PRACTICE EXAM 14: ASE A5 BRAKES SIMULATION

Total Questions: 45 **Recommended Time:** 75 minutes **Domain Distribution:** Domain A: 19 questions | Domain B: 5 questions | Domain C: 11 questions | Domain D: 10 questions

1. A vehicle with a tandem master cylinder has the secondary piston return spring fail — the spring collapses and no longer returns the secondary piston to its rest position. With the pedal fully released, the secondary piston remains slightly forward in the bore. Which of the following symptoms would MOST likely result?

A. The rear circuit loses all pressure — the secondary piston cannot build pressure without the return spring

B. The secondary circuit compensating port is blocked by the displaced piston — residual pressure builds in the rear circuit after each brake application, causing rear brake drag

C. The primary circuit is isolated from the secondary circuit — both pistons must move independently

D. The brake pedal becomes very hard — the collapsed spring removes the cushion between the driver's foot and the hydraulic resistance

2. A vehicle with front disc brakes has new brake pads installed. During the first few stops, the customer notices a slight burning smell and can see a faint haze of smoke from the front wheels. After approximately 10 stops the smell and smoke are gone. The brakes feel and perform normally. Which of the following BEST explains this finding?

A. The brake pad friction material is defective and is burning prematurely — replace the pads

B. The caliper pistons are not retracting — the continuous pad contact with the rotor is generating the burn smell

C. This is normal behavior during brake pad break-in — new brake pad binder resins burn off during initial heat cycles. The smell and light smoke represent the binder material curing and transferring a thin film to the rotor surface. After the break-in period the smell and smoke stop permanently

D. The rotor surface was not cleaned before pad installation — the rust preventive coating on the new rotors is burning off

3. A technician is testing the brake system on a vehicle that uses a push-type power brake booster (booster is between the firewall and master cylinder). The pedal feel is normal. The technician conducts a booster vacuum check by placing their hand gently against the brake pedal with the engine running and then shutting the engine off. The pedal slowly moves toward the floor after engine shutdown. Which of the following does this observation indicate?

A. The master cylinder cup seals are failing — the fluid is bypassing past the cups after engine shutdown reduces the assist

B. The booster check valve has failed — after engine shutdown, vacuum from the booster is escaping back into the intake manifold, and the atmospheric pressure differential is slowly applying force to the booster diaphragm, pushing the pedal inward

C. The brake caliper pistons are seizing — the pistons extend under sustained booster pressure after engine shutdown

D. Normal behavior — all boosters slowly equalize vacuum after engine shutdown and the pedal moves slightly

4. A vehicle has rear disc brakes with an integrated cable-actuated parking brake. The rear rotor has drum-in-hat style parking brake shoes inside the hat section. After replacing the rear rotors, the customer reports the parking brake holds on flat surfaces but barely holds on hills steeper than 10 percent grade. The service brake adjustment is correct. Which of the following is MOST likely the cause?

A. The new rear rotors have a slightly larger hat diameter — the increased diameter reduces the mechanical advantage of the parking brake shoes

B. The parking brake shoes inside the hat section have not been adjusted to the new rotor hat dimensions — the shoes need to be adjusted inward to contact the hat surface of the new rotors

C. The parking brake cable tension is incorrect — the cable was not adjusted after the rotor replacement

D. The new rotors have smoother hat interior surfaces — the smoother surface reduces parking brake shoe friction temporarily until the surfaces wear in

5. A vehicle with a hydraulic clutch and hydraulic brake system shares no fluid — the clutch has its own separate hydraulic system. The customer reports the brake pedal has become slightly spongy over the past week. A scan tool shows no ABS or brake system codes. A visual inspection finds no leaks. The technician pumps the pedal — it firms up after three pumps. Which of the following MOST likely explains the slowly developing spongy pedal?

A. Brake fluid has absorbed moisture from ambient air through the reservoir cap vent — over one week sufficient moisture was absorbed to alter fluid compressibility

B. A very small air leak into the brake system at a loose bleeder screw is allowing a tiny amount of air entry with each pump stroke

C. The front caliper piston seals are aging and beginning to allow very minor fluid bypass — the minor bypass allows a tiny amount of fluid past the seal and the resulting void becomes slightly compressible air

D. Normal hygroscopic fluid moisture absorption over a long service interval has finally reached a level where compressibility is noticeable under light braking

6. A vehicle with rear drum brakes has a wheel cylinder that was recently replaced. After the replacement and bleed, the customer returns the next day reporting the rear brakes on that side are dragging. The new wheel cylinder and its installation are confirmed correct. The brake shoe adjustment is within specification. Which of the following is MOST likely the cause?

A. The new wheel cylinder has a smaller bore than the original — the tighter bore prevents piston return

B. The rubber cup seals in the new wheel cylinder have not broken in yet — new seals have higher friction against the bore wall that will decrease as they wear in

C. The wheel cylinder boot was not installed correctly — the boot is folded and is preventing piston retraction

D. The brake shoe hold-down springs were not properly reinstalled after the wheel cylinder replacement — the loose shoes are being held against the drum by their own weight

7. A vehicle with a single-circuit master cylinder (old design) develops a front brake line leak. All braking is lost immediately. The driver pumps the pedal three times and regains slight braking. Which of the following BEST explains why pumping restored partial braking?

A. Pumping creates more pressure that overcomes the leak

B. Pumping with a single-circuit system allows the pedal stroke to push the residual fluid remaining in the circuit against the calipers before it leaks out — the very brief pressure spike applies slight braking force before the pressure again drops through the leak. Modern dual-circuit systems were developed specifically to prevent total brake loss from a single line failure

C. The fluid leak sealed itself temporarily from the pump action

D. Pumping activates a residual pressure valve that closes the leak

8. A vehicle with disc brakes all around has a caliper piston that extends properly during application but does not retract at all when the pedal is released. The caliper slides freely on its bracket. The flexible brake hose is confirmed to have no restriction. The piston dust boot is intact. Which of the following is MOST likely the cause?

A. The caliper piston seal has torn — without the seal's roll-back action the piston has no retraction force

B. The caliper piston is seized in the bore from corrosion — it extends under hydraulic pressure but cannot retract when hydraulic force is removed

C. The brake pad anti-rattle clip is too stiff — it is preventing the piston from returning to its retracted position

D. The master cylinder compensating port is blocked — residual pressure is holding the piston extended after pedal release

9. A vehicle's rear brake drums were found to be significantly overheated after an inspection following a customer complaint of rear brake drag. After measuring the drums, the technician finds both drums are 0.005 inch over the maximum allowable diameter. The drums were within specification at the previous service 12,000 miles ago. Which of the following BEST explains the rapid drum diameter growth?

A. The rear drums are made of a different metal alloy than specification — the softer alloy wears faster

B. The overheating that caused the drag also caused the drums to grow thermally beyond their maximum diameter during the drag event — extreme heat causes permanent thermal distortion of the drum, increasing its diameter irreversibly

C. The rear automatic adjusters advanced too far — they have been wearing the drum diameter from the inside since the last service

D. The rear brake shoes have an incorrect arc and have been cutting the drum diameter larger during normal use

10. A vehicle's brake system is being inspected and the technician finds the master cylinder reservoir cap vent hole is completely clogged. Which of the following symptoms would MOST likely result from a clogged reservoir cap vent?

A. Air will enter the hydraulic system through the clogged vent, causing a spongy pedal

B. A vacuum will develop in the reservoir as fluid is consumed during brake application — the vacuum will resist fluid flow into the hydraulic circuit and can cause brake application resistance or slow pedal return. Residual system pressure can also build if fluid cannot return to the reservoir after pedal release

C. Brake fluid will leak from the reservoir through the master cylinder bore seals due to pressure buildup

D. The ABS system will be unable to function — the ABS pump requires atmospheric reservoir pressure for proper priming

11. A vehicle with front disc brakes has a complaint of front brake pull that varies with outside temperature — the pull is toward the left on hot days but not on cold days. All hydraulic components have been confirmed equal pressure on both sides. Which of the following is MOST likely the cause?

A. The left front caliper piston seal material expands in heat, generating more force on hot days

B. The left front brake pad compound has a friction coefficient that is sensitive to temperature — at elevated ambient temperatures the pad's friction output increases relative to the right front, causing left pull during hot-weather braking

C. The left front rotor is warping from heat during hot weather

D. The left front flexible brake hose expands more in heat, reducing pressure delivery on hot days

12. A vehicle with rear drum brakes has a duo-servo configuration. The technician replacing the rear brake shoes installs both shoes with equal-length linings (the same shoe on both the primary and secondary positions). Which of the following symptoms will MOST likely result?

A. The brakes will not function — duo-servo systems require specific shoe designs to develop any force

B. The brakes will function normally — primary and secondary shoe lining lengths are interchangeable

C. The primary position shoe (with the longer lining designed for the secondary position) will generate excessive self-energizing force — the brakes will feel grabby and may pull. The secondary position shoe (with the shorter lining designed for the primary position) will wear faster than designed for its position

D. Uneven wear will develop — the incorrectly matched shoes will wear at different rates and the drums will develop taper wear corresponding to the incorrect shoe contact patterns

13. A vehicle with a wheel speed sensor DTC for right rear — signal amplitude low — has been diagnosed as having a cracked tone ring. The tone ring is integral to the rear axle flange and cannot be replaced independently. Which of the following represents the correct service action?

A. Adjust the wheel speed sensor to a closer air gap to compensate for the reduced signal from the cracked ring

B. Replace the rear axle shaft assembly — when the tone ring is an integral, non-serviceable part of the axle flange, the entire axle shaft must be replaced to restore correct wheel speed signal

C. Install a stand-alone aftermarket tone ring over the existing cracked ring using an adhesive bonding process

D. Replace the ABS control module with an updated unit that has higher signal sensitivity

14. A vehicle with ABS and ESC has a condition where the ESC activates briefly during every parking lot exit when the driver steers quickly from a parked position into the travel lane. The activation lasts less than one second. No DTCs are stored and the system returns to standby immediately. The vehicle was recently in a minor collision that was repaired without any suspension or steering component replacement. Which of the following is MOST likely the cause?

A. The ESC calibration was lost during the collision repair — the system requires recalibration

B. The steering angle sensor calibration was not performed after the collision repair — the SAS zero-point reference is incorrect. During the quick steering maneuver from a parked position, the incorrect SAS reference causes the module to calculate an incorrect intended path, triggering a brief unnecessary ESC intervention

C. The ESC system is too sensitive for parking lot low-speed maneuvers — a software update to raise the activation threshold is required

D. The lateral accelerometer was physically moved during the collision repair — its incorrect orientation is triggering false lateral acceleration readings during quick steering inputs

15. A vehicle with rear drum brakes has a parking brake that requires very high lever force to hold the vehicle on a grade despite correct cable tension and shoe adjustment. The parking brake shoes are within specification. Which of the following is MOST likely the cause?

A. The rear parking brake shoes have contaminated linings from long-term exposure to dust accumulation

B. The rear drums have glazed interior surfaces — glazed drum surfaces have reduced friction coefficient, requiring more shoe force to generate equivalent holding torque

C. The parking brake cable is routed correctly but has internal strand fraying — the frayed strands increase cable friction within the conduit, requiring more lever effort to move the cable the necessary distance

D. The parking brake shoe return springs are too strong — excessive spring tension requires more cable force to overcome

16. A vehicle with a four-channel ABS system develops a DTC indicating the left front outlet solenoid valve circuit is shorted to ground. The ABS warning light is on. The left front inlet valve circuit tests normal. Which of the following BEST describes the impact on vehicle braking?

A. The left front caliper loses all braking capability — the shorted solenoid valve opens continuously, preventing pressure from building in the left front circuit

B. ABS modulation is disabled at all four wheels — conventional braking at all four wheels is preserved through the default-open inlet valves

C. The left front outlet valve is held permanently open — this vents left front caliper pressure to the accumulator continuously, eliminating left front braking. ABS is disabled at all wheels

D. Only left front ABS modulation is disabled — all other wheels retain full ABS, and conventional braking at all four wheels is preserved

17. A vehicle with front disc brakes has a right front rotor that shows consistent blue discoloration in a band around the rotor approximately 1 inch wide near the outer edge of the friction surface. The inner portion of the friction surface is normal. The brake pads show even wear across their full face. Which of the following MOST likely explains this localized discoloration pattern?

A. The right front caliper is applying more force at the outer edge of the pad

B. The right front rotor has a metallurgical defect in the outer band — the softer outer zone overheats more than the inner zone

C. The right front brake pad is narrower than specified — only the outer portion of the rotor friction surface receives pad contact, concentrating heat in the pad contact band

D. The right front caliper is misaligned on its bracket — the caliper is shifted outward, positioning the pad contact zone toward the outer rotor edge

18. A technician is servicing a vehicle with an electronic stability control system that uses a four-sensor, four-channel ABS architecture. During the ESC module replacement, the technician accidentally damages the CAN bus wiring at the module connector. After repair of the damaged wiring, the ESC module is replaced and the system is powered on. The ESC warning light is on and the scan tool shows a DTC for CAN network communication error. Which of the following should the technician do NEXT?

A. Replace the replacement ESC module — the new module is incompatible with the vehicle's CAN network

B. Perform an ESC module initialization and calibration procedure — all new ESC modules require calibration before they can communicate on the CAN network

C. Inspect the repaired CAN bus wiring for correct termination resistance and proper continuity — a CAN network communication DTC after a wiring repair indicates the repair may not be complete or a termination issue exists

D. Replace the ABS module — the ABS module is the CAN network master and a failure there would appear as an ESC communication fault

19. A vehicle with four disc brakes has been diagnosed with a left rear caliper piston that is seized — the piston will not retract after the pedal is released. Before caliper replacement, the technician recommends also replacing the left rear flexible brake hose. The customer asks why the hose needs replacement when the caliper is the failed component. Which of the following is the BEST explanation?

A. Flexible brake hoses must always be replaced in axle pairs — replacing one side requires replacing both

B. A seized caliper piston generates significantly elevated heat from continuous rotor drag. This sustained heat is conducted through the caliper body and into the flexible brake hose connected to it — the heat degrades the hose's internal rubber liner. Additionally, a caliper that has been seized may have been subjected to high residual pressure, which can accelerate hose liner deterioration. Replacing the hose simultaneously ensures the new caliper is not compromised by a degraded hose

C. Flexible brake hoses have a fixed service life that coincides with caliper replacement intervals — both components should be replaced together regardless of condition

D. Replacing the hose simultaneously eliminates one potential variable if post-service bleeding is needed

20. A vehicle's master cylinder has a small crack in the reservoir body — not in the pressure bore. Brake fluid is weeping from the reservoir at the crack during brake applications. The technician considers epoxy repair of the reservoir crack. Which of the following represents the correct recommendation?

A. Epoxy repair is acceptable for reservoir cracks — the reservoir is not a pressure-bearing component during operation

B. Replace the master cylinder — any fluid weep from the master cylinder assembly, including the reservoir, is unacceptable. The reservoir crack will worsen from thermal cycling and pressure variation. Epoxy repair of brake system hydraulic components is not an approved repair method

C. Repair the reservoir with epoxy and monitor — if the repair holds for 1,000 miles, it is structurally adequate

D. Apply brake system hose repair tape to the reservoir crack — the tape is rated for brake system pressures

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21. A vehicle with ABS has a condition where the ABS warning light comes on exactly 2 minutes after the vehicle starts moving from cold, then extinguishes after the vehicle has been driven for 10 minutes. No DTCs are stored when the light extinguishes. This happens on every cold start. Which of the following MOST likely explains this specific pattern?

A. The ABS module requires a 2-minute warm-up period before it can process wheel speed signals correctly — during warm-up the light is on as a notification

B. A wheel speed sensor with a connector that develops marginal resistance when cold generates an out-of-specification signal for the first 2 minutes until the connector warms and its resistance decreases. After 10 minutes the sensor and connector are at operating temperature, the resistance normalizes, the DTC self-clears as a soft code, and the light extinguishes

C. The ABS pump motor requires exactly 2 minutes to reach operating temperature before correct function — the light notifies the driver that ABS is warming up

D. The vehicle's battery has insufficient cold-cranking capacity — the voltage drop during cold start triggers the ABS warning light until the battery recharges during driving

22. A vehicle with rear drum brakes and a mechanical parking brake has a condition where the parking brake will not release on the left rear — the cable is slack but the left rear shoe remains against the drum. The right rear releases normally. Which of the following is MOST likely the cause?

A. The left rear parking brake cable is seized — the slack indicates the cable has broken rather than released

B. The left rear parking brake return spring inside the drum has broken — without the return spring, the shoe remains in the applied position even after the cable releases. The parking brake actuating lever stays in the applied position because nothing pulls the shoe (and therefore the lever) back to the released position

C. The left rear wheel cylinder is holding pressure — hydraulic force is keeping the shoe applied after the cable releases

D. The left rear brake shoe lining is stuck to the drum surface — the shoe is bonded to the drum and the return spring cannot overcome the adhesion

23. A vehicle with ABS is undergoing a brake bleed that includes scan tool solenoid actuation. During the actuation procedure, the scan tool commands the front left outlet solenoid to open. Which of the following should the technician observe at the left front bleeder screw during this command?

A. A burst of fluid should flow from the left front bleeder screw — the open outlet valve routes fluid from the HCU accumulator out through the bleeder

B. The left front bleeder screw should show increased fluid flow — the outlet valve opening increases pressure delivery to the left front circuit, driving more fluid through the open bleeder

C. No change at the left front bleeder — the outlet solenoid connects the caliper circuit to the HCU accumulator, not to the bleeder path

D. The bleeder flow should stop — the outlet valve opening equalizes circuit pressure and stops forced flow through the bleeder

24. A vehicle with front disc and rear drum brakes has a combination valve. After replacing the front brake pads and bleeding only the front circuit, the red brake warning light comes on. The parking brake is released and the fluid level is correct. Before bleeding, the light was off. Which of the following is the MOST likely cause?

A. The new front brake pads have generated sufficient pressure during the first application to trigger the pressure differential valve

B. During the front circuit bleed, the front circuit was briefly at lower pressure than the rear circuit — the pressure differential displaced the valve spool toward the front circuit and into contact with the warning switch. The spool may not have recentered after the bleed was completed

C. Air introduced during the front circuit bleed has entered the combination valve and triggered the warning switch

D. The new front brake pads require break-in pressure that exceeds the differential valve's trigger threshold

25. A vehicle with all-wheel drive, ABS, and TCS has an intermittent condition where TCS activates during straight-line dry highway acceleration above 60 mph. The TCS warning light flashes during each event. No DTCs are stored. The tires are all the same brand, size, and wear level. Which of the following is MOST likely the cause?

A. The AWD transfer case is distributing unequal torque between axles — one axle receives more torque than it can use and TCS corrects the resulting wheelspin

B. The front-to-rear tire rolling circumference difference from normal weight transfer during acceleration creates a brief speed differential that crosses the TCS activation threshold at higher speeds where even small circumference differences produce significant speed deltas

C. A wheel speed sensor has a tone ring with a minor imperfection — at highway speeds the rotation frequency is high enough that the signal irregularity crosses the TCS threshold and triggers a false intervention

D. The TCS system is incorrectly calibrated for AWD operation — it is applying single-axle wheelspin thresholds to a four-wheel-drive system

26. A vehicle's parking brake light stays on after an electric parking brake application and release cycle. The EPB releases fully — both rear rotors spin freely. The EPB warning light is not on — only the red parking brake indicator light is on. No EPB system DTCs are stored. Which of the following is MOST likely the cause?

A. The EPB electronic actuator has failed to confirm release to the body control module — the BCM is illuminating the indicator light as a precaution

B. The red parking brake indicator light is controlled by a separate mechanical switch at the parking brake lever or EPB button — the switch contact is stuck in the closed position and illuminating the indicator light independently of the EPB actuator position sensor

C. The EPB caliper piston position sensor has failed — it cannot confirm piston retraction and the system defaults to illuminating the warning light

D. The brake fluid level is low — the EPB release caused sufficient fluid movement to drop the reservoir level and activate the float switch, which shares the parking brake warning light circuit

27. A vehicle is brought in with a complaint that the brakes are "grabbing" — the vehicle decelerates very suddenly at initial brake application before releasing to normal braking feel. The customer describes it as if someone bumped the car from behind on every stop. Brake fluid level, pad thickness, and rotor condition are all normal. Both front calipers are confirmed to slide freely. Which of the following MOST likely explains the grabbing sensation?

A. Air in the hydraulic system releases suddenly at initial pedal application, causing a pressure spike

B. The master cylinder primary cup seal is inverting at the start of each stroke — the initial inversion creates a sudden pressure spike before the seal resumes normal function

C. Brake pad deposits (hot spots) on the rotor surfaces from a previous overheating event — the transferred pad material on the rotor creates periodic high-friction contact patches that grab at initial application before the rotor rotates past them and normal friction resumes

D. The metering valve is releasing front disc brake pressure in a single spike rather than gradually

28. A vehicle with rear drum brakes is being inspected after 90,000 miles. The rear brake drums are within maximum diameter. The rear brake shoes have 3mm of remaining lining — above the 2mm minimum. The wheel cylinders have no visible seepage and the boots are intact. The return springs appear intact. Which of the following represents the most complete professional service recommendation?

A. No service needed — all components are within specification

B. Replace only the rear brake shoes — the lining is approaching minimum

C. Replace the rear brake shoes, inspect and replace the wheel cylinders (90,000 miles of service with moisture-laden fluid has compromised the cup seals), and replace all rear brake hardware (return springs and hold-down hardware) — springs lose tension over long service intervals and will not reliably retract new thicker shoes. Complete hardware replacement at shoe replacement maximizes service life of the new friction components

D. Replace the rear drums and shoes — 90,000 miles of drum service warrants complete drum and shoe replacement regardless of measurement

29. A vehicle with disc brakes all around has a complaint of a squeal that occurs during moderate braking from 30 mph to 10 mph — specifically in this speed range. The squeal does not occur during hard stops or gentle stops. All four sets of pads are above minimum thickness. Which of the following MOST likely explains the speed-specific squeal?

A. The brake pad compound resonates at the specific pressure and velocity combination that occurs during moderate braking in this speed range — the squeal is a brake noise frequency that happens to match the pad/rotor/caliper assembly's resonant frequency at that specific operating condition

B. The ABS system is activating during moderate braking in this speed range and the solenoid cycling creates the squeal

C. The metering valve is cycling between open and closed during this speed range, creating a pressure oscillation that produces squeal

D. The wheel speed sensors are interfering with the brake application in this speed range — the sensor signals create a feedback loop that modulates caliper pressure

30. A technician is replacing a front brake caliper on a vehicle. After installing the new caliper and pad assembly, the technician attempts to bleed the front circuit. Despite five bleed passes, the pedal remains spongy. The right front bleeder produces clean fluid. Which of the following is MOST likely the cause?

A. Air is entering the new caliper through a manufacturing defect in the casting

B. The right front flexible hose was not replaced — its deteriorated inner liner is introducing air during the bleed

C. The new left front caliper was installed without filling it with brake fluid first — a dry caliper has a large air void that five bleed passes cannot fully purge. The caliper should be pre-filled with brake fluid before installation

D. The left front bleeder screw is at the bottom of the caliper on this vehicle — air rises to the top of the caliper and cannot be bled through a bottom bleeder screw

31. A vehicle with ABS has a wheel speed sensor DTC for the right rear indicating erratic signal. Upon inspection, the technician finds the right rear tone ring has a section of metallic debris — brake pad backing plate material — embedded between several adjacent teeth. Which of the following is the correct service action?

A. Clean the tone ring teeth of the embedded debris and verify the debris has not damaged the tone ring or sensor tip. Confirm accurate signal with scan tool live data before clearing the DTC

B. Replace the ABS module — metallic debris in the tone ring area has corrupted the module's wheel speed calibration for the right rear

C. Replace the wheel speed sensor — any metallic debris contact with the sensor tip requires sensor replacement

D. Replace the rear axle — the debris originated from the drum brake shoe backing plate and indicates the wheel bearing is collapsing, which must be addressed before returning to service

32. A vehicle develops a brake fluid leak at a four-port junction block where multiple rigid brake lines connect. Two of the four connections are seeping. The fittings are correctly flared and properly torqued. Which of the following is MOST likely the cause?

A. The junction block material has corroded — the internal corrosion is creating void spaces that allow fluid to seep past the fittings

B. The junction block fitting seats have been damaged from previous overtightening — the deformed seats cannot form a proper fluid seal with the correctly flared line fittings. The block must be replaced

C. The brake fluid has become contaminated — contaminated fluid corrodes the fitting seats and creates leak paths

D. The junction block has been installed with the wrong orientation — two of the four ports are under higher pressure from the hydraulic circuit routing

33. A vehicle equipped with hill start assist (HSA) has a condition where the HSA activates on level ground — the brakes hold briefly after the pedal is released even when the vehicle is on a flat surface. No DTCs are stored. Which of the following is MOST likely the cause?

A. The inclinometer or grade sensor has failed in a position that reads a constant positive incline — the HSA activates at every stop because it believes the vehicle is always on an incline

B. The brake pressure sensor has failed — HSA is applying brakes from the last stored pressure value

C. The HSA system requires calibration after a battery disconnect event — the level ground activation will resolve after the first hill cycle

D. The wheel speed sensors are reading incorrectly at very low speeds — HSA misinterprets the signal as vehicle rollback on every stop

34. A vehicle with ESC is being evaluated after the customer reports the ESC warning light illuminates only when driving on rough roads. The light extinguishes immediately when the road surface becomes smooth. No DTCs are stored. All sensor wiring appears intact. Which of the following is MOST likely the cause?

A. The yaw rate sensor is vibration-sensitive — rough road vibrations create false yaw readings that trigger the warning light

B. The ESC module has a loose mounting bracket — road vibration causes the module to move slightly, intermittently disrupting its internal connections. The light extinguishes when vibration stops

C. A wheel speed sensor connector has a marginally loose terminal — rough road vibration causes brief signal interruptions that the module detects as a fault. Smooth road operation eliminates the vibration-induced intermittent. The soft fault clears without storing a DTC because the signal normalizes before the module completes its fault confirmation cycle

D. The vehicle's suspension is too stiff — the direct transmission of road vibration to the chassis triggers the ESC system's vibration detection circuit

35. A vehicle with rear disc brakes and EPB has the EPB caliper replaced. After installation, the technician enters the EPB service mode, installs the brake pads, and attempts to exit service mode — but the scan tool fails to complete the EPB initialization sequence. The motor runs briefly and then the initialization fails with an error. Which of the following should be checked FIRST?

A. Replace the new EPB caliper — a new caliper that fails initialization has a manufacturing defect

B. Verify the scan tool software is current and the correct vehicle selection was made — an incorrect vehicle selection or outdated software may use an incompatible initialization sequence for this specific caliper design

C. Check the battery voltage — EPB motor initialization requires adequate voltage to complete the full piston travel. Low battery voltage during initialization causes the motor to stall before completing the sequence

D. Replace the EPB module — initialization failure on a new caliper indicates the module cannot communicate with the new caliper's position sensor

36. A vehicle with front disc brakes has a condition where the right front caliper applies normally but releases very slowly — the vehicle noticeably decelerates when the pedal is released at highway speed as if the right front brake is briefly remaining applied. The right front rotor is hotter than the left after a short drive. Which of the following is MOST likely the cause?

A. The right front caliper piston seal has lost its elasticity — the seal no longer rolls back to retract the piston after pedal release, causing delayed release

B. The right front caliper is incorrectly sized — the larger piston needs more fluid return volume and takes longer to retract

C. The right front flexible hose has a partial internal restriction in the return direction — application pressure passes freely inward but return flow is restricted, delaying caliper piston retraction after pedal release

D. The right front brake pad has an anti-squeal shim that is too thick — the shim prevents piston retraction

37. A vehicle with ABS has a DTC for the ABS module internal voltage reference fault. Battery voltage is confirmed correct at 12.6 volts with the engine running. The ABS module fuse and wiring are confirmed intact. Which of the following is MOST likely the cause?

A. Battery voltage is too low — 12.6 volts is below the ABS module's minimum operating voltage of 13.5 volts

B. The ABS module has an internal voltage regulator fault — the module is not correctly regulating the internal reference voltage it uses for sensor power supply and internal calculations. Module replacement is required

C. The wheel speed sensor resistance values are outside specification — the incorrect sensor load is disrupting the module's internal voltage reference

D. The ABS pump motor is drawing excessive current — the current draw is reducing module supply voltage below its internal reference threshold

38. A vehicle has a brake pedal that feels excessively soft and easy to compress — the pedal requires very little force to achieve firm braking. No warning lights and no spongy feel. Stopping distances are normal. Which of the following MOST likely explains the very easy pedal?

A. The master cylinder bore is oversized — more pressure is being generated per pound of input force

B. The vacuum booster is providing excessive assist — the pedal requires very little driver input force because the booster is amplifying pedal force beyond the designed ratio. A booster control valve fault can cause this over-assist condition

C. The brake pads have a higher-than-specified friction coefficient — less pressure is needed to generate adequate clamping force

D. Air in the system is reducing the pressure ratio between pedal force and hydraulic output

39. A vehicle with drum rear brakes has a condition where the right rear drum becomes extremely hot after a highway drive despite the driver reporting light, infrequent braking. The left rear drum

is at ambient temperature. The right rear wheel cylinder and brake shoes are within specification and the adjuster is correctly set. Which of the following is MOST likely the cause?

A. The right rear wheel cylinder is applying slight hydraulic pressure continuously from a plugged master cylinder compensating port

B. The right rear parking brake cable has stretched and is holding the right rear shoe in constant light contact with the drum

C. The right rear drum has a lower thermal mass than normal — a slightly thinner casting heats more rapidly from the same braking event

D. The right rear automatic adjuster is too tight — it is holding the shoe in contact with the drum regardless of braking input

40. A vehicle with ABS, TCS, and ESC has a DTC for the vehicle speed sensor — the vehicle speed sensor reads 0 mph at all times. Wheel speed sensors at all four wheels are reading correctly. The speedometer is inoperative. Which of the following BEST describes the impact of a failed VSS on brake system active safety functions?

A. ABS is disabled — ABS requires vehicle speed input to calculate deceleration rates

B. TCS and ESC both lose their primary speed reference — both systems will be disabled or operate in a degraded mode since their calculations depend on vehicle speed as a reference for determining acceptable wheel speed differentials

C. No impact on ABS, TCS, or ESC — all three systems use individual wheel speed sensors rather than the vehicle speed sensor for their calculations

D. Only the speedometer is affected — brake system functions are completely independent of the vehicle speed sensor

41. A technician is performing a brake inspection on a commercial van used for delivery service. The vehicle has 75,000 miles and is driven 200 miles per day in urban stop-and-go delivery routes. The front pads are at 2mm — at minimum. The rear shoes are at 5mm. Which of the following is the MOST accurate service recommendation?

A. Replace front pads only — the rear shoes have adequate remaining life

B. Replace front pads and schedule rear shoes at the next service — rear shoes are at approximately 50% life

C. Replace all four sets of brake pads and shoes simultaneously — commercial vehicles require complete brake axle replacement regardless of measurement

D. Replace the front pads immediately — they are at minimum and require immediate service. Given the 200-mile-per-day urban route (extremely high brake usage), schedule rear shoe replacement within the next 15,000 miles and advise the customer that at this usage rate, all brake components will need more frequent inspection and replacement than typical passenger vehicle intervals

42. A vehicle with a power assist brake booster and master cylinder assembly is being road tested after replacement. During the test, the technician notices the brake pedal has adequate feel but the vehicle requires noticeably more pedal effort than before the repair. The booster vacuum is confirmed at 20 in-Hg. Which of the following should the technician check NEXT?

A. The brake fluid condition — degraded fluid increases pedal effort

B. The pushrod adjustment — if the new booster has a pushrod that is shorter than the original, the mechanical advantage between the booster output and master cylinder piston is reduced. The pushrod must be adjusted to the correct length to restore designed assist ratio

C. The brake pad friction coefficient — lower-friction replacement pads require more pressure and therefore more pedal force

D. The master cylinder bore diameter — an undersized bore requires more pedal strokes to build adequate pressure

43. A vehicle with ESC is involved in a low-speed parking lot collision with a concrete barrier. After the collision, the ESC warning light is on and the vehicle vibrates during straight-line driving. A scan tool shows the ESC module has a DTC for wheel speed sensor correlation fault — the four wheel speeds do not correlate correctly to vehicle motion. Which of the following MOST likely explains both the vibration and the DTC?

A. The collision impact damaged the ESC module — the module is generating false wheel speed data

B. The collision bent a front wheel or suspension component — a bent wheel rotates with runout, creating a periodic speed sensor signal variation (the bent wheel's apparent speed oscillates above and below actual vehicle speed as it rotates). This oscillating signal causes the wheel speed correlation fault. The bent wheel also creates the vibration during straight-line driving

C. The collision damaged the ABS pump motor — pump operation during ESC self-test is generating the vibration

D. The concrete barrier contact contaminated the front wheel speed sensor with debris — the signal variation is from debris passing the sensor face

44. A vehicle with rear drum brakes has a condition where the left rear brake produces a rhythmic, low-frequency grinding that occurs at exactly the rate of wheel rotation during light braking. Under harder braking, the grinding frequency does not change but the intensity increases. No pulling accompanies the grinding. Which of the following MOST likely explains this condition?

A. The left rear wheel cylinder is applying intermittent hydraulic pressure pulses at wheel rotation frequency

B. The left rear drum has a localized high spot — a raised area around one section of the friction surface contacts the brake shoe with more force than the rest of the drum during each revolution, creating the rhythmic grinding at wheel rotation frequency

C. A piece of road debris (stone or metal) has become embedded between the brake shoe lining and the drum and is grinding one revolution per wheel rotation

D. The left rear automatic adjuster has partially advanced and is contacting the drum on one side only

45. A technician has completed all repairs on a vehicle and is preparing to return it to the customer. The technician considers what final information the customer should receive about the brake system service performed. Which of the following represents the MOST complete and professional final customer communication?

A. Tell the customer the brakes are fixed and have them sign the repair order

B. Explain specifically what was repaired or replaced and why, describe what the brakes should feel like now versus before the repair, advise the customer to return immediately if they experience any unusual brake feel, noise, warning lights, or pulling, explain when the next brake service should be scheduled based on observed wear rates, and ensure the customer has the repair documentation for their records

C. Provide a written warranty card for the parts replaced and instruct the customer to return only if the warning light comes on

D. Explain what was repaired and advise the customer to have the brakes reinspected in 500 miles to verify the repair

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PRACTICE EXAM 14: ANSWER KEY AND EXPLANATIONS

1. B. Compensating port blocked by displaced secondary piston — residual pressure causes rear drag — The secondary piston's return spring positions the piston at its correct rest position — with the compensating port open to the reservoir. When the spring fails, the piston remains slightly forward, blocking the rear circuit compensating port. After each brake application, fluid cannot return from the rear circuit to the reservoir — residual pressure is trapped and slowly dissipates, holding the rear brakes slightly applied and causing drag.

2. C. Normal break-in burn-off of pad binder resins — New brake pad friction compounds contain binder resins that hold the friction material together. During initial heat cycles, these resins outgas and cure — producing a brief burning smell and light smoke. The bedding process also transfers a thin layer of friction material to the rotor surface, optimizing the pad-to-rotor interface. Once the initial heat cycles are complete, the smell and smoke stop permanently. This is an expected and desirable break-in characteristic, not a defect.

3. B. Booster check valve failed — vacuum escaping to intake manifold after shutdown causes pedal drift — A booster check valve that fails allows the vacuum stored in the booster front chamber to bleed back into the intake manifold after engine shutdown. As the stored vacuum escapes, the pressure differential across the diaphragm gradually decreases — the atmospheric pressure in the rear chamber is no longer balanced by vacuum in the front chamber. The resulting unbalanced force slowly pushes the diaphragm and output rod forward, moving the brake pedal inward.

4. B. Drum-in-hat shoes need adjustment to new rotor hat dimensions — When rear rotors with drum-in-hat parking brake shoes are replaced, the parking brake shoes retain their previous adjustment — which was set to the worn rotor hat's interior. New rotors may have a slightly different effective interior diameter even at the same nominal specification. The parking brake shoe star wheel adjuster must be advanced to bring the shoes into proper contact with the new hat interior. Without this adjustment, the shoes have excessive clearance and cannot generate adequate holding force.

5. B. Very small air leak at loose bleeder screw — A spongy pedal developing over one week that firms up after pumping is characteristic of a very slow air entry into the system. A bleeder screw that is not fully closed allows a tiny amount of air to enter with each pressure release cycle — the air accumulates slowly over days until it is noticeable as sponginess. Each pump stroke temporarily consolidates the air and restores firm feel, but the air returns between applications. Finding and fully tightening the loose bleeder eliminates the progressive sponginess.

6. C. Wheel cylinder boot folded during installation — preventing piston retraction — A dust boot that was not properly seated during installation can be pinched or folded against the piston or

bore edge. The folded boot creates mechanical interference that prevents the piston from retracting fully after each application. With the wheel cylinder itself confirmed correct and properly installed, the boot installation detail is the remaining variable. Removing the boot and reinstalling it correctly resolves the drag.

7. B. Pumping pushes residual fluid against calipers in brief pressure spikes — A single-circuit master cylinder with a line leak loses all fluid and pressure immediately. Pumping the pedal repeatedly can briefly build hydraulic pressure from whatever small amount of remaining fluid is in the circuit before that fluid also escapes through the leak. Each pump stroke generates a brief, diminishing pressure spike that provides a small amount of braking force before the pressure drops through the leak. This was the real-world limitation of single-circuit systems and the exact reason dual-circuit systems became mandatory.

8. A. Caliper piston seal torn — no roll-back action for retraction force — The caliper piston seal serves two functions: sealing hydraulic pressure and providing retraction force. The seal is installed in a machined groove in the caliper bore. When hydraulic pressure applies the piston outward, the seal distorts slightly in the groove — it rolls in the direction of piston travel. When pressure is released, the elastic seal rolls back to its undistorted position, pulling the piston inward slightly. A torn seal seals adequately for brake application under pressure, but cannot roll back — the piston has no retraction force and remains extended.

9. B. Overheating caused permanent thermal distortion expanding drum diameter — Cast iron brake drums can undergo permanent thermal distortion when subjected to extreme overheating from sustained dragging. The severe heat changes the metallurgical structure of the iron — the drum permanently expands in diameter. This is not normal gradual wear — a 0.005-inch diameter increase in 12,000 miles from wear alone would require extremely aggressive conditions. The correlation between the overheating event (caused by the drag) and the drum size increase confirms thermal distortion as the cause.

10. B. Vacuum develops in reservoir — resists fluid flow into circuit and can prevent compensating port return — The master cylinder reservoir is designed to be at atmospheric pressure through its vent — fluid flows freely in and out as braking demands change. A clogged vent creates a sealed reservoir. As fluid is drawn into the hydraulic circuit during brake application, the reservoir volume increases and a vacuum develops inside the closed reservoir. This vacuum resists the next fluid demand, increasing pedal effort. On release, the vacuum can also resist fluid return through the compensating port, retaining residual pressure in the circuit.

11. B. Left front pad friction coefficient temperature-sensitive — friction increases at elevated ambient temperature — Brake pad friction coefficients are not constant — they vary with temperature. Some pad compounds exhibit significantly higher friction at elevated temperatures than at cold temperatures. If the left front pad has a compound with a steeper temperature-friction curve than the right front, the friction imbalance between sides increases as

ambient temperature rises — producing more left-side braking force relative to the right on hot days and a resulting left brake pull that disappears in cold weather.

12. D. Uneven wear develops from incorrectly matched shoe positions — Installing identical lining lengths in both primary and secondary positions of a duo-servo brake places the wrong shoe geometry in each role. In a duo-servo design, the primary shoe (shorter lining, first position) and secondary shoe (longer lining, second position) are specifically designed for their respective positions. The mismatched shoe in the secondary position receives more braking load than its shorter lining can handle evenly, while the mismatched shoe in the primary position underperforms for its load. Uneven, disproportionate wear develops at both positions.

13. B. Replace the rear axle shaft assembly — When a tone ring is an integral, non-separable part of the axle flange — pressed, machined, or cast into the flange — it cannot be serviced independently. The entire axle shaft assembly that carries the integral tone ring must be replaced to restore correct wheel speed signal generation. This is a significant repair that customers should be made aware of when purchasing vehicles — integrated tone rings eliminate the option of inexpensive ring replacement.

14. B. SAS zero-point calibration not performed after collision repair — After a collision repair that involved steering or suspension work, the steering angle sensor zero-point calibration is required to re-establish the correct straight-ahead reference. Without calibration, the SAS reports an offset from the true straight-ahead position — making a quick steering maneuver from stationary appear to the ESC module as a more extreme turning event than it actually is. The module calculates instability and briefly intervenes. SAS calibration after the repair resolves the false activation.

15. B. Glazed drum interior surfaces — reduced friction requires more holding force — Brake drum interior surfaces can become glazed from sustained light contact (such as from a slightly misadjusted parking brake), from overheating, or from lack of use. A glazed drum surface has a polished, low-friction character that requires more shoe force to generate adequate braking torque. The parking brake must be applied with more lever force to push the shoes against the low-friction drum surface with enough force to prevent vehicle rolling. Resurfacing or replacing the drums restores normal surface friction.

16. B. ABS modulation disabled at all four wheels — conventional braking fully preserved — A short-to-ground fault in any ABS solenoid valve circuit causes the ABS module to disable all ABS modulation function as a safety measure. The module cannot risk attempting partial ABS modulation with one solenoid valve in an indeterminate state. All ABS function is suspended, both warning lights may illuminate, and TCS that uses the same solenoid valves is also disabled. Conventional hydraulic braking through the default-open inlet valves is completely unaffected.

17. D. Caliper misaligned outward — pad contact zone shifted toward outer rotor edge — When a floating caliper is mounted with a slight outward offset from its designed position — from

an incorrect bracket or incorrect installation — the brake pad contact zone shifts toward the outer edge of the rotor friction surface. The concentrated contact at the outer edge generates higher local heat in that band compared to the inner friction surface that receives minimal contact. The localized heat creates the blue discoloration band at the outer edge while the inner surface remains at normal temperature.

18. C. Inspect repaired CAN bus wiring for correct termination resistance and proper continuity — A CAN network communication DTC after a wiring repair indicates the repair itself may be incomplete or incorrect. CAN bus wiring requires specific termination resistors at each end of the bus and correct differential signal pair routing. A repaired section that has incorrect splicing, incorrect termination, or a remaining open circuit will produce CAN communication errors even with a correctly functioning new module. The wiring repair must be fully verified before module compatibility is assumed to be the issue.

19. B. Seized caliper heat conduct into flexible hose — simultaneous replacement ensures new caliper is not compromised — A caliper that has been continuously dragging from a seized piston generates sustained elevated temperatures. This heat conducts through the rigid caliper body and into the flexible brake hose connected to it. The internal rubber liner of the flexible hose is rated for normal operating temperatures — sustained abnormal heat from a dragging caliper degrades the liner. A degraded liner can detach internally, creating a one-way restriction that would cause the new caliper to drag. Replacing both simultaneously eliminates this risk.

20. B. Replace the master cylinder — no field repair of brake hydraulic components is acceptable — The master cylinder reservoir, while not a high-pressure component, is still an integral part of the brake system that contains brake fluid under cycling vacuum and pressure conditions. A crack that is weeping fluid will propagate from thermal cycling, vibration, and pressure variation. Epoxy is not an approved repair method for any brake system hydraulic component. Any seeping or leaking master cylinder must be replaced — the risk of progressive failure is unacceptable.

21. B. Cold-sensitive connector developing marginal resistance — normalizes as connector warms — A wheel speed sensor connector with a terminal that develops elevated resistance when cold (from corrosion, deformed terminal contact, or moisture within the connector) generates a sensor signal that is below specification during the cold period. The ABS module detects the out-of-specification signal and illuminates the warning light. As the vehicle warms over 10 minutes, the connector reaches operating temperature and the resistance normalizes — the signal returns to specification, the soft DTC self-clears, and the light extinguishes. The cycle repeats on every cold start.

22. B. Left rear parking brake return spring broken — A parking brake that will not release mechanically despite a slack cable (meaning the cable itself is releasing correctly) indicates the mechanical return spring inside the drum assembly has failed. The return spring pulls the parking brake actuating lever back to its released position after the cable releases tension. Without the

return spring, the lever stays wherever the cable last positioned it — in the applied position. The shoe remains against the drum because nothing is pulling the lever (and therefore the shoe) back.

23. C. No change at the left front bleeder — outlet solenoid routes to HCU accumulator, not to bleeder path — The outlet solenoid valve connects the wheel circuit (caliper side) to the ABS HCU internal accumulator — not to the bleeder screw or the external bleed path. The bleeder screw connects the caliper to the outside atmosphere. These are separate internal HCU pathways. Commanding the outlet solenoid open during a scan tool solenoid actuation procedure cycles fluid between the caliper circuit and the internal accumulator — this is invisible at the bleeder screw. The solenoid actuation procedure purges air from the HCU internal passages, which then flows out during subsequent wheel bleeder passes.

24. B. Front circuit briefly at lower pressure during bleed — pressure differential valve spool displaced toward front circuit — During sequential bleeding where only the front circuit is bled, the front circuit is periodically at lower pressure than the unbled rear circuit — especially when the bleeder is open and pressure is near atmospheric at the front. This front-low pressure imbalance displaces the pressure differential valve spool toward the front circuit. If the spool contacts the warning switch and is not recentered after the bleed, the light remains on. Applying firm pedal pressure to equalize both circuits after completing the bleed recenters the spool.

25. C. Wheel speed sensor tone ring imperfection — at highway speeds, signal irregularity crosses TCS threshold — At low speeds, a minor tone ring imperfection creates a small speed reading error that is below the TCS activation threshold. At highway speeds, the wheel rotates much faster — the same physical imperfection creates the same relative speed variation, but at high rotation rates this variation represents a larger absolute speed differential per unit time. The larger speed delta at highway speed crosses the TCS activation threshold that was not reached at lower speeds.

26. B. Separate mechanical switch for parking brake indicator stuck in closed position — On many vehicles, the red parking brake indicator light is controlled by a dedicated mechanical switch that is separate from the EPB actuator position sensor circuit. The EPB electronic system has its own warning lamp for EPB faults (EPB warning light). The red parking brake indicator light switch — typically a simple mechanical contact switch at the parking brake button or lever — can stick in the closed position independently of the EPB actuator's electronic confirmation of release.

27. C. Brake pad deposits (hot spots) on rotor from previous overheating — When brake pads are held firmly against a rotor that is exceptionally hot — from a hard stop or prolonged braking — the pad material transfers to the rotor surface in concentrated patches rather than as a thin even film. These patches create localized high-friction zones on the rotor. At every subsequent brake application, the pads engage these high-friction deposits momentarily before the rotor rotates past them — creating the grab-and-release pattern the customer describes as being "bumped from behind" on each stop.

28. C. Replace shoes, replace wheel cylinders, replace all return springs and hold-down hardware — At 90,000 miles, the wheel cylinders have operated in moisture-saturated brake fluid for the vehicle's service life — the cup seals are near the end of their reliable life. Return springs and hold-down hardware lose tension and resilience over long service intervals — worn springs will not reliably retract new, thicker replacement shoes. Installing new shoes on worn springs and aging wheel cylinders wastes the new friction components and invites early re-failure. Complete rear brake hardware replacement during a shoe service at high mileage is the professional standard.

29. A. Brake pad compound resonates at specific pressure and velocity combination in this speed range — Brake squeal is a resonance phenomenon — the pad, rotor, caliper, and mounting assembly resonate at a specific frequency when the friction conditions match the system's natural frequency. This resonance is highly dependent on the pad-to-rotor contact pressure and relative velocity. Moderate braking in a specific speed range produces a specific combination of contact pressure and surface velocity that matches the brake assembly's resonant frequency — producing squeal that does not occur at other braking intensities or speeds where the conditions are different.

30. C. New caliper not pre-filled before installation — large air void cannot be purged through wheel bleed — A caliper that is installed dry (without being pre-filled with brake fluid) contains a significant volume of air in its internal passages and piston bore. During a standard bleed procedure, air exits the circuit at the wheel bleeder screws. However, a completely dry caliper represents a large air reservoir that is difficult to purge through the bleeder screw alone — the air in the caliper must first migrate through the caliper's internal passages to reach the bleeder. Pre-filling the caliper with fresh brake fluid before installation eliminates this condition.

31. A. Clean tone ring, verify debris removal did not damage ring or sensor, confirm signal accuracy — Metallic debris embedded between tone ring teeth disrupts the signal but does not permanently damage the ring if the debris is removed without causing additional damage. After cleaning, the tone ring tooth profile and spacing should be visually confirmed intact. The sensor tip should be inspected for any scoring from debris contact. Confirm accurate, stable wheel speed signal with scan tool live data before clearing the DTC and returning the vehicle.

32. B. Junction block fitting seats damaged from previous overtightening — Inverted flare brake line fittings create their hydraulic seal at the contact between the fitting's flare and the port's conical seat. When fittings are overtightened, the soft copper or steel flare deforms the port seat. Subsequent connections with correctly flared fittings cannot seal against the deformed seat — they seal initially at installation but the irregular contact allows seepage under pressure cycling. The junction block must be replaced to restore correct undamaged seating surfaces.

33. A. Grade sensor failed reading constant positive incline — Hill Start Assist uses an inclinometer or grade sensor to determine whether the vehicle is on an incline before deciding to hold the brakes. A grade sensor that has failed in a position that outputs a constant positive grade signal causes HSA to activate at every stop — flat or not — because the system believes the vehicle

is always on an uphill grade. The sensor requires replacement to restore grade-appropriate HSA activation.

34. C. Wheel speed sensor connector with marginally loose terminal — A sensor connector with a terminal that loses contact during road vibration creates intermittent signal dropout detectable by the ABS/ESC module. The module detects the brief signal loss and illuminates the warning light. When the road surface is smooth and vibration ceases, the connector terminal remakes contact, the signal normalizes, and the soft fault clears before the module completes its fault confirmation cycle — the light extinguishes and no permanent DTC stores. Rough road vibration consistently reproduces the dropout.

35. C. Check battery voltage — EPB motor initialization requires adequate voltage — The EPB initialization sequence uses the motor to drive the caliper piston through its full stroke range to establish position references. This motor operation requires adequate battery voltage to maintain sufficient current throughout the complete stroke. If battery voltage is marginal, the motor stalls before completing the stroke and the initialization sequence fails with an error. Testing battery voltage and recharging or replacing the battery before reattempting initialization is the correct first step.

36. C. Right front flexible hose with partial internal restriction in return direction — A flexible hose with an internal liner defect that acts as a one-way restriction allows application pressure to flow freely inward to the caliper but restricts return flow when the pedal is released. The restriction holds residual pressure in the right front caliper after pedal release — the piston remains partially extended. As the vehicle moves, the partially extended piston drags against the rotor, generating heat and causing the delayed release the driver notices as deceleration after pedal release. Opening the right front bleeder during a drag test would release the trapped pressure — confirming the diagnosis.

37. B. ABS module internal voltage regulator fault — module replacement required — An internal voltage reference fault DTC — with correct external voltage supply confirmed — indicates the module's internal voltage regulation circuit has failed. The module uses internal regulated voltages to power sensor excitation circuits and for its own calculations. An internal regulator fault cannot be repaired in the field — the module must be replaced. This diagnosis is reached after confirming all external factors (battery, fuse, wiring) are correct.

38. B. Vacuum booster providing excessive assist — over-assist from control valve fault — A booster that over-assists — applying more force to the master cylinder than the driver intends — creates a pedal that feels unnaturally easy to compress. The driver applies light pedal force but the booster multiplies it to a level the brake system was not calibrated for, producing stronger braking than expected for the input. A fault in the booster's atmospheric control valve — one that allows more atmospheric air into the rear chamber than commanded by pedal input — causes this over-assist condition.

39. B. Parking brake cable stretched — holding right rear shoe in constant light contact — A stretched parking brake cable maintains continuous light tension on the right rear actuating lever even when the parking brake is fully released — the lever cannot return to its fully released position because the cable's increased length prevents full slack. The light tension keeps the right rear shoe in just enough contact with the drum to generate sustained friction heat over a highway drive, while the left rear cable at correct tension allows full shoe retraction and no drag.

40. B. TCS and ESC lose primary speed reference — both operate in degraded mode or are disabled — TCS and ESC systems use the vehicle's speed as a reference to calculate acceptable wheel speed differentials and expected vehicle dynamic behavior. Without a valid vehicle speed reference, TCS cannot accurately determine the difference between legitimate wheelspin (spin above vehicle speed) and normal braking deceleration. ESC loses its reference for calculating expected yaw rates. Both systems are likely to operate in degraded capability or disable entirely. ABS uses individual wheel deceleration rates and typically can function without a separate vehicle speed input.

41. D. Replace front pads immediately — schedule rear shoes based on high-usage route assessment — Front pads at minimum require immediate service — there is no deferral option. However, the professional value of this diagnosis is recognizing the context: a 200-mile-per-day urban delivery route represents extremely high brake usage. At this usage rate, the rear shoes that are currently at 5mm will reach minimum much sooner than normal mileage intervals would suggest. The customer should be informed of the accelerated wear pattern and scheduled for more frequent brake inspections than the standard passenger vehicle recommendation.

42. B. Check pushrod adjustment — new booster may have pushrod shorter than original — The mechanical advantage ratio between the booster output and master cylinder piston is determined by the pushrod length. A pushrod that is too short requires the master cylinder piston to have less mechanical input from the booster, reducing the assist multiplier effect. The driver must supply more pedal force to compensate for the reduced booster-to-master-cylinder mechanical coupling. Adjusting the pushrod to the manufacturer's specified length restores the designed assist ratio.

43. B. Collision bent a wheel or suspension component — bent wheel creates periodic speed sensor oscillation and vibration — A wheel that was bent in the collision rotates with lateral and radial runout. The radial runout causes the wheel's effective rolling radius to vary during each rotation — the wheel speed sensor reads the apparent speed as higher than actual when the larger-radius portion is contacting the ground and lower when the smaller-radius portion is. This oscillating speed signal creates the correlation fault DTC. The physical runout of the bent wheel also causes the vibration felt during straight-line driving.

44. C. Road debris embedded between lining and drum — grinding once per revolution — A piece of debris embedded between the brake shoe lining and the drum interior creates a single high-friction, grinding contact point that repeats exactly once per drum revolution — regardless of

braking intensity. As braking force increases, the debris is pressed harder between the lining and drum, increasing the grinding intensity without changing its frequency. This one-per-revolution pattern at all braking intensities is distinctive for embedded debris rather than a drum surface irregularity or hydraulic cause.

45. B. Complete professional communication covering repair, expected feel, return criteria, service schedule, and documentation — The most professional final communication ensures the customer: understands what was done and why, knows what the vehicle should feel like post-repair, is equipped to recognize if something is wrong and knows to return immediately, has a clear timeline for the next inspection, and has documentation of the service for warranty and resale purposes. This level of communication demonstrates professional expertise, protects both the customer and the shop, and builds the trust relationship that creates repeat business.