SECTION D: T4 — BRAKES SIMULATION EXAMS

Section D contains eight full-length simulation exams for the T4 — Brakes certification test. Each simulation contains 50 scored questions with a recommended completion time of 75 minutes — matching the official ASE T4 examination scored question count exactly. T4 is among the most safety-critical tests in the entire T-Series, covering the complete air brake system, hydraulic brake system, parking brake system, and electronic brake controls found on medium and heavy-duty commercial trucks.

Every T4 simulation in this section delivers questions across the four official ASE domains in the precise weighting used on the actual test:

Domain	Topic	Questions per Simulation
A	Air Supply and Service Systems	20
B	Mechanical and Foundation	15
C	Parking Brakes	5
D	Hydraulic Brakes and Air Over Hydraulic Brakes	10
	Total	**50**

The eight simulations together provide 400 practice questions covering the complete T4 task list. Air supply and service systems at 40 percent and mechanical foundation brakes at 30 percent together account for 70 percent of every test, reflecting the central role air brake architecture plays in heavy-duty commercial truck operation. Pay particular attention to the distinction between S-cam and disc brake foundation systems, the operation of the dual-circuit air supply system, and the function of safety-critical components such as the spring brake chamber, treadle valve, and ABS modulator — these are the components ASE emphasizes most heavily on the actual examination.

The questions use all five ASE question formats in proportions that match the real exam: direct questions, Technician A and Technician B questions, EXCEPT questions, LEAST likely questions, and completion questions. Brake-specific question patterns appear throughout — distinguishing service brake from parking brake from emergency brake operation, identifying air leak sources by location and severity, reasoning through pressure sequence diagnostics, and recognizing the safety-critical interlocks built into modern dual-circuit air systems.

The content reflects current ASE T4 task list specifications, including FMVSS 121 air brake standards, ABS and stability control systems, automatic slack adjusters, electronic brake controls (EBS) on newer applications, and the integration between foundation brakes and the truck's J1939 data bus. Where specifications or procedures vary by manufacturer or model year, questions are written to reflect the most widely applicable current practice across the medium- and heavy-duty truck industry.

Begin with Practice Exam 1 to establish a baseline of your current preparation level. T4 emphasizes safety-critical diagnostic reasoning across systems that protect drivers, passengers, and the public — a failed brake component can have catastrophic consequences in commercial truck operation. Pay special attention to questions about air pressure governor operation, low-pressure warning systems, spring brake chamber service safety, slack adjuster adjustment specifications, ABS fault diagnosis, and the proper sequence for verifying brake system integrity after any component service. After completing each simulation under timed conditions, review every question against the explanations and return to Chapter 5 to address any knowledge gaps. By the time you complete Practice Exam 8, you should be consistently scoring above 75 percent on simulations across all four domains — the threshold that indicates strong readiness for the actual T4 examination, the most safety-critical credential in the medium and heavy-duty truck technician certification path.

PRACTICE EXAM 1: T4 SIMULATION (50 QUESTIONS)

1. The primary function of the air dryer on a heavy-duty truck air brake system is to:

A. Increase the storage capacity of the supply reservoir during normal operation

B. Filter contamination particles before air enters the supply reservoir tanks

C. Remove moisture and oil contamination from compressed air before storage

D. Regulate system pressure between cut-in and cut-out values during operation

2. The air pressure governor on a heavy-duty truck air brake system controls:

A. Compressor cut-in and cut-out pressures during normal operating cycles

B. Maximum pressure delivered to the service brake chambers during application

C. Spring brake chamber pressure during parking brake engagement events

D. Treadle valve output pressure during normal service brake application

3. Technician A says the cut-out pressure on most heavy-duty air brake systems is approximately 100 to 105 PSI. Technician B says the cut-in pressure on most heavy-duty air brake systems is approximately 80 to 85 PSI. 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 has the values right

4. The dual-circuit air brake system on a heavy-duty truck provides:

A. Increased system pressure for improved brake response during operation

B. Independent primary and secondary circuits for safety redundancy in service

C. Faster compressor recovery during repeated heavy brake applications

D. Reduced air consumption during normal service brake application events

5. The minimum air pressure at which the low-pressure warning device must activate is:

A. 60 PSI per FMVSS 121 specifications for heavy-duty applications

B. 90 PSI per FMVSS 121 specifications for heavy-duty applications

C. 30 PSI per FMVSS 121 specifications for heavy-duty applications

D. 100 PSI per FMVSS 121 specifications for heavy-duty applications

6. The treadle valve in a heavy-duty truck air brake system is responsible for:

A. Filtering compressed air before delivery to the brake chambers during operation

B. Regulating pressure between the primary and secondary circuit reservoirs

C. Modulating air pressure to the service brake chambers during pedal application

D. Releasing the spring brake chambers during normal driving operation events

7. The most likely cause of a heavy-duty air brake system that builds pressure slowly during initial start-up is:

A. Excessive moisture accumulated in the supply reservoir during overnight conditions

B. Air compressor wear or restriction in the supply line during operation

C. Failed governor unable to maintain proper cut-out pressure during operation

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

8. The proper procedure when an air brake system shows excessive moisture in the supply reservoir 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 without further investigation during the same service event

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

9. The air dryer on a heavy-duty truck typically purges accumulated moisture and contamination during which operating event?

A. Each compressor cut-out cycle when the governor reaches the cut-out pressure

B. Each service brake application event during normal vehicle operation

C. Each spring brake engagement event during parking brake application

D. Continuously throughout normal operation regardless of compressor cycle

10. The LEAST likely cause of an air brake system that fails to build pressure to cut-out is:

A. Worn compressor unable to deliver adequate volume during normal operation

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

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

D. Failed governor stuck in the unloaded position during normal operation

11. The proper service action when an air brake system shows the air dryer purge valve continuously discharging is to:

A. Continue operation since continuous purge has minimal effect on system function

B. Replace the air dryer cartridge or governor as needed to correct the condition

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

D. Add lubricant to the purge valve assembly to reduce the discharge frequency

12. The most accurate description of an air brake system primary circuit is:

A. Supplies air to the spring brake chambers during parking brake engagement only

B. Supplies air to the trailer service brake circuit through the tractor protection valve

C. Supplies air to all service brake chambers regardless of brake circuit assignment

D. Supplies air to the rear axle service brake chambers on most tractor configurations

13. A heavy-duty truck shows complete loss of air pressure overnight after the system was at full pressure when parked. The most likely cause is:

A. Major air leak in the supply system exceeding normal acceptable leak rates

B. Failed compressor unable to maintain pressure during overnight operation

C. Failed governor stuck in the unloaded position during the overnight period

D. Normal pressure loss within acceptable limits during extended parked periods

14. The maximum acceptable air pressure leak rate on a heavy-duty tractor with engine off and brakes released is:

A. 5 PSI in 5 minutes per FMVSS 121 specifications during operation

B. 10 PSI in 1 minute per FMVSS 121 specifications during operation

C. 2 PSI in 1 minute per FMVSS 121 specifications during operation

D. 25 PSI in 5 minutes per FMVSS 121 specifications during operation

15. Technician A says the air compressor on a heavy-duty truck is typically belt-driven or gear-driven from the engine. Technician B says the air compressor on a heavy-duty truck is typically driven by an electric motor independent of the engine. 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

16. The proper diagnostic priority when an air brake system shows the low-pressure warning light remaining on after pressure has reached normal operating range is to:

A. Continue operation since the warning light malfunction has minimal effect on safety

B. Replace the warning light bulb or LED as the most likely failure component

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

D. Inspect the low-pressure switch operation and verify reservoir pressure with a gauge

17. The air pressure governor on a heavy-duty truck signals the compressor to:

A. Build pressure continuously regardless of system pressure during operation

B. Unload at cut-out pressure and reload at cut-in pressure during normal cycling

C. Operate at maximum capacity during all engine operating conditions

D. Match compressor output to driver brake demand during normal operation

18. The most likely consequence of operating a heavy-duty truck with a failed air dryer is:

A. Improved compressor service life from reduced operating cycle frequency

B. Faster system pressure build-up during initial start-up procedures

C. Moisture and contamination accumulation in the supply reservoir and brake system

D. No effect on the air brake system during normal operating conditions

19. The proper service action when a heavy-duty air brake system shows oil contamination in the supply reservoir is to:

A. Replace or rebuild the air compressor and inspect downstream components for damage

B. Continue operation since oil contamination has minimal effect during operation

C. Add desiccant material to the reservoir to absorb the oil contamination

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

20. The LEAST likely cause of a heavy-duty air brake system that produces excessive moisture in the supply reservoir is:

A. Failed air dryer cartridge unable to remove moisture from compressed air

B. Compressor wear allowing excessive blow-by past the piston rings

C. Operation in high-humidity conditions during extended driving periods

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

21. The S-cam in a heavy-duty foundation brake assembly is responsible for:

A. Releasing the brake shoes from the brake drum during pedal release

B. Providing parking brake force application during spring brake engagement

C. Distributing brake force evenly between front and rear axle brake chambers

D. Spreading the brake shoes apart to contact the brake drum during application

22. The slack adjuster on a heavy-duty foundation brake serves to:

A. Adjust the air pressure delivered to the brake chamber during pedal application

B. Convert linear chamber pushrod motion into rotational force at the S-cam

C. Provide spring brake mechanical force during parking brake engagement

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

23. The proper measurement procedure for heavy-duty brake chamber pushrod stroke is to:

A. Apply 90 to 100 PSI to the chamber and measure stroke from released to applied position

B. Apply 30 to 40 PSI to the chamber and measure stroke from released to applied position

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

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

24. The maximum allowable brake chamber pushrod stroke on most Type 30 chambers is:

A. 1 inch measured from released to applied position during inspection

B. 4 inches measured from released to applied position during inspection

C. 2 inches measured from released to applied position during inspection

D. 6 inches measured from released to applied position during inspection

25. Technician A says automatic slack adjusters require periodic manual adjustment during scheduled service. Technician B says automatic slack adjusters self-adjust during normal brake application without manual intervention. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Neither Technician A nor Technician B

D. Technician B only

26. The most likely cause of brake chamber pushrod stroke exceeding service specification on a heavy-duty truck is:

A. Brake shoe lining worn beyond service specification limits requiring replacement

B. Brake adjustment out of specification or failed automatic slack adjuster operation

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

D. Brake chamber diaphragm failure preventing proper pushrod extension during operation

27. The LEAST likely cause of brake chamber pushrod stroke that exceeds service specification is:

A. Brake shoe lining worn beyond service specification limits during inspection

B. Brake drum worn beyond service specification limits during inspection

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

D. Failed automatic slack adjuster unable to compensate for normal lining wear

28. The proper procedure when adjusting a heavy-duty manual slack adjuster is to:

A. Tighten the adjustment until the brake shoe contacts the drum, then back off per spec

B. Apply maximum torque to the adjustment screw during installation procedures

C. Continue adjustment until the brake chamber pushrod fully extends during operation

D. Apply battery voltage to the slack adjuster for diagnostic testing during adjustment

29. Heavy-duty foundation brake drum maximum diameter specifications are typically:

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

B. Listed only in the manufacturer service manual for the application

C. Visible only after complete brake assembly disassembly during service

D. Cast onto the drum and listed as the maximum machine-to or maximum-allowable diameter

30. The proper service action when a heavy-duty brake drum shows hot spots or heat checks is to:

A. Continue service since minor hot spots have minimal effect on brake performance

B. Replace the brake drum and inspect the brake shoes and slack adjuster operation

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

D. Resurface the drum regardless of remaining thickness during the service event

31. The spring brake chamber on a heavy-duty truck is responsible for:

A. Providing parking brake force through mechanical spring application during engagement

B. Releasing the service brakes during normal pedal application events during operation

C. Modulating service brake pressure during normal service brake application events

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

32. The proper procedure when a spring brake chamber must be removed from service is to:

A. Apply maximum torque to the chamber bolts during the removal procedure

B. Remove the chamber without any preparation steps during the service procedure

C. Cage the spring brake mechanism using the manual caging bolt before removal

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

33. Technician A says spring brake chambers contain a high-force spring that engages parking brakes when air pressure is released. Technician B says working on a spring brake chamber without caging the spring can cause serious injury or death. Who is correct?

A. Technician A only

B. Technician C only

C. Neither Technician A nor Technician B

D. Both Technician A and Technician B

34. The most likely cause of a heavy-duty 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 brake shoe lining preventing proper drum contact during release

D. Excessive ring and pinion wear in the rear drive axle assembly during operation

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

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

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

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

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

36. The most accurate description of hydraulic brake system operation on a heavy-duty medium-duty truck is:

A. Air pressure delivers force directly to the wheel cylinders during pedal application

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

C. Hydraulic pressure delivers force to the wheel cylinders during pedal application

D. Vacuum boost provides primary force to the wheel cylinders during application

37. The proper diagnostic priority when a hydraulic brake system shows a complaint of "low pedal that gradually returns to normal" is to:

A. Continue operation since gradual return has minimal effect on brake performance

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

C. Replace the master cylinder as preventive maintenance during the same service

D. Inspect for hydraulic system leakage or master cylinder seal degradation systematically

38. Technician A says hydraulic brake fluid is hygroscopic and absorbs moisture from the atmosphere over time. Technician B says hydraulic brake fluid should be changed periodically per manufacturer service interval recommendations. 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

39. The most likely cause of a hydraulic brake system that shows brake pedal pulsation during normal application is:

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

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

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

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

40. The proper service action when a hydraulic brake system shows fluid contamination with moisture during analysis is to:

A. Continue operation since moisture has minimal effect on hydraulic brake fluid

B. Add additional fluid to dilute the moisture during the same service event

C. Flush the entire hydraulic brake system and refill with proper specification fluid

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

41. The LEAST likely cause of a hydraulic brake system that produces a spongy pedal during application is:

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

B. Failed brake hose with internal damage allowing expansion during application

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

D. Worn or damaged master cylinder seal allowing internal fluid bypass during operation

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

A. Bleed the wheel cylinders in sequence per manufacturer service information

B. Apply battery voltage to the brake system during the bleeding procedure

C. Bleed only the wheel furthest from the master cylinder during normal service

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

43. The air-over-hydraulic brake system on some medium-duty trucks combines:

A. Mechanical linkage with vacuum boost to actuate hydraulic wheel cylinders during use

B. Air pressure with hydraulic pressure to actuate wheel cylinders during application

C. Vacuum boost with hydraulic pressure for primary brake force during application

D. Pneumatic pressure direct to wheel cylinders without hydraulic conversion

44. The proper diagnostic approach when an air-over-hydraulic system shows a complaint of "weak braking during pedal application" is to:

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

B. Replace the hydraulic master cylinder as preventive maintenance during service

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

D. Verify air supply pressure, air-hydraulic actuator, and hydraulic system condition

45. The most likely cause of a hydraulic brake system that pulls to one side during 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. Restricted brake hose, contaminated lining, or seized caliper on the affected side

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

46. The proper service action when a hydraulic brake system shows discoloration in the master cylinder reservoir during inspection is to:

A. Flush the entire hydraulic brake system and refill with proper specification fluid

B. Add additional fluid of the same specification during the same service event

C. Continue operation since fluid discoloration has minimal effect on brake performance

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

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. Both Technician A and Technician B

C. Technician B only

D. Neither Technician A nor Technician B

48. The proper diagnostic priority when an ABS warning lamp remains illuminated after key-on is to:

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

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

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

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

49. The most likely cause of an ABS system that sets a wheel speed sensor fault on one wheel only is:

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

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

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

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

50. The LEAST likely cause of brake system pull during application on a heavy-duty truck is:

A. Restricted brake hose on one side limiting fluid flow during application events

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

C. Contaminated brake lining on one side reducing friction during application events

D. Seized caliper or wheel cylinder on one side preventing equal pressure distribution

PRACTICE EXAM 1: ANSWER KEY AND EXPLANATIONS

1. C — Remove moisture and oil contamination from compressed air before storage. The air dryer is positioned between the compressor and the supply reservoir to remove water vapor and oil aerosol from the compressed air stream. Without proper drying, moisture accumulates throughout the brake system, causing corrosion, valve sticking, and freezing in cold weather.

2. A — Compressor cut-in and cut-out pressures during normal operating cycles. The governor monitors system pressure and signals the compressor to load (build pressure) at cut-in pressure and unload (stop building) at cut-out pressure. This cycling maintains system pressure within the safe operating range without continuous compressor loading.

3. A — Both Technician A and Technician B. Cut-out pressure on most heavy-duty air brake systems is typically 100–125 PSI, with 100–105 PSI common on many fleet applications. Cut-in pressure is typically 80–85 PSI on the same systems. The pressure differential between cut-in and cut-out provides hysteresis that prevents continuous compressor cycling.

4. B — Independent primary and secondary circuits for safety redundancy in service. The dual-circuit design ensures that failure of one circuit (typically primary serves rear axle, secondary serves front axle) leaves the other circuit operational, allowing the truck to be brought safely to a stop. This redundancy is mandated by FMVSS 121 for safety-critical commercial brake systems.

5. A — 60 PSI per FMVSS 121 specifications for heavy-duty applications. The low-pressure warning device must activate at or above 60 PSI to alert the driver before pressure drops to a level that compromises stopping capability. The federal standard establishes this threshold to ensure adequate warning time for safe vehicle stopping.

6. C — Modulating air pressure to the service brake chambers during pedal application. The treadle valve (foot valve) controls service brake pressure proportional to driver pedal input, delivering metered air to the brake chambers. The valve provides simultaneous metered air to both primary and secondary circuits during normal application.

7. B — Air compressor wear or restriction in the supply line during operation. Slow pressure build-up indicates inadequate compressor output relative to system demand, typically from worn compressor components or restriction in the supply path. Moisture and governor problems produce different symptoms; ECT errors don't affect air pressure build-up.

8. D — Drain the reservoir and inspect the air dryer cartridge for replacement need. Excessive moisture in the supply reservoir indicates the air dryer is no longer 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.

9. A — Each compressor cut-out cycle when the governor reaches the cut-out pressure. The air dryer purge valve opens at each cut-out event, releasing accumulated moisture and contamination from the dryer through the purge port. This cyclic purging keeps the desiccant material functional throughout normal compressor operating cycles.

10. C — 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 system pressure build-up. Worn compressor, major leaks, and failed governor all directly prevent the system from reaching cut-out pressure through inadequate output or excessive demand.

11. B — Replace the air dryer cartridge or governor as needed to correct the condition. Continuous purge valve discharge indicates either a failed dryer cartridge unable to retain pressure or a governor signaling continuous unload. Both conditions require component service to restore proper system function and prevent compressor damage from continuous unloaded operation.

12. B — Supplies air to the trailer service brake circuit through the tractor protection valve. The primary circuit on most heavy-duty tractors supplies the rear axle service brakes and the trailer service circuit through the tractor protection valve, while the secondary circuit supplies the front axle service brakes. The dual-circuit configuration provides safety redundancy for the service brake system.

13. A — Major air leak in the supply system exceeding normal acceptable leak rates. Complete loss of pressure overnight indicates a leak rate far exceeding the FMVSS 121 maximum of 2 PSI per minute. The leak is typically in the supply system and must be identified and corrected before the truck is returned to service.

14. C — 2 PSI in 1 minute per FMVSS 121 specifications during operation. The federal standard establishes 2 PSI per minute as the maximum acceptable leak rate with engine off and brakes released. Leak rates exceeding this specification indicate a brake system fault requiring service before the truck can be safely operated.

15. A — Technician A only. Heavy-duty truck air compressors are typically belt-driven or gear-driven from the engine, providing continuous mechanical power as long as the engine is running. Electric motor-driven compressors are not standard on heavy-duty trucks because they cannot supply the required air volume for service brake operation.

16. D — Inspect the low-pressure switch operation and verify reservoir pressure with a gauge. A warning light staying on at normal pressure typically indicates either a failed pressure switch or actual low pressure in one circuit. Verification with a gauge identifies whether pressure is actually low or whether the switch is the fault.

17. B — Unload at cut-out pressure and reload at cut-in pressure during normal cycling. The governor maintains system pressure between defined limits by signaling the compressor to stop building at cut-out and resume building at cut-in. This control prevents over-pressurization while ensuring adequate pressure is available for brake operation.

18. C — Moisture and contamination accumulation in the supply reservoir and brake system. A failed air dryer allows water vapor and oil contamination to pass through to the supply reservoir and downstream components. The accumulation causes corrosion, valve sticking, freezing in cold weather, and progressive damage throughout the air brake system.

19. A — Replace or rebuild the air compressor and inspect downstream components for damage. Oil contamination in the supply reservoir indicates compressor wear allowing oil past the piston rings into the discharge air stream. The compressor requires service, and downstream components (air dryer, valves, brake chambers) must be inspected for contamination damage.

20. D — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not produce moisture in the air supply reservoir. The other choices all describe direct sources of moisture: failed dryer, compressor wear allowing moisture-laden combustion gas blow-by, and high-humidity operation.

21. D — Spreading the brake shoes apart to contact the brake drum during application. The S-cam rotates when the slack adjuster is rotated by the brake chamber pushrod, with the cam profile spreading the brake shoes outward against the drum friction surface. This converts pneumatic chamber force into mechanical brake application force.

22. B — Convert linear chamber pushrod motion into rotational force at the S-cam. The slack adjuster acts as a lever arm that translates the linear extension of the brake chamber pushrod into rotational movement of the S-cam shaft. This conversion provides the mechanical advantage needed to actuate the foundation brake under load.

23. A — Apply 90 to 100 PSI to the chamber and measure stroke from released to applied position. Brake chamber pushrod stroke is measured at full service application pressure (90–100 PSI) to verify adequate stroke remains for proper brake force delivery. The measurement compares released and applied pushrod positions to determine total stroke.

24. C — 2 inches measured from released to applied position during inspection. The maximum allowable stroke on most Type 30 chambers is 2 inches; stroke exceeding this specification indicates excessive lining wear, slack adjuster failure, or other foundation brake issues that compromise braking capacity. Stroke at or beyond limit places the truck out of service per CVSA criteria.

25. D — Technician B only. Automatic slack adjusters self-adjust during normal brake application without manual intervention, compensating for normal lining wear over service life. Manual

adjustment of automatic slack adjusters is generally limited to initial installation or after foundation brake service that disturbed the adjustment.

26. B — Brake adjustment out of specification or failed automatic slack adjuster operation. Excessive pushrod stroke typically indicates the slack adjuster is no longer compensating for lining wear, either from manual adjustment being out of specification or from a failed automatic adjuster. Both conditions allow stroke to grow beyond service limits.

27. C — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect brake chamber pushrod stroke. Worn lining, worn drum, and failed automatic slack adjuster all directly cause excessive pushrod travel through their effect on foundation brake clearance.

28. A — Tighten the adjustment until the brake shoe contacts the drum, then back off per spec. Manual slack adjuster adjustment requires tightening until the shoes contact the drum (eliminating clearance), then backing off the specified amount to establish proper running clearance between the lining and drum. This procedure ensures consistent brake application across all wheel positions.

29. D — Cast onto the drum and listed as the maximum machine-to or maximum-allowable diameter. Brake drums are cast with two diameter specifications: maximum machine-to (the limit for resurfacing) and maximum allowable (the limit before drum replacement). Drums exceeding the maximum allowable diameter must be replaced because they cannot safely transmit braking force.

30. B — Replace the brake drum and inspect the brake shoes and slack adjuster operation. Hot spots and heat checks indicate excessive thermal stress on the drum, often from dragging brakes, improper adjustment, or aggressive use. Replacement of the drum plus inspection of the shoes and adjuster identifies whether the cause is component-specific or system-wide.

31. A — Providing parking brake force through mechanical spring application during engagement. The spring brake chamber contains a high-force spring that engages parking brakes mechanically when air pressure is released. This design ensures parking brakes apply automatically if air pressure is lost, providing a fail-safe parking brake function.

32. C — Cage the spring brake mechanism using the manual caging bolt before removal. Caging compresses the parking brake spring mechanically, preventing it from extending dangerously when the chamber is removed. Working on a non-caged spring brake chamber risks serious injury or death from the explosive release of the high-force spring.

33. D — Both Technician A and Technician B. 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 without caging the spring can cause serious injury or death from the sudden release of the spring force during disassembly.

34. B — Insufficient air pressure or failed parking brake control valve operation. Parking brake release requires adequate air pressure (typically 65 PSI minimum) to overcome the spring force in the

spring brake chambers. Insufficient pressure or a failed control valve prevents air from reaching the chambers to release the parking brakes.

35. C — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not affect parking brake operation. Major air pressure loss, failed control valve, and damaged supply lines all directly cause spring brake application through inadequate pressure to keep the spring brakes released.

36. C — Hydraulic pressure delivers force to the wheel cylinders during pedal application. Hydraulic brake systems use brake fluid under pressure to transmit pedal force from the master cylinder to the wheel cylinders or calipers. The fluid is incompressible, providing direct force transmission proportional to pedal application.

37. D — Inspect for hydraulic system leakage or master cylinder seal degradation systematically. A pedal that gradually returns to normal indicates fluid bypassing internal seals or leaking externally before pedal pressure can be maintained. Systematic inspection identifies whether the cause is external leakage or internal master cylinder seal failure.

38. B — Both Technician A and Technician B. Hydraulic brake fluid is hygroscopic, absorbing moisture from the atmosphere through brake hoses, reservoir vents, and seals over time. The absorbed moisture lowers the boiling point and accelerates corrosion, requiring periodic fluid replacement per manufacturer service intervals.

39. A — 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.

40. C — Flush the entire hydraulic brake system and refill with proper specification fluid. Moisture in hydraulic brake fluid lowers the boiling point dramatically and causes corrosion throughout the system. Complete system flush with new fluid is required because moisture cannot be selectively removed from the contaminated fluid.

41. C — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not produce hydraulic brake pedal sponginess. The other choices all describe direct causes of spongy pedal: air contamination, failed brake hose with internal damage, and worn master cylinder seal allowing internal bypass.

42. A — Bleed the wheel cylinders in sequence per manufacturer service information. Hydraulic brake bleeding follows a specific sequence (typically furthest from master cylinder first, then progressing closer) per manufacturer service information. The sequence ensures all air is purged from the system without re-introducing air at upstream components.

43. B — Air pressure with hydraulic pressure to actuate wheel cylinders during application. Air-over-hydraulic systems use compressed air to power a hydraulic actuator that develops fluid pressure in

the wheel cylinders. The combination provides the high force capability of air systems with the mechanical advantage of hydraulic actuation in medium-duty truck applications.

44. D — Verify air supply pressure, air-hydraulic actuator, and hydraulic system condition. Air-over-hydraulic system diagnosis requires verification of all three subsystems because weakness in any one reduces braking capacity. Systematic inspection identifies whether the fault is in air supply, actuator operation, or hydraulic system condition.

45. C — Restricted brake hose, contaminated lining, or seized caliper on the affected side. Brake pull during application indicates unequal braking force between the two sides, typically from one side delivering less force than the other. Restricted hoses, contaminated lining, or seized calipers all directly produce this asymmetric braking pattern.

46. A — Flush the entire hydraulic brake system and refill with proper specification fluid. Discoloration in the master cylinder reservoir indicates fluid contamination from moisture, debris, or chemical degradation. Complete system flush is required because contaminated fluid cannot be selectively replaced; the contamination has reached all system components.

47. B — 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 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.

48. D — Connect a scan tool to retrieve ABS fault codes and review 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.

49. C — 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.

50. B — A failed coolant temperature sensor reading falsely cold to the engine ECM. ECT sensor errors affect engine fuel mixture but do not cause brake pull during application. Restricted hoses, contaminated lining, and seized calipers all directly cause asymmetric braking force through their effect on hydraulic pressure or friction at the affected wheel.