PRACTICE EXAM 3: T4 SIMULATION (50 QUESTIONS)

1. The minimum air pressure required to release heavy-duty truck parking brake spring brake chambers is typically:

A. 30 PSI applied to the parking brake control circuit during operation

B. 90 PSI applied to the parking brake control circuit during operation

C. 65 PSI applied to the parking brake control circuit during operation

D. 120 PSI applied to the parking brake control circuit during operation

2. The cut-out pressure on most heavy-duty truck air brake systems is typically set within the range of:

A. 100 to 125 PSI on most fleet applications during normal operation

B. 50 to 75 PSI on most fleet applications during normal operation

C. 150 to 175 PSI on most fleet applications during normal operation

D. 200 to 225 PSI on most fleet applications during normal operation

3. Heavy-duty truck air compressor displacement is typically rated in:

A. PSI of pressure delivered during normal operation conditions

B. Gallons of compressed air storage during normal operation

C. Pounds of mass delivered during normal operation conditions

D. Cubic feet per minute (CFM) of free air delivery at rated RPM

4. The proper procedure for testing air brake system leak rate per FMVSS 121 with brakes released is:

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

B. Build pressure to cut-out, shut off engine, and measure pressure decay over 1 minute

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

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

5. The maximum allowable air pressure leak rate per FMVSS 121 with engine off and brakes released is:

A. 2 PSI in 1 minute on heavy-duty single tractor configurations

B. 5 PSI in 1 minute on heavy-duty single tractor configurations

C. 10 PSI in 1 minute on heavy-duty single tractor configurations

D. 25 PSI in 1 minute on heavy-duty single tractor configurations

6. The check valve in the supply line between the air dryer and the supply reservoir prevents:

A. Air from the supply reservoir flowing back during pressure build-up events

B. Compressor oil from entering the supply reservoir during normal operation

C. Moisture from entering the supply reservoir during normal compressor operation

D. Reverse flow of air back through the dryer during purge cycle events

7. The standard color coding for heavy-duty truck air brake supply lines on most North American applications is:

A. Black for the supply circuit and red for the service circuit during operation

B. Yellow for the supply circuit and green for the service circuit during operation

C. Blue for the supply line and red for the emergency line on tractor-trailer applications

D. Green for the supply circuit and orange for the service circuit during operation

8. The treadle valve delivers air pressure to:

A. The spring brake chambers during parking brake engagement only during operation

B. Both primary and secondary service brake circuits proportional to driver pedal input

C. The trailer service brake circuit only without affecting tractor brake circuits

D. The compressor unloader during cut-out events during normal operation conditions

9. The brake chamber size designation (Type 30) refers to:

A. The effective area of the diaphragm in square inches inside the chamber

B. The maximum stroke length in inches at full service application pressure

C. The brake chamber operating pressure rating in PSI during normal operation

D. The number of brake chambers required per axle on heavy-duty applications

10. Type 30 brake chambers are commonly paired with which slack adjuster length on most heavy-duty applications?

A. 3 inch length on most heavy-duty applications during normal operation

B. 4 inch length on most heavy-duty applications during normal operation

C. 6 inch length on most heavy-duty applications during normal operation

D. 5 to 6 inch length on most heavy-duty applications during normal operation

11. The maximum brake chamber pushrod stroke specification per CVSA out-of-service criteria for Type 30 chambers is:

A. 2 inches measured at 90–100 PSI applied pressure during inspection

B. 4 inches measured at 90–100 PSI applied pressure during inspection

C. 1 inch measured at 90–100 PSI applied pressure during inspection

D. 6 inches measured at 90–100 PSI applied pressure during inspection

12. The proper measurement procedure for heavy-duty brake drum diameter requires:

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

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

C. Use a brake drum micrometer at multiple positions across the friction surface

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

13. Heavy-duty brake drum maximum-allowable diameter dimensions are typically:

A. Listed only in the manufacturer service information for the application

B. Cast onto the drum surface during the manufacturing process for reference

C. Visible only after complete brake assembly disassembly during service

D. Determined by the technician based on observed wear patterns during inspection

14. The proper torque application for heavy-duty wheel lug nuts during installation is:

A. Maximum torque applied randomly across all wheel positions

B. Single-pass installation without torque measurement during procedures

C. Torque to specification in random sequence using a calibrated wrench

D. Torque to specification in star pattern using a calibrated wrench in stages

15. The standard heavy-duty truck wheel lug nut torque specification on most fleet applications is:

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

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

C. 200 to 250 ft-lbs applied per TMC RP 237 specifications during installation

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

16. The proper procedure for installing heavy-duty foundation brake shoes during service is:

A. Replace one shoe at a time to maintain consistent lining thickness across positions

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

C. Replace shoes as a matched set per axle with proper anchor pin lubrication

D. Clean existing shoes with solvent and reinstall during the same service event

17. The function of brake shoe return springs in a heavy-duty foundation brake is to:

A. Apply force to the brake shoes during pedal application events during operation

B. Pull the brake shoes away from the drum when air pressure is released from the chamber

C. Modulate brake force during normal service brake application events during operation

D. Filter compressed air before delivery to the brake chamber during operation

18. The proper service action when a heavy-duty foundation brake shows brake shoe lining contaminated with grease from a failed wheel seal is to:

A. Apply additional brake adjustment to compensate for reduced friction coefficient

B. Continue operation since grease contamination has minimal effect on lining performance

C. Clean the contaminated lining with brake cleaner and reinstall during the same service

D. Replace the wheel seal AND replace the contaminated brake lining components together

19. The S-cam in a heavy-duty foundation brake assembly is rotated by:

A. The slack adjuster acting as a lever from the brake chamber pushrod movement

B. The brake chamber pushrod acting directly on the cam without intermediate components

C. Hydraulic pressure delivered through the slave cylinder during pedal application

D. Mechanical linkage from the brake pedal during normal service brake application

20. The proper inspection procedure for heavy-duty foundation brake shoes during service includes verification of:

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

B. Engine compatibility with the foundation brake during service procedures

C. Lining thickness, contact pattern, and freedom from contamination

D. Vehicle type compatibility with the foundation brake during service operations

21. Heavy-duty automatic slack adjusters compensate for:

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. Normal brake lining wear during operation without manual adjustment intervention

22. The proper procedure for verifying heavy-duty automatic slack adjuster operation is:

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

B. Observe pushrod stroke at various wear levels and confirm self-adjustment function

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

D. Replace the slack adjuster as preventive maintenance regardless of condition

23. The most accurate description of brake chamber diaphragm function is:

A. Converts air pressure into mechanical force applied to the chamber pushrod

B. Filters compressed air before delivery to the brake chamber during operation

C. Modulates air pressure to the spring brake chamber during normal operation

D. Releases air pressure from the brake chamber during pedal release operations

24. The proper procedure for inspecting heavy-duty foundation brake drum thickness is:

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

B. Listen for drum thickness with a stethoscope during normal brake application

C. Measure drum diameter and compare to maximum-allowable specification value

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

25. The function of the compressor unloader in a heavy-duty truck air brake system is to:

A. Modulate air pressure to the brake chambers during normal application events

B. Reduce compressor pumping work during the unloaded operation cycle phase

C. Filter compressed air before delivery to the supply reservoir during operation

D. Build air pressure during the loaded operation cycle phase of normal operation

26. The proper procedure for identifying air brake system leaks is to:

A. Listen for leak sounds with a stethoscope during normal vehicle operation only

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

C. Replace components as preventive maintenance regardless of leak presence

D. Apply soap solution to suspect areas while system is pressurized for visual confirmation

27. Heavy-duty truck spring brake chambers use spring force typically in the range of:

A. 1,500 to 2,500 pounds applied during parking brake engagement events

B. 100 to 250 pounds applied during parking brake engagement events

C. 50 to 100 pounds applied during parking brake engagement events

D. 5,000 to 7,500 pounds applied during parking brake engagement events

28. The proper safety procedure when working on a heavy-duty truck spring brake chamber is to:

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

D. Apply battery voltage to the chamber for diagnostic testing before disassembly

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

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

B. Insufficient air pressure or failed parking brake control valve operation

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

30. The proper diagnostic priority when a heavy-duty truck parking brake fails to engage when the operator pushes the dash valve is to:

A. Verify air pressure release at the spring brake chambers and inspect dash valve operation

B. Replace the parking brake control valve as the most likely failure component during service

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

D. Continue operation since intermittent parking brake operation has minimal effect on safety

31. The proper diagnostic approach when a heavy-duty truck shows a complaint of "parking brake drags during normal forward operation" is to:

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

B. Verify air pressure to the spring brake chambers and inspect for incomplete release

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

D. Continue operation since dragging parking brake has minimal effect on operation

32. The most accurate description of hydraulic brake fluid specification is:

A. Standard automotive engine oil specifications during normal operation

B. Industrial lubricant specifications for heavy-duty applications during operation

C. Diesel fuel quality specifications for proper hydraulic system operation

D. DOT-rated brake fluid specifications appropriate for the application

33. The proper procedure for measuring hydraulic brake fluid moisture content is:

A. Use a brake fluid moisture tester (electronic or chemical strip) per service information

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

C. Listen for moisture-related noise with a stethoscope during normal operation

D. Estimate moisture content visually using shop lighting during inspection process

34. The proper service procedure when a heavy-duty hydraulic brake system shows the master cylinder reservoir fluid level dropping during normal operation is to:

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

B. Add additional brake fluid to compensate for the level loss during normal operation

C. Inspect the entire hydraulic system for external leakage and internal seal failure

D. Continue operation since fluid level changes have minimal effect on brake performance

35. The most likely cause of a heavy-duty hydraulic brake system that produces a low pedal that gradually returns to normal during application is:

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

B. Failed master cylinder primary seal allowing internal fluid bypass during application

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

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

36. The proper procedure for bleeding a heavy-duty hydraulic brake system is:

A. Bleed only the wheel cylinder closest to the master cylinder during service procedures

B. Apply battery voltage to the system for diagnostic testing during bleeding procedures

C. Listen for air with a stethoscope during the bleeding procedure without manual bleed

D. Bleed wheel cylinders in sequence per manufacturer service information specifications

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

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

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

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

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

38. 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 service event

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

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

39. The function of ABS modulator valves in a heavy-duty truck brake system is to:

A. Modulate air pressure to the brake chambers during normal service application events

B. Filter compressed air before delivery to the brake chamber during operation

C. Apply parking brake force during normal vehicle operation conditions during service

D. Modulate brake pressure during ABS-detected wheel slip events to prevent lockup

40. The proper diagnostic approach when an ABS warning lamp remains illuminated after vehicle key-on is to:

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

B. Connect a scan tool to retrieve fault codes and review ABS system data systematically

C. Continue operation since the ABS warning has minimal effect on normal brake function

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

41. The most likely cause of an ABS wheel speed sensor fault on one wheel position only is:

A. ABS controller hardware failure requiring complete controller replacement during service

B. ABS modulator valve mechanical failure requiring valve assembly replacement during service

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

D. Wheel speed sensor wiring damage, sensor failure, or excessive air gap on the affected wheel

42. The proper service action when a heavy-duty ABS wheel speed sensor air gap exceeds specification is to:

A. Adjust the sensor position to achieve proper air gap per service information

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

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

D. Continue operation since air gap variation has minimal effect on ABS function

43. The most accurate description of automatic stability control (ATC) operation is:

A. Stability control automatically engages parking brakes during normal driving operation

B. Stability control modulates engine fuel injection during normal vehicle operation

C. Stability control applies individual brake pressure based on detected wheel slip during operation

D. Stability control activates during cold-start operation to prevent ice buildup during operation

44. The proper diagnostic priority when an ABS controller shows multiple fault codes referencing different wheel speed sensors is to:

A. Replace all wheel speed sensors immediately as the most likely failure component

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

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

D. Continue operation since multiple ABS faults have minimal effect on brake function

45. The most likely cause of a heavy-duty hydraulic brake system that produces brake pedal pulsation during normal application is:

A. Insufficient brake fluid level in the master cylinder reservoir during operation

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. Brake rotor or drum thickness variation or excessive runout during inspection

46. The proper procedure for verifying heavy-duty hydraulic brake hose condition is to:

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

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

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

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

47. The proper service action when a heavy-duty truck brake system shows DEF or coolant contamination in the air supply system is to:

A. Continue operation since contamination has minimal effect on the air brake system

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

C. Identify the contamination source, drain affected components, and address root cause

D. Add air system cleaner additive to dissolve the contamination during service

48. The proper torque application for heavy-duty foundation brake hardware components is:

A. Maximum torque applied without measurement during the installation procedures

B. Per manufacturer service information specific to the foundation brake assembly model

C. Standard automotive torque specifications for similar hardware diameter applications

D. Visual estimation based on hardware appearance during the installation procedure

49. The proper procedure when a heavy-duty truck shows a complaint of "intermittent ABS warning during normal operation" is:

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

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

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

D. Connect a scan tool to retrieve fault codes during operation and isolate the trigger condition

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

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

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

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

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

ANSWER KEY AND EXPLANATIONS

1. C — 65 PSI applied to the parking brake control circuit during operation. The minimum air pressure required to release spring brake chambers is typically 65 PSI; below this pressure, the spring force in the chamber overcomes the air pressure and the parking brakes engage automatically. This threshold provides the fail-safe parking brake function mandated by FMVSS 121.

2. A — 100 to 125 PSI on most fleet applications during normal operation. Cut-out pressure on heavy-duty trucks is typically set within 100 to 125 PSI, with specific values varying by manufacturer and application. The range provides adequate operating pressure for service brake performance while protecting components from over-pressurization.

3. D — Cubic feet per minute (CFM) of free air delivery at rated RPM. Air compressor displacement is rated in CFM of free air delivery at a specified compressor RPM. The rating allows technicians to compare compressor capacity across applications and verify that the compressor meets the air demand requirements of the truck system.

4. B — Build pressure to cut-out, shut off engine, and measure pressure decay over 1 minute. The FMVSS 121 leak test with brakes released requires building system pressure to cut-out, shutting off the engine, and measuring pressure decay over 1 minute. The test isolates the supply system from compressor influence to identify air leakage in storage and supply components.

5. A — 2 PSI in 1 minute on heavy-duty single tractor configurations. The federal standard establishes 2 PSI per minute as the maximum acceptable leak rate with engine off and brakes released for single tractors. Tractor-trailer combinations have different specifications. Rates exceeding the limit result in CVSA out-of-service determination.

6. D — Reverse flow of air back through the dryer during purge cycle events. The check valve between the air dryer and supply reservoir prevents stored air from flowing backward through the dryer during purge cycles. Without the check valve, every purge event would discharge stored compressed air, defeating the system's pressure retention.

7. C — Blue for the supply line and red for the emergency line on tractor-trailer applications. Standard color coding on tractor-trailer applications uses blue for the service line and red for the emergency line, with both connecting tractor to trailer through the gladhand connectors. The standard coding prevents misconnection that could compromise brake function.

8. B — Both primary and secondary service brake circuits proportional to driver pedal input. The treadle valve delivers metered air simultaneously to primary and secondary service brake circuits,

with the pressure proportional to driver pedal input. The dual-circuit delivery provides safety redundancy if one circuit fails during operation.

9. A — The effective area of the diaphragm in square inches inside the chamber. Brake chamber size designations refer to the effective area of the diaphragm in square inches; a Type 30 chamber has 30 square inches of effective diaphragm area. Larger chambers provide more force at the slack adjuster, scaled to the brake size and load.

10. D — 5 to 6 inch length on most heavy-duty applications during normal operation. Type 30 brake chambers are typically paired with 5 to 6 inch slack adjusters on most heavy-duty applications. The pairing balances chamber force, mechanical advantage, and required braking torque for the foundation brake.

11. A — 2 inches measured at 90–100 PSI applied pressure during inspection. CVSA out-of-service criteria for Type 30 chambers establish 2 inches as the maximum allowable pushrod stroke at 90–100 PSI applied pressure. Stroke at or beyond limit places the truck out of service because excessive stroke compromises braking force delivery.

12. C — Use a brake drum micrometer at multiple positions across the friction surface. Brake drum diameter measurement requires a brake drum micrometer at multiple positions across the friction surface to detect both maximum diameter and ovality. Single-position measurements miss out-of-round conditions that could affect brake performance.

13. B — Cast onto the drum surface during the manufacturing process for reference. Brake drum maximum-allowable diameter dimensions are cast onto the drum surface during manufacturing, providing on-component reference for technicians during service. The cast-in markings include both maximum machine-to and maximum-allowable specifications.

14. D — Torque to specification in star pattern using a calibrated wrench in stages. Heavy-duty wheel lug nut installation uses a star pattern in stages with a calibrated torque wrench, building from initial torque to final specification across multiple passes. The pattern ensures even clamping force across all studs without distortion.

15. A — 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.

16. C — Replace shoes as a matched set per axle with proper anchor pin lubrication. Foundation brake shoe service requires matched-set replacement per axle to maintain balanced braking, plus proper anchor pin lubrication to ensure free shoe movement. Single-shoe replacement creates unequal braking; cleaning and reinstalling worn shoes is not acceptable practice.

17. B — Pull the brake shoes away from the drum when air pressure is released from the chamber. Brake shoe return springs pull the shoes away from the drum when air pressure is released,

providing the running clearance between the lining and drum during normal driving. Without proper return spring function, the brakes drag continuously, causing heat and wear.

18. D — Replace the wheel seal AND replace the contaminated brake lining components together. Grease-contaminated brake lining cannot be cleaned effectively because the contamination penetrates the porous lining material. Both the source (wheel seal) and the contaminated components (lining) must be replaced to restore proper brake function and prevent recurrence.

19. A — The slack adjuster acting as a lever from the brake chamber pushrod movement. The S-cam is rotated by the slack adjuster, which acts as a lever arm translating the linear extension of the brake chamber pushrod into rotational movement of the S-cam shaft. The mechanical advantage of the slack adjuster provides the force multiplication needed for foundation brake actuation.

20. C — Lining thickness, contact pattern, and freedom from contamination. Foundation brake shoe inspection during service requires verification of lining thickness (against minimum specification), contact pattern (showing proper drum contact), and freedom from contamination (oil, grease, water, or chemical exposure). All three conditions affect brake performance.

21. D — Normal brake lining wear during operation without manual adjustment intervention. Automatic slack adjusters compensate for normal lining wear during operation by self-adjusting during brake applications. The mechanism activates as wear creates excess clearance, eliminating the need for periodic manual adjustment that manual slack adjusters require.

22. B — Observe pushrod stroke at various wear levels and confirm self-adjustment function. Automatic slack adjuster verification requires observing pushrod stroke at various lining wear levels and confirming that the adjuster self-adjusts to maintain proper stroke. Failed automatic adjusters allow stroke to grow as lining wears, eventually exceeding service limits.

23. A — Converts air pressure into mechanical force applied to the chamber pushrod. The brake chamber diaphragm separates the air pressure side from the pushrod side, converting air pressure into mechanical force on the pushrod. The diaphragm flexes under pressure, transmitting force without allowing air to escape past the seal.

24. C — Measure drum diameter and compare to maximum-allowable specification value. Brake drum thickness verification is performed by measuring drum diameter and comparing to the maximum-allowable specification cast onto the drum or listed in service information. Drums exceeding maximum-allowable diameter must be replaced because they cannot safely transmit braking force.

25. B — Reduce compressor pumping work during the unloaded operation cycle phase. The compressor unloader opens at cut-out pressure to vent compressor cylinder pressure to atmosphere, eliminating the compression work the compressor would otherwise perform during the unloaded cycle. This reduces fuel consumption and component wear during periods when no air is being added to the system.

26. D — Apply soap solution to suspect areas while system is pressurized for visual confirmation. Air leak identification uses soap solution applied to suspect areas with the system pressurized; bubbles form at leak points, providing visual confirmation of the leak source. The method is both reliable and accessible for field diagnosis.

27. A — 1,500 to 2,500 pounds applied during parking brake engagement events. Heavy-duty truck spring brake chambers typically use spring force in the 1,500 to 2,500 pound range to engage parking brakes mechanically when air pressure is released. The high spring force ensures positive parking brake application even on grades with heavy loads.

28. C — Cage the spring brake mechanism using the manual caging bolt before any work. The proper safety procedure when working on a spring brake chamber is to cage the spring mechanism using the manual caging bolt before any disassembly. Caging compresses the spring mechanically, preventing dangerous explosive release that could cause serious injury or death.

29. B — Insufficient air pressure or failed parking brake control valve operation. Parking brake release requires adequate air pressure (typically 65 PSI minimum) delivered through the parking brake control valve to the spring brake chambers. Insufficient pressure or a failed valve prevents the air from reaching the chambers to release the spring brakes.

30. A — Verify air pressure release at the spring brake chambers and inspect dash valve operation. Parking brake engagement requires air pressure release from the spring brake chambers when the dash valve is pushed. Verification of pressure release and dash valve operation identifies whether the issue is in the control valve, supply line, or chamber operation.

31. B — Verify air pressure to the spring brake chambers and inspect for incomplete release. Parking brake drag during forward operation indicates that the spring brakes are not fully releasing despite adequate dash valve operation. Verification of pressure at the chambers and inspection for incomplete release identifies whether the issue is in pressure delivery or chamber operation.

32. D — DOT-rated brake fluid specifications appropriate for the application. Hydraulic brake fluid must meet DOT specifications (typically DOT 3, DOT 4, or DOT 5.1 for heavy-duty applications) appropriate for the system. The DOT rating establishes boiling point, viscosity, and chemical compatibility requirements for safe hydraulic brake operation.

33. A — Use a brake fluid moisture tester (electronic or chemical strip) per service information. Hydraulic brake fluid moisture content is measured using a brake fluid moisture tester (electronic or chemical strip) per manufacturer service information. The measurement guides fluid replacement decisions because moisture content affects boiling point and corrosion potential.

34. C — Inspect the entire hydraulic system for external leakage and internal seal failure. Master cylinder reservoir fluid level dropping during normal operation indicates fluid loss somewhere in the hydraulic system. Inspection for external leakage (visible fluid at components, lines, fittings) and internal seal failure (master cylinder bypass) identifies the specific cause.

35. B — Failed master cylinder primary seal allowing internal fluid bypass during application. A low pedal that gradually returns to normal indicates fluid bypassing internal master cylinder seals during application. The bypass allows fluid to leak past the seal under pressure, producing the gradual pedal return as fluid bleeds back during pressure hold.

36. D — Bleed wheel cylinders in sequence per manufacturer service information specifications. Hydraulic brake bleeding follows a specific sequence per manufacturer service information, typically starting at the wheel furthest from the master cylinder and progressing closer. The sequence ensures all air is purged from the system without re-introducing air at upstream components.

37. A — 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.

38. 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.

39. D — Modulate brake pressure during ABS-detected wheel slip events to prevent lockup. ABS modulator valves modulate brake pressure during ABS-detected wheel slip events, releasing and reapplying pressure rapidly to prevent wheel lockup during braking. The modulation maintains wheel rotation and steerability during emergency braking on slick surfaces.

40. B — Connect a scan tool to retrieve fault codes and review ABS system data systematically. ABS warning lamp illumination indicates the controller has detected a fault and disabled some or all ABS function. Scan tool retrieval of fault codes points directly to the specific fault location, allowing targeted diagnosis without unnecessary parts replacement.

41. D — Wheel speed sensor wiring damage, sensor failure, or excessive air gap on the affected wheel. A single-wheel ABS sensor fault typically originates at the affected wheel, with the controller detecting absent or incorrect signal from that specific sensor. Common causes are wiring damage, sensor failure, or excessive air gap from improper installation or tone ring damage.

42. A — Adjust the sensor position to achieve proper air gap per service information. Wheel speed sensor air gap exceeding specification typically requires adjustment to bring the sensor within specification range per manufacturer service information. Many sensors are self-adjusting on initial installation but may require manual reset after service.

43. C — Stability control applies individual brake pressure based on detected wheel slip during operation. Automatic Traction Control (ATC) and stability control systems apply individual brake

pressure based on detected wheel slip and vehicle dynamics, helping the truck maintain directional control and prevent rollover. The system can apply brakes independent of driver input when needed for stability.

44. B — Verify ABS controller power, ground, and J1939 data bus communication integrity. Multiple wheel speed sensor fault codes simultaneously suggest 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.

45. D — Brake rotor or drum thickness variation or excessive runout during inspection. Pedal pulsation during application indicates uneven contact between brake friction material and rotor or drum surfaces, typically from thickness variation or runout. The variation produces alternating contact pressure that telegraphs back through the hydraulic system to the pedal.

46. A — Inspect for cracks, swelling, abrasion, and leakage at all connection points. Hydraulic 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.

47. C — Identify the contamination source, drain affected components, and address root cause. DEF or coolant contamination in the air supply system requires identification of the source (failed seal, internal component damage, or external entry), draining of affected components, and addressing the root cause to prevent recurrence. Continued operation allows contamination to spread.

48. B — Per manufacturer service information specific to the foundation brake assembly model. Foundation brake hardware torque values come from manufacturer service information specific to the brake assembly model. Standard automotive specifications and visual estimation are inadequate for heavy-duty equipment because incorrect torque can cause component failure or improper brake function.

49. D — Connect a scan tool to retrieve fault codes during operation and isolate the trigger condition. Intermittent ABS warnings during operation 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.

50. C — 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.