine components during brake application events

10. The Bendix self-adjusting heavy-duty automatic slack adjuster design uses:

A. Standard manual adjustment requiring periodic service intervals during operation

B. Hydraulic pressure compensation that adjusts during operation continuously

C. A wear-compensating mechanism that eliminates manual periodic adjustment

D. Electronic control compensation through the engine ECM during operation

11. A driver reports that the parking brake feels normal in cold weather but takes longer to release after the engine reaches operating temperature. The most likely cause is:

A. Air introduced into the parking brake supply system that expands with thermal increase

B. Worn brake facings affecting engagement at operating temperature only during operation

C. Failed pilot bearing producing resistance during clutch engagement events during operation

D. Master cylinder seal degradation that worsens with thermal expansion during operation

12. A scan tool review on a Bendix-equipped ABS system shows fault code referencing the ABS modulator valve on one wheel position. The proper diagnostic priority is:

A. Replace the ABS modulator valve assembly as the primary repair component during service

B. Apply battery voltage to the modulator for diagnostic verification during service

C. Replace the entire ABS system as preventive maintenance during the same service

D. Verify modulator electrical and pneumatic connections, then test commanded operation

13. Technician A says heavy-duty truck air brake system reservoir capacity typically ranges from 12 to 16 gallons depending on the model. Technician B says heavy-duty truck air brake system reservoir capacity typically ranges from 4 to 6 gallons on most fleet applications. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Technician B only

D. Neither Technician A nor Technician B

14. The proper service action when a heavy-duty truck shows minor metallic glitter on the air dryer purge port discharge during routine fluid service is:

A. Replace the air dryer immediately as preventive maintenance during the same service

B. Continue operation since minor metallic glitter has minimal effect during operation

C. Document the finding, replace the cartridge, and inspect the compressor for wear

D. Apply battery voltage to the air dryer for diagnostic testing during service

15. The Bendix AD-IS air dryer uses which moisture removal mechanism?

A. Desiccant material that adsorbs moisture from compressed air during operation

B. Vacuum-assisted moisture extraction through standard linkage during operation

C. Pneumatic actuation using the truck's compressed air supply system during operation

D. Manual actuation requiring driver pedal input during all operations

16. The proper procedure when reusing a heavy-duty truck air brake reservoir during rebuild includes inspection for:

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

B. Engine compatibility verification with the air brake system during service procedures

C. Vehicle type compatibility with the air brake reservoir during the rebuild

D. Cracks at fitting boss areas, internal corrosion, and mating surface condition

17. The most likely consequence of operating a heavy-duty ABS system with an incorrect calibration after ABS controller replacement is:

A. Immediate ABS system failure requiring complete replacement service

B. Erratic ABS operation, false fault codes, and possible loss of ABS protection

C. Loss of engine power requiring complete engine ECM replacement during service

D. External lubricant leakage requiring case repair during the next service procedure

18. The most accurate description of an Eaton/Bendix automatic slack adjuster operation is:

A. Self-adjusts during brake applications without requiring manual intervention

B. Manual adjustment performed at fixed mileage intervals during service procedures

C. Hydraulic compensation that prevents any wear during normal operation conditions

D. Electronic compensation controlled by the engine ECM during operation

19. The proper torque specification for heavy-duty truck brake chamber clamp bolts is determined by:

A. Standard automotive torque specifications for similar bolt diameter applications

B. Maximum torque applied that the bolt can sustain without thread failure during installation

C. Manufacturer service information specific to the brake chamber model and bolt grade

D. Visual estimation based on bolt size during the installation procedure

20. The LEAST likely cause of a heavy-duty truck air brake system that won't build pressure during cold morning start-up is:

A. Frozen moisture in the supply line restricting air flow during cold conditions

B. Failed compressor unable to deliver air during normal operation conditions

C. Major air leak in the supply system exceeding compressor delivery capacity

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

21. A driver complaint of "brakes drag at one wheel position only after a long highway trip" most likely indicates:

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

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

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

D. Failed slack adjuster, return spring, or seized cam roller at the affected wheel position

22. The proper diagnostic procedure when a heavy-duty truck shows "harsh shifting" along with a reported brake pull complaint is to:

A. Continue operation since shifting and braking issues are unrelated symptoms during operation

B. Investigate whether ABS-related stability control is intervening during shift events

C. Apply battery voltage to the transmission and brakes for diagnostic testing during service

D. Replace both the transmission and brake systems as preventive maintenance during service

23. A heavy-duty truck transmission produces a normal whine in all gears, but the brake pedal "pulses" during light brake applications. The most likely cause is:

A. Brake rotor or drum thickness variation or excessive runout at the affected wheel position

B. Worn input shaft bearing carrying load during all operations conditions during operation

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

D. Worn output shaft bearing producing noise during driven operation conditions

24. The proper service action when a heavy-duty foundation brake shows lining contaminated with engine coolant is to:

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

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

C. Identify the coolant source, repair the leak, and replace the contaminated lining

D. Continue operation since coolant contamination has minimal effect on lining performance

25. The most likely cause of a heavy-duty truck brake system that produces a low pedal feel after recent hydraulic brake fluid replacement is:

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

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. Air introduced during the fluid replacement that requires proper bleeding

26. Technician A says heavy-duty foundation brake S-cam rollers should rotate freely during inspection. Technician B says S-cam rollers that are seized during inspection allow the brake shoe to drag against the drum during operation. 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

27. The proper diagnostic approach for a heavy-duty truck that shows intermittent ABS warning during specific operating conditions is:

A. Connect a scan tool to retrieve fault codes during the trigger condition and isolate the cause

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

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

D. Continue operation since intermittent warnings have minimal effect on brake function

28. A heavy-duty manual brake adjustment that requires more than 5 turns of the slack adjuster wrench to bring the shoes to the drum indicates:

A. Failed clutch hydraulic system preventing complete clutch release during operation

B. Damaged shift rail interlock preventing rail movement during shift attempts

C. Severely worn brake lining or failed automatic slack adjuster requiring service

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

29. The proper measurement procedure for heavy-duty truck brake chamber pushrod free travel is to:

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

B. Measure pushrod travel from released to applied position at 90–100 PSI

C. Listen for chamber operation with a stethoscope during normal brake application

D. Estimate free travel visually using shop lighting during the inspection process

30. The most likely cause of a heavy-duty truck air brake system that fails to release a parking brake at one wheel position only is:

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

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

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

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

31. The proper service procedure when reusing brake chamber clamp bolts during rebuild is:

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

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

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

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

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

B. Insufficient transmission lubricant level affecting normal engagement operations

C. Damaged gear teeth preventing complete engagement during the shift

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

33. The proper measurement procedure for heavy-duty truck slack adjuster wear is to:

A. Apply battery voltage to the slack adjuster for diagnostic testing during measurement

B. Listen for slack adjuster wear with a stethoscope during normal brake application

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

D. Inspect for free rotation, internal binding, and clutch mechanism wear per service info

34. The most accurate description of heavy-duty truck air brake system reservoir layout is:

A. Single reservoir supplying all service brake circuits during normal operation

B. Two reservoirs supplying primary and secondary circuits without supply tank

C. Supply tank, primary reservoir, and secondary reservoir for system redundancy

D. Three reservoirs all supplying the same circuit during normal operation

35. The LEAST likely cause of a heavy-duty truck air brake system that produces a humming noise during normal operation with the engine running is:

A. Air compressor operating during normal pressure build-up cycle conditions

B. Air leak at a fitting producing a continuous flow noise during operation

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

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

36. The proper procedure when a heavy-duty truck spring brake chamber must be removed for hydraulic service is:

A. Apply maximum air pressure to compress the spring before disassembly procedures

B. Disconnect the chamber while the spring is fully released during normal service

C. Continue operation with the chamber in place since removal is dangerous during service

D. Cage the spring brake mechanism using the manual caging bolt before any work

37. Technician A says spring brake chambers contain a high-force spring that engages parking brakes when air pressure is released. Technician B says spring brake chambers can be safely disassembled without caging the spring during normal service. 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

38. The most likely cause of a heavy-duty truck parking brake that requires excessive force to release after the operator pulls the dash valve is:

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

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

C. Insufficient air pressure or restricted line to the spring brake chambers during release

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

39. The LEAST likely cause of a heavy-duty truck parking brake that engages spontaneously during normal driving operation is:

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

B. Major air pressure loss triggering automatic spring brake application during operation

C. Failed parking brake control valve allowing inadvertent application during operation

D. Damaged air supply line to the spring brake chambers causing pressure loss

40. The proper diagnostic priority when a heavy-duty truck parking brake fails to hold the truck on a grade is:

A. Replace the spring brake chambers as preventive maintenance during the same service

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

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

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

41. The most likely cause of a heavy-duty hydraulic brake system that shows brake pedal that drops to the floor with steady pressure applied is:

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

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. Technician A says hydraulic brake hose internal damage can cause spongy pedal that does not improve with bleeding. Technician B says hydraulic brake hose external appearance always indicates internal hose condition during inspection. Who is correct?

A. Both Technician A and Technician B

B. Technician C only

C. Technician A only

D. Neither Technician A nor Technician B

43. The proper service action when a heavy-duty hydraulic brake system shows external fluid leakage at a wheel cylinder during inspection is to:

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

B. Replace the wheel cylinder, inspect adjacent components, and bleed the system properly

C. Continue operation since minor leakage has minimal effect on brake performance

D. Add additional brake fluid to compensate for the leakage during normal operation

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

A. Restricted brake hose limiting fluid flow to one or more wheel cylinders

B. Brake booster failure (vacuum or hydraulic) reducing pedal-to-line pressure assist

C. Severely worn or contaminated brake lining reducing friction coefficient

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

45. The most accurate description of air-over-hydraulic brake 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 the wheel cylinders without hydraulic conversion

46. The proper diagnostic priority when a heavy-duty air-over-hydraulic brake system shows weak braking performance is to:

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

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

C. Verify air supply pressure, actuator operation, and hydraulic system integrity systematically

D. Listen for system operation with a stethoscope during normal brake application

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

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

B. ABS controller power, ground, or J1939 data bus communication problem 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

48. Technician A says ABS wheel speed sensors typically operate using magnetic principles with a tone ring at the wheel hub. Technician B says ABS wheel speed sensors require periodic lubrication during scheduled maintenance service. Who is correct?

A. Both Technician A and Technician B

B. Technician B only

C. Technician C only

D. Technician A only

49. The proper service action when a heavy-duty truck shows an ABS warning lamp that activates only during heavy brake application events is to:

A. Continue operation since intermittent warning has minimal effect on brake function

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

C. Connect a scan tool to retrieve fault codes and inspect wheel speed sensor air gaps

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

50. The LEAST likely consequence of operating a heavy-duty truck with a non-functional ABS system is:

A. Increased risk of wheel lockup during emergency braking on slick surfaces during operation

B. Improved braking performance from elimination of ABS modulation during application

C. Loss of automatic stability control function during normal vehicle operation

D. Potential CVSA out-of-service determination during roadside inspection events

ANSWER KEY AND EXPLANATIONS

1. C — Compressor wear allowing oil contamination to saturate the new cartridges prematurely. When multiple trucks from the same shop show identical premature dryer cartridge failure, the common cause is typically compressor wear that allows oil contamination into the discharge air. Oil saturates the desiccant material faster than normal moisture, producing the premature failure pattern across all affected units.

2. A — Technician A only. Heavy-duty Class 8 tractors typically use Type 30 brake chambers on the drive axles, providing the high braking force capability needed for the heavy axle loads. Type 6 chambers are used only on light-duty applications and do not have the diaphragm area required for Class 8 drive axle braking force.

3. D — ABS controller power, ground, or J1939 data bus communication problem. Zero readings at all four wheel speed sensors during a road test indicate the ABS controller is not receiving sensor data, typically from a power, ground, or data bus communication problem. Mechanical failure of all four sensors simultaneously is statistically unlikely; the common cause is upstream of the sensors.

4. B — 450 to 500 ft-lbs applied per TMC RP 237 specifications during installation. TMC RP 237 establishes 450 to 500 ft-lbs as the standard heavy-duty wheel lug nut torque for most fleet applications. The specification ensures proper stud loading without exceeding the design strength of the studs or hub.

5. A — Air contamination in the hydraulic system requiring proper bleeding procedures. Spongy hydraulic brake pedal feel typically indicates air contamination in the hydraulic system. Air compresses under pressure (unlike incompressible brake fluid), producing the spongy feel during application. Proper bleeding restores solid pedal feel by removing the air.

6. C — Drain the reservoir and inspect the air dryer cartridge for replacement need. Excessive moisture in the supply reservoir indicates the air dryer is not removing moisture effectively, typically from a saturated or failed desiccant cartridge. Both addressing the moisture (draining) and the root cause (dryer service) are required to prevent recurrence.

7. B — Per manufacturer service interval, typically every PM inspection cycle during operation. Hydraulic brake fluid level should be checked per manufacturer service intervals, typically every preventive maintenance inspection cycle. Regular checking catches small leaks before they cause brake failure and ensures the system maintains proper hydraulic operation.

8. 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 wheel speed sensor operation. The other

choices all directly cause single-wheel ABS sensor faults: damaged tone ring, sensor wiring damage, and excessive air gap all affect signal quality at the affected wheel.

9. A — Test the brake balance with graduated brake applications during a controlled road test. Brake pull diagnosis requires testing brake balance through graduated brake applications (light, medium, heavy) during a controlled road test. The pattern of pull at different application levels distinguishes foundation brake issues (asymmetric friction) from air supply issues (asymmetric pressure delivery).

10. C — A wear-compensating mechanism that eliminates manual periodic adjustment. The Bendix automatic slack adjuster uses a wear-compensating mechanism that automatically adjusts during brake applications as lining wears, eliminating the need for periodic manual adjustment. This extends service intervals and reduces the risk of out-of-adjustment brakes between PM cycles.

11. A — Air introduced into the parking brake supply system that expands with thermal increase. Air in the parking brake supply system produces problems that worsen with operating temperature because air expands more than fluid as temperature rises. The expanded air increases system pressure inconsistently and changes release characteristics from cold to hot operation.

12. D — Verify modulator electrical and pneumatic connections, then test commanded operation. ABS modulator valve diagnosis begins with verification of electrical and pneumatic connections, then commanded operation testing using a scan tool. The modulator may be functional with damaged wiring or pneumatic connection, or may be faulty itself. Verification first determines the actual fault location before parts replacement.

13. B — Technician A only. Heavy-duty truck air brake system reservoir capacity typically ranges from 12 to 16 gallons depending on the model, providing the volume needed for repeated heavy brake applications between compressor cut-out cycles. The 4-to-6 gallon range is more typical of medium-duty or specialty applications, not standard Class 8 tractors.

14. C — Document the finding, replace the cartridge, and inspect the compressor for wear. Minor metallic glitter on air dryer purge port discharge typically indicates compressor component wear introducing metal particles into the air stream. Documentation, cartridge replacement, and compressor inspection identify whether the wear is normal or indicates a developing compressor problem.

15. A — Desiccant material that adsorbs moisture from compressed air during operation. The Bendix AD-IS air dryer uses desiccant material (typically activated alumina beads) that adsorbs moisture from compressed air as it passes through the cartridge. The moisture is then released during purge cycles when the dryer is depressurized at compressor cut-out events.

16. D — Cracks at fitting boss areas, internal corrosion, and mating surface condition. Air brake reservoir rebuild inspection requires verification of cracks at fitting boss areas (where stress concentrates), internal corrosion (which can affect structural integrity), and mating surface

condition (which affects sealing). All three conditions affect whether the reservoir can be safely returned to service.

17. B — Erratic ABS operation, false fault codes, and possible loss of ABS protection. Incorrect ABS calibration after controller replacement produces erratic operation, false fault codes, and possible loss of ABS protection. The calibration controls modulator timing, sensor signal interpretation, and stability control logic; wrong calibration disrupts these functions, potentially compromising safety-critical brake operation.

18. A — Self-adjusts during brake applications without requiring manual intervention. The Eaton/Bendix automatic slack adjuster self-adjusts during brake applications, compensating for normal lining wear without requiring manual periodic adjustment. The mechanism activates as wear creates excess clearance, maintaining proper pushrod stroke throughout service life.

19. C — Manufacturer service information specific to the brake chamber model and bolt grade. Brake chamber clamp bolt torque values come from manufacturer service information specific to the chamber model and bolt grade. Standard automotive specifications and visual estimation are inadequate for heavy-duty equipment because incorrect torque can cause chamber separation or improper brake function.

20. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect air brake pressure build-up. The other choices all describe direct causes of failure to build pressure during cold start-up: frozen moisture restricting flow, failed compressor preventing output, and major leaks exceeding compressor capacity.

21. D — Failed slack adjuster, return spring, or seized cam roller at the affected wheel position. Brake drag at one wheel position after a long highway trip indicates the brake at that position is not fully releasing during operation. Common causes include failed slack adjuster (over-adjusted), failed return spring (shoes don't fully retract), or seized cam roller (cam doesn't return). The single-wheel pattern points to a component-specific fault.

22. B — Investigate whether ABS-related stability control is intervening during shift events. Combined "harsh shifting" and brake pull complaints may indicate ABS-related stability control system intervention during shift events. Modern ABS systems include automatic stability control that can apply individual brakes during driving events; investigation determines whether the stability control activation is appropriate or indicates a fault.

23. A — Brake rotor or drum thickness variation or excessive runout at the affected wheel position. Brake pedal pulsation during light application indicates uneven contact between brake friction material and rotor or drum surfaces, typically from thickness variation or runout at one wheel position. The variation produces alternating contact pressure that telegraphs back through the hydraulic system to the pedal.

24. C — Identify the coolant source, repair the leak, and replace the contaminated lining. Coolant-contaminated brake lining requires identification of the coolant source (typically a failed wheel hub seal allowing coolant from a leaking head gasket or other source to reach the brake), repair of the leak, and replacement of the contaminated lining. Both the source and the affected components must be addressed.

25. D — Air introduced during the fluid replacement that requires proper bleeding. Low pedal feel after recent hydraulic brake fluid replacement typically indicates air introduced during the service procedure. Any time the hydraulic system is opened, air enters the lines and must be properly bled to restore solid hydraulic transmission of pedal force.

26. B — Both Technician A and Technician B. S-cam rollers should rotate freely during inspection because seized rollers prevent proper cam rotation, allowing the brake shoe to drag against the drum during operation. Both conditions are correctly described — proper rotation is required for normal operation, and seized rollers cause drag that wears lining and generates heat.

27. A — Connect a scan tool to retrieve fault codes during the trigger condition and isolate the cause. Intermittent ABS warnings during specific operating conditions require scan tool retrieval of fault codes during the trigger condition, allowing isolation of the specific component or condition causing the fault. Static testing in the shop may not reveal the intermittent fault that occurs only during operation.

28. C — Severely worn brake lining or failed automatic slack adjuster requiring service. Manual brake adjustment requiring more than 5 turns to bring shoes to drum indicates excessive clearance from severely worn lining or failed automatic slack adjuster. Either condition requires service to restore proper foundation brake function and bring pushrod stroke within service limits.

29. B — Measure pushrod travel from released to applied position at 90–100 PSI. Brake chamber pushrod free travel is measured from released to applied position with 90–100 PSI applied to the chamber. The measurement compares released and applied pushrod positions to determine total stroke, which is then compared to CVSA out-of-service criteria for the chamber type.

30. A — Damaged or restricted air supply line to the spring brake chamber at that wheel. Single-wheel parking brake release failure typically indicates a 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.

31. B — Inspect threads, replace any damaged bolts, and torque to specification per service info. Reusing brake chamber clamp bolts during rebuild 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.

32. A — 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.

33. D — Inspect for free rotation, internal binding, and clutch mechanism wear per service info. Slack adjuster wear inspection includes verification of free rotation of the adjustment mechanism, check for internal binding, and verification of the wear-compensating clutch mechanism per service information. All three conditions affect the adjuster's ability to function properly during operation.

34. C — Supply tank, primary reservoir, and secondary reservoir for system redundancy. Heavy-duty truck air brake systems use a three-reservoir layout: supply tank (between compressor and dryer/storage), primary reservoir (typically supplying rear axle service brakes and trailer service circuit), and secondary reservoir (typically supplying front axle service brakes). The configuration provides safety redundancy.

35. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not produce air brake system humming noise. The other choices all describe direct sources of humming during operation: compressor cycling, air leak at a fitting, and worn drivetrain components produce different but identifiable noise patterns.

36. D — Cage the spring brake mechanism using the manual caging bolt before any work. Spring brake chamber removal for hydraulic service requires caging the spring mechanism using the manual caging bolt before any work. Caging mechanically compresses the parking brake spring, preventing dangerous explosive release that could cause serious injury or death during disassembly.

37. B — Technician A only. Spring brake chambers contain a high-force spring (typically 1,500–2,500 pounds) that engages parking brakes when air pressure is released. Working on a spring brake chamber without caging the spring can cause serious injury or death from the explosive release of the spring force; safe disassembly requires caging.

38. C — Insufficient air pressure or restricted line to the spring brake chambers during release. Excessive force required to release the parking brake indicates insufficient air pressure or restricted line preventing full pressure delivery to the spring brake chambers. The chambers cannot fully overcome the spring force without adequate pressure, requiring the operator to wait for pressure build-up.

39. A — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not cause spontaneous parking brake application. The other choices all describe direct causes of unexpected parking brake engagement: major air pressure loss triggers automatic application, failed control valve allows inadvertent application, and damaged supply line causes pressure loss.

40. D — Verify spring brake force, foundation brake adjustment, and lining condition systematically. Parking brake hold-grade ability depends on 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.

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

42. C — Technician A only. Hydraulic brake hose internal damage can cause spongy pedal that does not improve with bleeding because the damaged hose expands under pressure during application. External appearance does not always indicate internal hose condition because internal damage can occur from age, chemical exposure, or hidden mechanical damage that is not visible from the outside.

43. B — Replace the wheel cylinder, inspect adjacent components, and bleed the system properly. External fluid leakage at a wheel cylinder requires cylinder replacement, inspection of adjacent components (brake shoes, drum, lining for fluid contamination), and proper system bleeding. Each step ensures the underlying problem is addressed and the system is restored to proper service condition.

44. 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: restricted hose reduces fluid flow, brake booster failure reduces pressure assist, and worn lining reduces friction coefficient at the wheel.

45. 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.

46. C — Verify air supply pressure, actuator operation, and hydraulic system integrity systematically. Air-over-hydraulic system diagnosis requires verification of all three subsystems because weakness in any one reduces braking capacity. Air supply pressure, hydraulic actuator operation, and hydraulic system condition (fluid level, leaks, lining condition) must all be inspected for complete diagnosis.

47. B — 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.

48. D — Technician A only. ABS wheel speed sensors operate using magnetic principles with a tone ring (also called an exciter ring) at the wheel hub. The sensor generates an AC signal proportional to wheel speed as the tone ring teeth pass the sensor. ABS wheel speed sensors do not require periodic lubrication; they are sealed sensors without lubricated moving parts.

49. C — Connect a scan tool to retrieve fault codes and inspect wheel speed sensor air gaps. Intermittent ABS warnings during heavy braking often indicate wheel speed sensor air gap issues that become apparent under load conditions when wheel deflection occurs. Scan tool fault codes plus air gap inspection identify the specific affected sensor for targeted repair.

50. B — Improved braking performance from elimination of ABS modulation during application. Operating with non-functional ABS does not improve braking; it eliminates the safety benefits ABS provides. Increased wheel lockup risk, loss of stability control, and potential out-of-service status all directly result from non-functional ABS during operation, particularly on slick surfaces or during emergency braking.