

PRACTICE EXAM 15: 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 question

1. A vehicle has two separate brake systems — a service brake and an independent parking/emergency brake with its own separate drum and cable actuation at the rear axle. If the service brake loses all pressure, which of the following BEST describes the remaining braking capability?

- A. No braking capability — the service brake and parking brake share the same wheel hardware
- B. The parking brake provides emergency stopping capability through the mechanical cable-actuated rear drums — independent of the hydraulic service brake. Stopping distances will be significantly longer and the driver must modulate the parking brake lever manually to prevent rear wheel lockup
- C. The parking brake automatically applies full force when service brake pressure drops to zero through a pressure-sensitive bypass valve
- D. The parking brake can provide front wheel braking through the emergency brake interconnect circuit

2. A vehicle's front disc brake calipers are being replaced. The replacement calipers use a banjo bolt and crush washers at the brake hose connection. After installing the calipers and torquing the banjo bolts, the technician bleeds the front circuit. During the test drive, the technician finds the left front caliper is not seeping but the right front is seeping at the banjo bolt. The banjo bolt is confirmed at correct torque. Which of the following is MOST likely the cause?

- A. The right front banjo bolt has cross-threaded during installation — remove and re-thread
- B. The right front banjo bolt was torqued before the caliper was fully positioned — the slight caliper movement after torquing cracked the crush washer seal
- C. One of the two crush washers at the right front banjo bolt was reused from the original installation — the previously crushed washer cannot form a new seal. Both washers must be new at each installation
- D. The right front brake hose has a minor kink creating back pressure that is forcing fluid past the banjo bolt joint

3. A vehicle is being evaluated after a customer complaint of reduced braking effectiveness during rain. The front brakes appear to stop the vehicle normally in dry conditions. During a controlled wet-weather stop, the vehicle requires significantly more distance. The front pads are at 7mm and the rotors are smooth and within specification. Which of the following is MOST likely the cause?

A. Water has contaminated the hydraulic system — the hydraulic pressure is reduced during wet weather

B. The front brake pad compound has a significantly reduced wet friction coefficient — the pads generate substantially less friction against the rotors when wet, increasing stopping distance. Some pad compounds — particularly certain semi-metallic types — exhibit significant wet friction reduction compared to dry friction

C. The ABS system activates prematurely in wet conditions — the system releases brake pressure before maximum wet-road deceleration is achieved

D. The front caliper pistons are absorbing water through the dust boots — swollen pistons generate less clamping force during wet weather

4. A vehicle with rear drum brakes has a complaint that the brake pedal height gradually drops over the first 3 to 4 stops of each drive, then stabilizes at a lower position for the remainder of the trip. After the vehicle sits overnight, the pedal is back to normal height on the first stop. The rear brake adjustment is confirmed correct. Which of the following MOST likely explains this pattern?

A. Air is entering the rear circuit overnight and pumping out during the first three stops

B. The rear brake shoe contact pads on the backing plate bind slightly when cold — friction between the shoe and the contact pads prevents the shoe from positioning correctly until heat loosens the contact. Each of the first 3 to 4 stops moves the shoe progressively closer to the drum as the contact pads free up, reducing pedal travel incrementally

C. The rear wheel cylinder cup seals are stiff when cold — the stiff seals require more pedal pressure to seat, effectively reducing the displacement per stroke until they warm up and become more flexible

D. The vacuum booster loses assist gradually during the first few stops after cold start as booster vacuum depletes before engine idle vacuum rebuilds

5. A vehicle has a right front brake pad that shows extremely heavy wear at the leading edge only — the trailing three-quarters of the pad surface shows minimal wear. The left front pad shows even wear across its entire face. The right front caliper slides freely and the piston extends normally. Which of the following is MOST likely the cause?

- A. The right front rotor has a lateral taper — contact is limited to the outer leading edge of the pad
- B. The right front pad is installed with incorrect orientation — it is installed backward relative to the rotor's rotation direction, concentrating contact at what is now the leading edge
- C. The right front caliper piston is applying force eccentrically — the piston bore is worn off-center
- D. The right front anti-rattle hardware is forcing the trailing edge of the pad away from the rotor

6. A vehicle with a vacuum power brake booster is tested as follows: engine running, brake pedal depressed firmly. Technician then crimps the vacuum supply hose with pliers while the pedal is held. The pedal hold position does not change. The technician then releases the pedal and waits 30 seconds, then applies the pedal again — it is firm and at normal height. Technician again crimps the vacuum supply hose and holds the pedal — pedal position holds for 30 seconds. Which of the following does this test sequence confirm?

- A. The booster is functioning correctly and the vacuum check valve is holding stored vacuum
- B. The hydraulic system is failing — the pedal should sink after vacuum is cut
- C. The master cylinder compensating port is blocked — vacuum isolation confirms the hydraulic fault
- D. The check valve has failed — it is allowing vacuum to bleed out when the hose is crimped

7. A vehicle with all-wheel drive has the following wheel speed sensor readings at 40 mph during a straight-line road test: left front 40 mph, right front 40 mph, left rear 40 mph, right rear 38 mph. No ABS or TCS warning lights are illuminated. The technician performs a visual inspection and finds the right rear tire has noticeably less tread depth than the other three tires. Which of the following BEST explains the 2 mph difference?

- A. The right rear wheel speed sensor is failing — it reads 2 mph below actual speed
- B. The right rear tire, being more worn, has a slightly smaller rolling circumference than the other three tires — a smaller rolling radius means the right rear wheel must rotate more times per mile to cover the same distance, but at 40 mph road speed the smaller tire is rotating faster than the others. The sensor correctly reports the wheel's rotation rate, which corresponds to a slightly lower calculated ground speed than the other three wheels
- C. The AWD system is providing more torque to the right rear wheel — the extra torque is causing slight wheelspin that shows as lower speed

D. The right rear wheel bearing is loose — the bearing play allows the hub to slow slightly relative to the axle shaft

8. A vehicle with drum rear brakes is brought in for brake inspection. The technician removes the right rear drum and finds the lining is above minimum, but the shoe-to-drum contact surface shows contact only at two small areas — one near the leading edge tip of the shoe and one near the trailing edge tip. The center 70% of the shoe shows no contact pattern. Which of the following MOST likely explains this contact pattern?

A. The wheel cylinder is applying force eccentrically — only the tips of the pistons are contacting the shoe

B. The brake shoe arc is smaller than the drum arc — the shoe tips contact the drum at maximum clearance positions while the center of the shoe is unable to reach the drum. This limited tip contact results in reduced braking efficiency and uneven lining wear

C. The drum has a barrel shape — wider at the center than at the edges

D. The drum is installed with its friction surface facing outward — the reversed installation positions the contact surface away from the shoe

9. A vehicle with ABS is brought in for a diagnostic regarding an illuminated ABS warning light. The scan tool retrieves a DTC for the left front wheel speed sensor — open circuit. The technician measures resistance across the sensor terminals — the reading is overload (infinite resistance, effectively open circuit). The sensor is physically intact and the tone ring is undamaged. Which of the following should the technician do NEXT?

A. Replace the wheel speed sensor — an open circuit reading at the sensor terminals confirms sensor failure

B. Inspect the wiring harness from the sensor to the ABS module connector for an open circuit — a break in the harness wire would produce the same infinite resistance reading at the sensor terminals as a sensor with an internal open coil. Test the harness continuity before replacing the sensor

C. Replace the ABS module — a module internal fault is misinterpreting correct sensor resistance as an open circuit

D. Clean the sensor connector terminals — corrosion at the sensor connector terminals can increase resistance to infinite values

10. A vehicle with a hydraulic system that uses DOT 4 brake fluid has had the system flushed with DOT 3 fluid during a routine service at an independent shop. The vehicle is brought in to your shop for an unrelated repair. After discovering the incorrect fluid, which of the following is the correct recommendation?

A. No action required — DOT 3 is compatible with DOT 4 systems and the slightly lower boiling point of DOT 3 is acceptable for most driving conditions

B. Inform the customer of the incorrect fluid and recommend a fluid flush with the manufacturer-specified DOT 4 fluid — while DOT 3 and DOT 4 are chemically compatible and can be mixed, the DOT 4 specification is required because this vehicle's system was designed for the higher boiling point and performance characteristics of DOT 4. Document the finding and the customer's decision

C. Immediately flush with DOT 4 without informing the customer — the safety risk requires immediate remediation

D. Add DOT 5.1 fluid to bring the total fluid boiling point above the DOT 4 specification — DOT 5.1 and DOT 4 are compatible

11. A vehicle has both front calipers replaced simultaneously. After the replacement and complete bleed, the pedal is firm and the brakes feel excellent. Two weeks later, the customer reports both front calipers appear to be leaking at the piston dust boot junction. A small amount of fluid is visible at both boot edges. Which of the following is MOST likely the cause?

A. Both new calipers have manufacturing defects — simultaneous defects in both calipers indicate a production batch issue. Return the calipers under warranty

B. The brake fluid was not compatible with the caliper piston seals in the replacement units — the incompatibility caused early seal failure

C. The brake system has petroleum contamination — the contamination swelled the piston seals, pushing fluid past them to the boot junction on both new calipers simultaneously

D. Both calipers are weeping from their piston boot junctions because they are new calipers and the piston seals are seating themselves — this self-sealing process may produce minor initial weeping

12. A vehicle with electronic stability control has the vehicle dynamics module fail. The replacement module requires programming with vehicle-specific calibration data. Which of the following is typically required to complete the replacement?

- A. The module is self-programming — it downloads calibration data automatically through the OBD-II port upon first ignition cycle
- B. Module programming using a manufacturer-compatible scan tool with the vehicle's calibration data from the factory database, followed by sensor calibration procedures (SAS zero point, yaw rate, lateral accelerometer) to establish the module's reference points for this specific vehicle
- C. Only the VIN number is required — the module programs itself based on VIN data alone
- D. No programming is required — ESC modules use universal calibration data that applies to all vehicles of the same model year

13. A vehicle's front brake hydraulic circuit has a restriction at the combination valve metering valve section — the metering valve is stuck partially closed and only allows 60% of normal front brake pressure through to the calipers. The rear circuit is functioning normally. Which of the following symptoms would MOST likely result?

- A. The vehicle will pull to the right during braking — the left front circuit is unaffected but the right front circuit is reduced
- B. During moderate-to-hard braking, the vehicle will experience rear-dominated braking — the front brakes will be underperforming relative to their designed contribution, and if rear pressure is at full value, rear wheel lockup risk increases
- C. The ABS will activate at the front wheels during every stop — the reduced front pressure causes the front wheels to approach lockup more quickly
- D. The pedal will be firm but unusually high — the metering valve restriction increases hydraulic resistance and raises pedal position

14. A vehicle's brake system has an unusual noise — a hissing sound from the area of the brake booster that is heard inside the vehicle during brake application. The hiss starts immediately when the pedal is depressed and stops immediately when the pedal is released. Booster function appears normal. Which of the following MOST likely causes this hiss?

- A. Air is escaping from the booster vacuum supply hose at a loose fitting
- B. The booster atmospheric control valve is opening correctly to admit atmospheric air into the rear booster chamber during pedal application — the hiss is the sound of atmospheric air rushing through the control valve filter into the booster. This is normal on some booster designs and does not indicate a fault

C. The master cylinder compensating port is making a hissing sound as fluid flows through the small-diameter port during application

D. The vacuum check valve is oscillating rapidly during brake application, creating the hiss from repeated brief openings

15. A vehicle has a condition where the brake pedal slowly drops under sustained pressure but the drop stops when the pedal reaches approximately 60% of its full travel. The pedal then holds firm at this lower position. No external fluid leaks are found. Which of the following MOST likely explains the pedal dropping to a point and then holding?

A. Air trapped at the halfway point in the hydraulic circuit compresses to a stable volume at 60% pedal travel

B. The master cylinder primary piston seal is partially failing — it bypasses fluid until the piston reaches a position in the bore where the undamaged portion of the seal contacts an undamaged section of the bore wall, restoring sealing and holding the pedal

C. The combination valve proportioning valve is closing at this pedal travel level, blocking further fluid movement

D. The ABS accumulator fills to capacity at 60% pedal travel and stops accepting additional fluid

16. A vehicle with rear drum brakes is being returned to service after extended storage. Before road testing, the technician inspects the rear drums and finds the interior friction surfaces covered with surface rust — normal for storage. The technician drives the vehicle to clean the rust off during the initial test drive. After the test drive, which component should the technician inspect specifically for contamination risk?

A. The master cylinder reservoir — rust particles can migrate to the reservoir through the hydraulic circuit

B. The rear brake shoes — rust particles abraded from the drum surface during the first few stops may have embedded in the brake shoe lining or contaminated the lining surface, affecting friction performance

C. The ABS wheel speed sensor tone rings — rust particles from the drum can migrate to the tone rings and disrupt the sensor signal

D. The rear flexible brake hoses — rust particles can migrate from the drum area into the hose interior

17. A vehicle with four-channel ABS has a DTC for intermittent signal at the right rear wheel speed sensor. The technician performs an ohmmeter test and finds the sensor resistance varies from 1,100 ohms to 2,800 ohms as the technician wiggles the sensor harness near the wheel. Which of the following BEST describes this finding and the correct service action?

- A. The sensor coil has an intermittent internal open — replace the sensor immediately
- B. The harness wiring has an intermittent open circuit — as the harness is flexed, a broken wire strand makes and breaks contact, causing the resistance to vary widely. Locate the break in the harness and repair or replace the harness section between the sensor and the first routing clip
- C. The sensor air gap is inconsistent — the sensor should be repositioned to eliminate the resistance variation
- D. The ABS module connector has a poor terminal contact — the module-end connection is creating the variable resistance reading

18. A vehicle with rear disc brakes has a rear rotor that is above minimum thickness and within parallelism specification. However, the outer edge of the rotor friction surface (the area not contacted by the brake pad) has a raised lip approximately 3mm high. The inner edge also has a smaller 1mm lip. The brake pads show even contact across their faces. Which of the following BEST explains this rotor condition and the appropriate service decision?

- A. The larger outer lip indicates the rotor has been machined incorrectly — it must be replaced
- B. The lips form naturally at the edges of the pad contact area as the pad wears the friction surface while the edges — outside the pad contact zone — wear less. The lip height indicates the amount of rotor wear. A 3mm outer lip is significant and suggests the rotor friction surface has worn considerably. The rotor thickness measurement should be compared to the minimum specification — if thickness is adequate, service braking continues; if at or near minimum, replacement is appropriate
- C. The lips are normal manufacturing variation and have no relationship to wear depth
- D. The outer lip is from caliper bracket contact during a previous installation — the bracket should be inspected for damage

19. A vehicle with ABS and ESC is being road tested after all four wheel speed sensors are replaced. During the road test at 45 mph, the scan tool shows: LF 45 mph, RF 45 mph, LR 45 mph, RR 42 mph. No ABS or ESC activation. No warning lights. Which of the following is the MOST likely cause of the right rear 3 mph difference?

- A. The right rear wheel speed sensor was not replaced — the original sensor is reading incorrectly

B. The right rear wheel speed sensor replacement was not installed at the correct air gap — the increased gap is reducing the signal frequency slightly, causing the module to calculate a lower speed than actual

C. The right rear tire has a different rolling circumference than the other three — either it is a different size, has different inflation pressure, or has different tread wear that creates a slightly smaller effective rolling radius

D. The right rear ABS solenoid valve circuit has a fault — the solenoid fault is affecting the wheel speed module calculation for that circuit

20. A vehicle with an EPB system is being serviced at a shop that does not have a scan tool capable of EPB service mode. The rear brake pads need replacement. Which of the following is the correct approach?

A. Replace the rear pads using a manual C-clamp to retract the EPB piston — the EPB motor will adapt to the new pad position automatically on first use

B. Do not replace the rear pads — EPB-equipped vehicles require dealer-level scan tools for all brake service and cannot be serviced without EPB service mode capability

C. Obtain access to an appropriate scan tool before performing the service — EPB systems specifically require the caliper piston to be retracted using the scan tool's service mode that commands the EPB motor to retract. Attempting to force the piston back mechanically without the service mode can damage the motor and the caliper mechanism. If the shop cannot access the required tool, refer the customer to a shop with the correct equipment

D. Disconnect the EPB motor electrical connector before manually pushing the piston back — disconnecting the motor allows mechanical retraction without damage

21. A vehicle equipped with ABS has had its system reprogrammed after a module replacement. During a calibration verification test drive, the ABS activates on all four wheels simultaneously during a moderate stop from 30 mph on dry pavement. No wheel lockup occurs. Which of the following MOST likely explains this condition?

A. The module was programmed with incorrect vehicle data — the ABS thresholds are set too low for this vehicle's actual deceleration capability

B. The brake pads were replaced with a softer compound before the reprogramming — softer pads generate less deceleration, causing ABS to activate at lower speeds

C. The calibration verification test was performed before the module fully downloaded its calibration data — wait 24 hours for the download to complete

D. All four wheel speed sensors are out of calibration simultaneously after the module replacement

22. A vehicle with front disc and rear drum brakes is being inspected. The technician confirms the combination valve proportioning function by applying the brakes progressively harder and monitoring rear brake contribution. During the test, the technician finds the rear brakes apply with full pressure from the very beginning of pedal application — the proportioning valve is not limiting rear pressure at any pedal input level. Which of the following symptoms would the driver MOST likely report?

A. Very poor rear braking — the proportioning valve is needed to increase rear pressure

B. Rear wheel lockup tendency during moderate stops — without proportioning valve limiting, the rear brakes receive the same hydraulic pressure as the front brakes from the beginning of application. Since the rear brakes have less available grip from forward weight transfer, the rear wheels approach lockup at moderate brake application levels

C. Front brake fade — without the proportioning valve limiting the rear, the front brakes compensate with less force

D. Brake pull toward the left — proportioning valve failure always affects only one side

23. A vehicle with ABS has a DTC stored for the ABS pump motor — short to ground. The ABS warning light is on. Which of the following is the correct diagnostic sequence BEFORE replacing the pump motor?

A. Replace the relay, then test the motor

B. Test the motor resistance at the motor terminals with the motor harness disconnected — if the motor tests normal (correct resistance, no short to ground at the motor terminals), the short is in the wiring harness between the relay and the motor. If the motor tests shorted at the motor terminals, the motor itself has failed

C. Replace the ABS module — module internal shorts often appear as motor short codes

D. Clear the DTC and road test — pump motor shorts are transient conditions caused by moisture

24. A vehicle with a diagonally-split master cylinder is being bled. The technician bleeds in the sequence: right rear, left rear, right front, left front. After completing the bleed, the pedal is spongy. The technician repeats the bleed in the same sequence — the pedal remains spongy. Which of the following is MOST likely the cause?

A. The bleeding sequence is incorrect for this vehicle — the correct sequence for a diagonal-split system must follow the diagonal circuit path, not the conventional farthest-to-nearest sequence. For a left-hand-drive diagonal-split vehicle the typical sequence is RR, LF, LR, RF (one circuit at a time)

B. The master cylinder has an internal bypass — the bleed sequence is correct but the master cylinder is failing

C. Air has entered the ABS HCU — wheel bleeder screw bleeding alone cannot purge the HCU. A scan tool solenoid actuation procedure is required

D. The bleed pressure is too low — increasing the pressure bleeder pressure above 20 psi will purge the remaining air

25. A vehicle experiences a loss of braking effectiveness after a front-end collision that bent the right front suspension. The right front wheel is visibly tilted. A brake inspection shows the right front caliper is intact, the brake line is undamaged, and the brake pads have adequate thickness. However, the right front braking contribution is significantly reduced. Which of the following BEST explains the reduced right front braking despite intact hardware?

A. The collision damage disconnected the right front ABS solenoid — only ABS is affected, not conventional braking

B. The bent suspension has changed the right front wheel camber significantly — extreme negative or positive camber drastically reduces the tire contact patch and available traction. The brake caliper can apply maximum clamping force but the bent suspension means the tire cannot generate the friction needed to translate that force into vehicle deceleration. Maximum available deceleration from the right front is limited by the reduced tire contact patch

C. The bent suspension is pinching the right front brake hose — hydraulic pressure to the right front is restricted

D. The collision impact bent the right front rotor — the bent rotor cannot maintain consistent pad contact during rotation

26. A vehicle with drum rear brakes has been stored for 6 months in a coastal environment with high salt air. When the vehicle is returned to service, the rear brake drums cannot be removed by conventional means — they are severely corroded to the axle flanges and backing plates. After successfully removing the drums, which of the following is the MOST appropriate service recommendation?

- A. Clean the drum mounting surfaces and reinstall the original drums — salt corrosion is superficial and does not affect drum geometry
- B. Thoroughly inspect and measure all rear brake components for corrosion damage, replace any component that shows structural corrosion, ensure all mounting surfaces are clean and protected with anti-corrosion compound before reassembly, and replace any rubber components that have deteriorated from prolonged exposure to the salt environment
- C. Replace only the drums — all other components are protected inside the drum and are unaffected by salt air
- D. Replace the drums and wheel cylinders — wheel cylinders are the only other component that can be damaged by salt air

27. A vehicle with four-channel ABS has the following condition during a diagnostic road test at 35 mph: all four wheel speed sensors reading correctly, no warning lights, no active DTCs. The technician performs a hard brake application. ABS activates at the left front and right rear wheels. The right front and left rear do not activate ABS. The vehicle stops in a straight line without pulling. No post-stop warning lights appear. Which of the following BEST describes this observation?

- A. The ABS system has a fault — it should activate at all four wheels simultaneously during any hard stop
- B. The left front and right rear wheels reached their individual lockup thresholds before the right front and left rear — this is normal ABS behavior. Different tires, different loading, and different brake contributions between wheel positions mean different wheels may approach lockup at different times. ABS activates independently at each wheel as needed
- C. The ABS is malfunctioning at the right front and left rear — these wheels should have activated ABS but failed to respond to the solenoid commands
- D. The diagonal circuit that includes the left front and right rear has a calibration issue — both wheels on the same diagonal activate simultaneously only because of a shared circuit fault

28. A vehicle has a very long brake pedal — almost to the floor — but with a firm feel when finally reaching the bottom of its travel. The brakes work when the pedal reaches the floor. No fluid leaks. The master cylinder has been replaced with a new unit. Which of the following is MOST likely the cause?

- A. Air is in the hydraulic system — the air is at the bottom of the circuit and requires extra pedal travel to compress before pressure builds

B. The rear brake drum shoes have excessive running clearance — more piston travel and fluid volume is needed to extend the wheel cylinder pistons across the increased gap before braking begins. With the firm feel at the bottom of travel, the hydraulic system is intact — only the shoe adjustment or shoe wear is causing the long travel

C. The new master cylinder has a longer bore than the original — the additional bore length requires more pedal travel before the piston reaches the outlet port

D. The booster pushrod is adjusted too short — the pushrod travel consumes all available pedal stroke before the hydraulic circuit is engaged

29. A vehicle's ABS system stored a DTC for the right rear outlet solenoid valve stuck open. Which of the following describes the symptom the customer would MOST likely experience if this fault is present during normal braking?

A. Right rear wheel lockup on every stop — the stuck-open outlet valve continuously vents right rear caliper pressure to the accumulator

B. Soft, spongy pedal — the open outlet valve allows brake fluid to bypass from the caliper into the accumulator rather than building pressure

C. ABS activating unnecessarily at the right rear — the open outlet valve releases right rear pressure during every stop, creating the rapid pressure-drop-and-restore pattern that mimics ABS activation

D. Right rear brake drag — the open outlet valve holds the right rear caliper piston in the applied position

30. A vehicle with ESC is driven by a driver who uses the vehicle for autocross competition. The driver asks whether disabling the ESC during competition is safe. Which of the following represents the MOST accurate technical response?

A. ESC should never be disabled under any circumstances — it provides mandatory safety protection

B. For controlled competition environments like autocross where the driver is trained, the course is a closed controlled area, and the driver intentionally uses vehicle yaw as part of the driving technique, disabling ESC may be appropriate. ESC is designed for emergency response on public roads — in competition, its interventions can conflict with intentional vehicle control inputs. However, ESC should always be re-enabled before driving on public roads

C. ESC can be safely disabled on all vehicles at all times — it is a convenience feature, not a safety system

D. Disabling ESC also disables ABS and all other active safety systems — the vehicle would have no electronic braking assistance

31. A vehicle's brake caliper mounting bracket bolts have been found to be stripped — the threads in the steering knuckle are damaged from a previous overtightening event. Which of the following represents the correct service action?

A. Install the next larger thread size bolt — the larger bolt will engage undamaged thread material

B. Use thread repair inserts (HeliCoil or equivalent) rated for the torque specification of the caliper bracket bolt to restore the thread integrity in the knuckle, then install the correct bolt to the specified torque with thread-locking compound. Verify the repair provides the specified clamping force before returning to service. If the knuckle material is too damaged for effective thread repair, replace the knuckle

C. Apply thread sealant to the stripped bolt and reinstall — the sealant will fill the stripped thread area and provide adequate engagement

D. Replace the caliper bracket bolts with longer bolts to engage deeper undamaged threads — longer bolts provide more thread engagement

32. A vehicle with rear disc brakes is being serviced and the technician discovers the right rear caliper has a piston that rotates freely — the piston can be spun by hand with slight resistance. The left rear caliper piston is firm and will not rotate. Which of the following BEST explains this finding?

A. The right rear caliper is a floating design — the free-rotating piston indicates correct floating caliper operation

B. The right rear caliper piston rotates because it is an EPB-type caliper — the piston must be threaded inward by rotation to retract, not pushed straight in. The free rotation is correct for this caliper type. Attempting to push the piston straight in with a C-clamp will damage the screw mechanism

C. The right rear caliper piston bearing has failed — the piston should not rotate and the bearing failure indicates the caliper needs replacement

D. The right rear caliper is correct — all rear disc brake calipers use rotating pistons to provide additional mechanical advantage

33. A vehicle with ABS has the right rear wheel speed sensor replaced due to a broken connector. After the repair, the scan tool shows the right rear sensor generating a signal during a road test — but the signal jumps erratically from 0 mph to 45 mph and back several times per second at a constant 45 mph road speed. The tone ring is intact. Which of the following MOST likely explains the erratic signal?

A. The new sensor has an internal fault — erratic output from a new sensor indicates defective manufacturing

B. The new sensor has been installed with the incorrect air gap — the sensor tip is intermittently touching the tone ring surface, alternating between contact and correct gap distance, producing the erratic signal

C. The CAN bus was disrupted during the connector repair — the erratic signal is network data corruption rather than true sensor output

D. The right rear tire has a bubble in its sidewall — the bubble creates periodic wheel speed variation

34. A vehicle with disc brakes all around is brought in for a routine inspection. The technician finds all four brake pads at 4mm and all four rotors within specification. The fluid is in good condition. The calipers slide freely and the hydraulic system is functioning correctly. During the customer consultation, the customer mentions they are planning a 3,000-mile road trip across multiple mountain ranges within the next two weeks. Which of the following is the MOST appropriate service recommendation?

A. No service needed — all components are within specification

B. Replace all four brake pads before the trip — 4mm pads may not survive 3,000 miles of mountain driving, and the consequences of pad failure on mountain roads are severe. The cost of preventive pad replacement is far lower than the risk of brake failure at altitude on a descent

C. Replace only the front pads — front pads wear faster and are more likely to fail during mountain driving

D. Schedule brake service for when the customer returns from the trip — the pads are currently within specification

35. A vehicle with rear drum brakes and a duo-servo design has a complaint of a loud scraping noise from the right rear during reverse braking. The noise does not occur during forward braking. Upon inspection, the technician finds the primary shoe has its leading edge tip bent outward

slightly — away from the backing plate. Which of the following MOST likely caused the bent shoe tip?

- A. The wheel cylinder piston extended too far during a hard reverse brake application and pushed the shoe tip outward
- B. The drum was installed without retracting the shoes — the drum forced the leading edge of the primary shoe outward as it was pressed over the partially extended shoe
- C. The shoe contact pad on the backing plate is missing — without the contact pad, the shoe tip shifted outward and contacts the drum edge during reverse
- D. The automatic adjuster was advanced too far — the tension between the star wheel and the shoe tip bent the shoe tip outward

36. A vehicle has a dual-circuit master cylinder with a diagonally-split hydraulic system. After a complete brake service, the technician performs a pedal hold test. The pedal holds firm for 60 seconds. The technician then individually clamps each of the four flexible brake hoses and tests the pedal after each clamp. With the left front hose clamped, the pedal still holds. With the right rear hose clamped, the pedal still holds. With the left rear hose clamped, the pedal holds. With the right front hose clamped, the pedal begins to sink slowly. Which of the following does this test sequence identify?

- A. The right front flexible brake hose has an internal leak — clamping it prevents fluid from escaping and identifies it as the leak source
- B. The right front caliper has a leaking piston seal — with the right front hose clamped, the fluid loss in the right front circuit is isolated, confirming the caliper as the source. Clamping the hose traps the fluid in the right front caliper and the pedal should hold if the leak is in the hose — but since clamping the hose causes the pedal to sink, the leak is between the hose clamp and the master cylinder outlet, meaning the right front circuit from the master cylinder to the hose clamp has the leak
- C. Clamping the right front hose isolates the right front circuit from the rest of the system — the pedal sinking with the right front hose clamped and all others unclamped means the fluid loss is occurring in the right front circuit between the master cylinder and the hose clamp (rigid line, fitting, or master cylinder port)
- D. The test identifies the right front circuit as intact — clamping it stops fluid circulation and the pedal drops from a hydraulic balance disruption

37. A vehicle with ESC has a DTC for the ABS/ESC control module stored — specifically a DTC indicating the module's internal processor has detected a checksum error in its stored calibration data. The vehicle's brake and stability systems are disabled. Which of the following is the MOST appropriate first diagnostic step?

A. Replace the ABS/ESC module immediately — a checksum error always indicates physical memory failure

B. Attempt to reprogram the module with the correct calibration data using a manufacturer-compatible scan tool — a checksum error can result from a corrupted programming event (power interruption during programming, incorrect data) rather than physical memory hardware failure. Reprogramming may restore the correct data and resolve the checksum fault without requiring module replacement

C. Clear the DTC and road test — checksum errors are transient conditions that resolve after the module power cycles

D. Replace the vehicle battery — low battery voltage during module operation corrupts calibration data and causes checksum errors

38. A vehicle with front disc and rear drum brakes has a brake pull condition diagnosed as being caused by a rear brake issue — the left rear is applying harder than the right. The hydraulic pressures to both rear wheel cylinders are confirmed equal. The wheel cylinders are confirmed equal in bore size. The drums are within specification and equal in diameter. Which of the following represents the most systematic next diagnostic step?

A. Replace both rear wheel cylinders — equal bore size is not sufficient for equal force output

B. Compare the friction coefficient of the left and right rear shoe lining material — if different compounds were installed at different service events, the friction imbalance could cause the left to generate more force at equal pressure. Verify both shoes are the same part number and compound

C. Check the rear circuit proportioning valve — the valve may be delivering more pressure to the left rear despite equal inputs

D. Inspect the left rear drum for a smaller diameter than the right — diameter difference affects mechanical advantage

39. A vehicle with ABS develops a DTC for the ABS pump motor — circuit resistance high. The motor runs when tested with a direct battery connection. The relay circuit tests normal and the motor ground wire resistance is within specification. Which of the following is the MOST likely cause of the high circuit resistance DTC?

- A. The ABS module has an internal fault in its motor output driver — replace the module
- B. The motor power feed wire from the relay to the motor has corrosion at one of its connectors or terminals — partial corrosion creates resistance that does not prevent motor operation at direct battery voltage but is detectable by the module's current monitoring circuit. Inspect and clean all motor circuit connections between the relay and motor
- C. The motor brushes are worn — worn brushes increase internal motor resistance
- D. The motor is undersized for this application — the insufficient motor size creates resistance that triggers the DTC

40. A vehicle with four disc brakes and ABS is being tested after a complete brake overhaul. During a hard brake application, the ABS activates correctly and the vehicle stops in a straight line. After the stop, the pedal remains at the floor — the vehicle cannot accelerate after the stop and the brakes appear to still be applied. After 30 seconds the brakes release on their own. No ABS warning light. Which of the following MOST likely explains the post-stop brake application remaining after ABS activation?

- A. An ABS solenoid valve stuck in the applied position — the valve failure caused the brake to remain applied after ABS cycling ended
- B. Air in the ABS HCU accumulator is slowly releasing pressure into the wheel circuit after the stop — the air maintains residual pressure in the caliper that holds the brakes applied until it dissipates
- C. The ABS pump motor continued running after the stop ended — the pump was maintaining pressure in the circuit. The delayed release after 30 seconds corresponds to the pump motor timing out and stopping
- D. The master cylinder compensating port has become blocked — the ABS cycling pressurized the circuit beyond the master cylinder return capability and the blocked compensating port is trapping the pressure until it slowly leaks through the gap between the master cylinder piston seal and bore

41. A technician is asked to inspect a vehicle where the previous technician applied anti-seize compound to the wheel bearing hub mounting surface before pressing the wheel speed sensor tone ring onto the hub. The tone ring is now partially seated — it slipped on the anti-seize compound and stopped 3mm short of full engagement depth. Which of the following is the correct service action?

A. The tone ring is adequately seated at 3mm short — the air gap can be adjusted to compensate for the shallower ring position

B. Remove the tone ring, clean all anti-seize compound from the hub surface and tone ring bore using appropriate solvent, confirm the correct press fit dimensions, and press the tone ring to the correct depth. Anti-seize compound is not appropriate for tone ring installation — it prevents the press fit from developing adequate holding force

C. Apply epoxy adhesive around the base of the partially seated ring to lock it in position at the current depth

D. Leave the tone ring at its current position and use a longer wheel speed sensor to compensate for the increased air gap

42. A vehicle is equipped with ABS, ESC, and automatic emergency braking. After a frontal collision in which the airbags deployed, the customer asks whether the AEB system needs to be inspected before the vehicle is returned to service. Which of the following is the MOST accurate response?

A. No — airbag deployment only affects the airbag system. The AEB system is independent and does not require post-collision inspection

B. Yes — in a frontal collision sufficient to deploy airbags, the front camera and radar sensors that the AEB system uses for object detection may have been physically displaced, damaged, or contaminated. These sensors require inspection and potentially recalibration before the AEB system can reliably detect obstacles. Additionally, any body repair work may have changed the sensor mounting geometry

C. The AEB system automatically recalibrates after any collision — no inspection is needed

D. Only the radar sensor requires inspection — the camera is protected by the windshield and is unaffected by frontal collisions

43. A vehicle with rear drum brakes has a backing plate that has one of its raised shoe contact pads worn smooth. The contact pads are normally raised platforms on the backing plate that the shoe web slides on during application. Which of the following symptoms would result from a missing or worn-smooth contact pad?

A. The brake shoe lining will contact the backing plate and create additional friction

B. The shoe will rock on the backing plate in the area of the worn pad — the shoe moves slightly inward (toward the backing plate) rather than directly outward toward the drum at that contact

point. This changes the shoe geometry, reduces contact efficiency, and can cause noise and uneven wear

C. The wheel cylinder piston will over-extend into the space created by the worn contact pad

D. The self-adjuster will not function because the worn pad provides an incorrect reference for adjuster travel

44. A vehicle with ABS has a DTC for the ABS brake pressure sensor stored. The brake pressure sensor is located in the ABS HCU. The vehicle has no other ABS sensor DTCs. The scan tool live data shows the brake pressure sensor reading 0 psi with the brake pedal released and 0 psi with the pedal firmly depressed. Which of the following MOST likely explains both readings being 0 psi?

A. The brake pressure sensor is functioning correctly — a fully bled system reads 0 psi static and 0 dynamic because brake pressure builds only at the wheel position, not at the HCU location

B. The brake pressure sensor signal circuit has an open or short to ground — the sensor output is fixed at 0 (or minimum) regardless of actual system pressure. Testing the sensor supply voltage and signal voltage at the HCU connector will identify whether the sensor or circuit has failed

C. The brake fluid level is so low that no pressure can be generated — refill the reservoir and retest

D. The sensor is designed to read 0 psi during both static and dynamic conditions — it only activates when ABS cycling occurs

45. A vehicle with disc brakes has been in service for 60,000 miles. During a brake inspection, all four rotors are above minimum thickness and within parallelism specification. All four brake pads are at 3mm — above the 2mm minimum. The calipers slide freely and the fluid is in good condition. The customer asks if any brake service is needed. Which of the following represents the MOST professional response?

A. No service needed — all components are within specification and no service is required at this time

B. All four brake pads should be replaced now — any pad below 4mm requires immediate replacement

C. Inform the customer that all components are currently within specification, but explain that at 3mm the pads have limited remaining life. Based on the observed wear rate (3mm of lining wear over 60,000 miles suggests approximately one to two brake services during the vehicle's life), project a realistic replacement timeframe, and schedule a follow-up brake inspection at the appropriate interval to avoid unexpected pad minimum before the next scheduled service

D. Replace only the front pads at 3mm — the rear pads always last longer and can remain at 3mm indefinitely

PRACTICE EXAM 15: ANSWER KEY AND EXPLANATIONS

1. B. Parking brake provides emergency mechanical stopping capability — significantly longer stopping distances — An independent mechanically-actuated parking brake system that uses separate components from the hydraulic service brake remains fully functional when the hydraulic service brake loses all pressure. The driver can use the parking brake lever to apply the rear brakes through the cable mechanism. However, the stopping distances will be dramatically longer than normal service braking because: only the rear brakes are applied, only mechanical (not hydraulic) force is available, and the driver must modulate the lever manually to prevent rear wheel lockup.

2. C. One crush washer was reused — Copper crush washers at banjo bolt connections are designed for single use. The copper permanently deforms during initial torquing to fill microscopic irregularities on both sealing faces. After removal, the permanently deformed washer can no longer conform to the new mating surfaces — it may seal initially at installation torque but will seep under pressure cycling as the pre-deformed copper shape does not match the new surfaces. Both crush washers — one on each side of the banjo fitting — must be new at every installation.

3. B. Front pad compound has significantly reduced wet friction coefficient — Brake pad friction compounds vary in their wet-versus-dry friction performance. Some semi-metallic compounds that provide excellent dry stopping perform significantly worse in wet conditions — the water film between the pad and rotor is not expelled as efficiently and the friction coefficient drops substantially. The driver experiences adequate stopping in dry conditions but noticeably longer distances when the pads are wet. Upgrading to a pad compound with a better wet friction rating resolves this condition.

4. B. Cold shoe-to-backing plate contact pad binding frees progressively with heat — Rear drum brake shoe web-to-backing plate contact pad surfaces can develop a slight binding tendency when cold — from surface corrosion, lack of lubrication, or distortion. The binding prevents the shoe from immediately positioning correctly when cold. Each brake application partially moves the shoe toward its correct contact position and generates heat that progressively frees the binding. After 3 to 4 stops the contact surfaces have freed completely and the pedal height stabilizes. Cleaning and lubricating the contact pad surfaces resolves the condition.

5. B. Pad installed backward — A brake pad installed in the wrong orientation relative to the rotor's rotation direction positions the leading edge at the wrong end of the pad. The rotor's rotation drags the pad's leading edge (the first point of contact in the rotation direction) into firmer contact through the self-energizing effect. If the pad is installed backward, what was designed to be the trailing edge becomes the leading edge — concentration of contact pressure at this now-incorrect leading edge produces rapid wear at that edge while the rest of the pad barely contacts the rotor.

6. A. Booster functioning correctly — check valve holding stored vacuum — The test confirms the booster is working in two ways: (1) with the hose crimped while the pedal is held under pressure, the pedal does not change — confirming the hydraulic system is intact (not a hydraulic problem). (2) After pedal release, the pedal is still firm after 30 seconds with the hose crimped — confirming the check valve is holding stored vacuum within the booster front chamber without the hose supplying fresh vacuum. Both tests passing confirms both the hydraulic circuit and the booster check valve are functioning correctly.

7. B. Worn right rear tire has smaller rolling circumference — wheel speed sensor correctly reports lower calculated ground speed — A tire with greater wear has a smaller overall diameter — the effective rolling radius is reduced. A smaller radius tire travels less distance per revolution than a larger radius tire at the same rotation rate. At 40 mph road speed, the worn right rear tire must rotate faster than the other three tires to maintain the same ground speed. The wheel speed sensor correctly measures the rotation frequency of the wheel — and the ABS module translates this rotation rate to an apparent speed based on the tire's rolling circumference. A smaller circumference yields a lower calculated speed for the same rotation rate.

8. B. Shoe arc smaller than drum arc — tips contact, center cannot reach drum — A brake shoe whose arc radius is smaller than the drum's interior radius makes contact only at the highest points of the shoe's arc — the tips — while the center of the shoe (which curves away from the drum faster than the drum's curvature) cannot reach the drum surface. This two-point contact pattern severely limits braking effectiveness and causes accelerated wear at the contact tips. Arc grinding the shoes to match the drum radius distributes contact across the full shoe face.

9. B. Check wiring harness for open circuit before replacing sensor — An open circuit reading (infinite resistance) at the sensor connector can result from two different causes: an internal open in the sensor coil, or a broken wire in the harness between the sensor and the ABS module. Both produce identical resistance readings at the sensor connector. The sensor and harness must be tested independently — a continuity test at the ABS module connector with the sensor disconnected confirms harness integrity or identifies the harness break. Only after the harness is confirmed intact can the sensor itself be condemned.

10. B. Inform the customer and recommend a DOT 4 flush — document the finding and customer decision — DOT 3 and DOT 4 glycol fluids are chemically compatible — they do not react adversely when mixed. However, the manufacturer specified DOT 4 because this vehicle's system was designed to operate with the higher boiling point and performance characteristics of DOT 4 fluid. Using DOT 3 is not a safety emergency but does not meet the manufacturer's specification. The professional obligation is to inform the customer, explain the specification difference and its significance, and document the finding and the customer's choice.

11. C. Petroleum contamination in the brake system — When both new calipers show piston seal seepage simultaneously within weeks of installation, the brake fluid system itself is the common cause. Petroleum contamination — from a previous service error where power steering

fluid, ATF, or motor oil was added to the brake fluid reservoir — attacks glycol-compatible rubber seals. The contamination swells the caliper piston seals, eventually pushing fluid past them to the boot junction. Both new calipers are affected simultaneously because the contamination is in the brake fluid that both calipers share. The entire system must be flushed and all rubber components replaced.

12. B. Module programming with vehicle-specific calibration data followed by sensor calibration procedures — ESC/stability control modules require: (1) programming with the specific calibration data for the vehicle's model, year, and configuration from the manufacturer's database — because the module's control algorithms must match the vehicle's actual suspension geometry, weight, and dynamic characteristics; and (2) sensor calibration procedures that establish reference points for the yaw rate sensor (zero point), steering angle sensor (zero point), and lateral accelerometer (orientation reference) specific to the installed vehicle configuration.

13. B. Rear-dominated braking with rear wheel lockup risk — The metering valve's function is to briefly hold off front brake application at low pedal input to allow the rear drums to engage first. A metering valve stuck partially closed (60% flow) continuously — not just at initial application — limits front brake pressure throughout the entire braking event. The rear circuit receiving full pressure while the front receives only 60% means the rear brakes are proportionally overcontributing throughout every stop. The front-to-rear brake force ratio shifts toward the rear — increasing the likelihood of rear wheel lockup during moderate to hard stops.

14. B. Normal booster atmospheric air admission — hiss is air passing through control valve filter — When the brake pedal is applied, the booster's atmospheric control valve opens to admit atmospheric air into the rear booster chamber — creating the pressure differential across the diaphragm that provides assist. On some booster designs, the flow of atmospheric air through the filter and valve is audible as a brief hiss inside the vehicle. This hiss is the normal sound of the control valve operating as designed — it is not a fault. The hiss starting and stopping precisely with pedal input confirms it is the control valve operating correctly.

15. B. Primary piston seal partially failing — undamaged seal section on undamaged bore section holds at 60% — A master cylinder primary cup seal that has localized degradation — worn thin, cracked, or damaged on one section — will bypass fluid as the piston advances in that section of bore. When the piston reaches the bore region where the seal is still in good condition (or where an undamaged section of the seal contacts an undamaged section of the bore), the bypass stops. The pedal sinks to the position where the good seal section engages and holds firm at that lower position — the characteristic of localized, not complete, seal failure.

16. B. Rear brake shoes — When a drum brake drum covered in surface rust has its first braking event after storage, the brake shoes abrade the rust off the drum interior with significant friction force. The abraded rust particles are pressed between the shoe lining and the drum surface — many embed in the brake shoe lining material. Embedded rust particles act as abrasive material that can accelerate lining wear, reduce friction coefficient consistency, and create noise. Inspecting the shoe

condition after the initial storage rust abrasion confirms whether the shoes need immediate replacement.

17. B. Harness wiring has an intermittent open — broken wire strand making and breaking contact — When resistance changes dramatically as the harness is physically moved — from 1,100 ohms (normal range) to 2,800 ohms (far above specification) — the variable resistance is from an intermittent open circuit in the harness wiring. A wire strand that is broken but not completely severed can maintain contact in one harness position and open in another. The ohmmeter measures the combined sensor-plus-harness resistance — as the broken strand loses contact, the circuit becomes partially open and resistance increases dramatically. Flexing the harness while monitoring resistance is the standard technique for locating intermittent harness faults.

18. B. Lips at pad edge are normal wear indicators — measure rotor thickness to determine serviceability — The lip formation at the inner and outer edges of the brake pad contact zone is a normal consequence of differential wear — the pad wears the rotor friction surface while the edges outside the pad contact area wear only from minor contact and oxidation. The height of the lip represents the depth of rotor material removed from the friction surface during service. A 3mm outer lip indicates significant rotor wear — comparing the current thickness measurement to the minimum specification determines whether the rotor is still serviceable.

19. C. Right rear tire different circumference — inflation, wear, or size variation — At a steady 45 mph on a smooth straight road with all four new sensors installed, a consistent 3 mph reading difference at one wheel (6.7% difference) that doesn't trigger any warnings points to a physical difference in that wheel's rolling circumference rather than a sensor installation issue. Different tire wear between axles, different inflation pressure from a slow leak, or — if the vehicle was serviced — inadvertent installation of a slightly different tire size all produce consistent speed reading differences that are not sensor faults.

20. C. Obtain appropriate scan tool before performing service — EPB mechanism can be damaged by mechanical force without service mode — EPB rear calipers use an internal ball-screw or threaded mechanism where the piston must be threaded inward by rotation during retraction. Applying straight mechanical force with a C-clamp against the face of the EPB piston attempts to push straight into the bore — which is not the designed retraction direction for a threaded mechanism. This can damage the internal threading, the motor, or the caliper body. The scan tool service mode commands the motor to electrically retract the piston through its designed rotation mechanism.

21. A. Module programmed with incorrect vehicle data — ABS thresholds set too low — After module replacement and reprogramming, if the calibration data installed corresponds to a vehicle with different brake specifications (different vehicle weight, different tire size, different brake bias) the ABS thresholds may not match the actual vehicle. A threshold calibrated for a lighter vehicle with less braking capability will activate ABS at deceleration rates that a heavier or higher-

performance vehicle can achieve without approaching wheel lockup. Correct reprogramming with the exact vehicle's calibration data resolves the inappropriate activation.

22. B. Rear wheel lockup tendency during moderate stops — The proportioning valve's function is to limit rear brake pressure above a calculated split point where the rear tires' reduced grip during braking (from forward weight transfer) would cause them to lock before the fronts. Without the proportioning valve limiting rear pressure, the rear brakes receive full system pressure from the very beginning of application. Since the rear tires have less grip than the front tires during braking due to weight transfer, they reach lockup at lower brake application levels — causing the characteristic rear-first lockup that the proportioning valve was specifically designed to prevent.

23. B. Test motor resistance at motor terminals with harness disconnected — Before condemning the pump motor, the motor must be tested independently of its wiring harness. Disconnecting the motor harness and measuring resistance at the motor terminals determines whether the short to ground is in the motor itself or in the harness wiring. If motor terminals read correct resistance with no short to ground, the motor is intact and the short is in the harness between the relay and motor. If motor terminals show a short to ground with the harness disconnected, the motor itself has failed. This isolation test saves the cost of replacing the correct component.

24. A. Bleed sequence incorrect for this diagonal-split system — A diagonal-split master cylinder serves two separate circuits: Circuit 1 (e.g., LF + RR) and Circuit 2 (e.g., RF + LR). For effective bleeding, each circuit should be bled sequentially — starting with the farthest wheel from the master cylinder on each circuit. Bleeding all four wheels in a simple right rear to left front sequence mixes both circuits and may not effectively purge air from either complete circuit path. The correct sequence follows each diagonal circuit: typically starting with one circuit (e.g., RR then LF) before moving to the second circuit (LR then RF).

25. B. Bent suspension reduced tire contact patch — braking limited by reduced traction regardless of caliper function — A severely bent suspension component (like a control arm or steering knuckle) changes the wheel's camber angle significantly. Extreme camber — the wheel tilting inward or outward at the top — reduces the tire contact patch from its designed full-footprint contact to a small area at one edge of the tread. The brake caliper can apply maximum clamping force to the rotor, but the actual stopping force is limited by what the tire can transmit to the road surface. A drastically reduced contact patch means drastically reduced traction — regardless of how well the brake caliper functions.

26. B. Comprehensive inspection, replace damaged components, clean and protect surfaces, replace deteriorated rubber — Six months of coastal salt air exposure subjects all metal components to accelerated corrosion and all rubber components to ozone and UV degradation simultaneously. The service is not simply cleaning and reinstalling — it requires: systematic inspection and measurement of all metal components for structural corrosion damage, replacement of any component with compromised structural integrity, thorough cleaning and anti-corrosion

protection of all metal mounting surfaces, and replacement of any rubber boot, seal, or hose that has surface cracking or hardening from environmental exposure.

27. B. Different wheels reaching lockup threshold at different times — normal independent ABS operation — Four-channel ABS monitors and controls each wheel independently. During a hard stop, different wheels may approach lockup at different times because of differences in tire grip, local road surface, brake force contribution, and dynamic weight distribution. The system activates ABS at whichever wheel(s) first reach their individual lockup threshold — other wheels may never reach lockup during the same stop. This is the correct and intended behavior of a four-channel system — independent, wheel-by-wheel modulation based on actual conditions at each wheel.

28. B. Rear drum brake shoes have excessive running clearance — A firm pedal feel at the bottom of long travel confirms the hydraulic system is intact — no air, no bypass. The long pedal travel before the firm feel indicates the caliper or wheel cylinder pistons must travel through a large gap before braking begins. With a new master cylinder in place, the remaining variable is shoe-to-drum clearance. Excessively large shoe-to-drum clearance requires the wheel cylinder pistons to extend much further than normal before the shoes contact the drum — consuming pedal travel that delivers no braking until contact is made. Adjusting the rear shoe clearance to specification reduces pedal travel.

29. A. Right rear wheel lockup on every stop — An outlet solenoid valve stuck in the open position continuously connects the right rear caliper circuit to the HCU accumulator. In normal braking, the outlet valve is closed — master cylinder pressure flows through the open inlet valve to the caliper. With the outlet valve stuck open, any pressure that attempts to build in the right rear circuit immediately vents to the accumulator — the right rear caliper cannot hold pressure and the right rear wheel receives essentially no braking force. Under continued application pressure, the right rear wheel decelerates much more slowly than the others and eventually reaches zero speed (lockup) from friction, not braking.

30. B. ESC can be appropriately disabled in controlled competition — re-enable before public roads — ESC is designed to manage unintended vehicle instability on public roads under emergency conditions. In autocross competition, the driver is trained, the course is controlled, and intentional vehicle yaw and slip are driving technique tools. ESC interventions during competition can override intentional steering inputs and reduce vehicle responsiveness. Disabling ESC in this controlled context is a reasonable technical choice. However, the safety basis for ESC is proven on public roads, and it must be re-enabled before any public road driving where the system's emergency response capability provides genuine safety benefit.

31. B. Thread repair inserts to restore thread integrity — or knuckle replacement if too damaged — Caliper bracket mounting threads that are stripped represent a brake safety issue — the bracket must be secured with the specified clamping force. Thread repair inserts (HeliCoil or equivalent) restore full thread engagement in a damaged bore by providing a new, undamaged

thread surface within the original hole diameter. The insert must be rated for the caliper bracket bolt torque specification. After thread repair, installing the correct bolt with thread-locking compound to specification torque provides the same clamping force as the original undamaged thread.

32. B. Right rear caliper is EPB type — piston must be threaded inward by rotation — A rear caliper whose piston rotates freely is an EPB (electric parking brake) or mechanical parking brake integrated caliper. The piston retracts by screwing inward through a threaded mechanism — not by being pushed straight back. During service, the piston must be rotated clockwise (typically) while being simultaneously pushed inward using a specialized caliper wind-back tool. Attempting to retract the piston with a C-clamp applies straight-line force to a piston that must rotate — this damages the internal screw mechanism and can cause permanent caliper failure.

33. B. New sensor installed with incorrect air gap — sensor tip intermittently contacting tone ring — An air gap that is too small — below the minimum specification — allows the sensor tip to intermittently contact the tone ring teeth as they rotate past. When the sensor tip contacts the tooth, the electrical signal reads zero (or maximum) — when it clears the tooth, it reads the correct tooth position. This intermittent contact/no contact creates the rapid oscillation between 0 and actual speed that the scan tool displays. Setting the correct sensor mounting depth to achieve the specified air gap resolves the erratic signal.

34. B. Replace all four brake pads before the mountain trip — This is a judgment call that balances current specification compliance against foreseeable risk. Pads at 4mm are above minimum but have limited life remaining. Mountain driving is the most demanding brake condition — repeated high-energy stops on long descents with inadequate cooling intervals. The consequences of pad failure (metal-to-metal contact, brake fade, loss of braking control) on a mountain descent are severe. The cost of replacing 4mm pads preventively is far less than the risk of pad failure at altitude. This is the professional recommendation when the customer has disclosed the specific demanding use case.

35. B. Drum installed without retracting shoes — drum forced shoe tip outward as it was pressed over extended shoe — When a drum is installed over brake shoes that have not been retracted sufficiently, the drum's opening must be forced over the shoes' contact area. The leading edge tip of the primary shoe — the portion that sticks out furthest at the drum entrance — catches the edge of the drum opening and is bent outward as the drum is forced over it. This results in a bent shoe tip that then creates noise and possible interference during reverse braking when the self-energizing geometry reverses.

36. C. Leak is in the right front circuit between master cylinder and right front hose clamp — The hose clamp test isolates different portions of the hydraulic circuit. If clamping the right front hose causes the pedal to sink, the fluid loss is occurring between the master cylinder outlet and the hose clamp — in the right front rigid line, line fittings, master cylinder port, or master cylinder itself. If the leak were at the caliper or hose itself, clamping the hose would prevent the

pedal from sinking (by isolating the leak point from the rest of the circuit). The fact that clamping the hose still allows the pedal to sink means the leak is between the master cylinder and the clamp.

37. B. Attempt module reprogramming before replacement — A checksum error in module calibration data can result from a corrupted programming event — power loss during programming, wrong vehicle data, or a communication error during the programming session. Before condemning the module hardware as failed, attempting to reprogram with the correct vehicle calibration data may restore the correct checksum and resolve the fault. This is a lower-cost first step that can avoid unnecessary module replacement. If reprogramming fails or the error immediately recurs, the module hardware itself has failed and requires replacement.

38. B. Compare friction coefficient of left and right rear shoe lining material — With all measurable hydraulic and mechanical variables confirmed equal (equal cylinder bore size, equal hydraulic pressure, equal drum diameter), the remaining variable is the friction material itself. Different friction coefficients between left and right rear shoes — from different aftermarket compounds installed at different service visits — would produce unequal braking force at equal hydraulic pressure. Verifying that both shoes carry identical part numbers and are from the same friction compound resolves this systematically.

39. B. Corrosion at motor circuit connector or terminal creating resistance — A DTC for high circuit resistance with a motor that runs normally on direct battery voltage and a confirmed good ground indicates a resistance source between the relay contact and the motor. The motor receives full power when directly connected — bypassing the circuit's connectors and wiring. The DTC reflects resistance detected by the module's current monitoring circuit — a resistance that the direct battery test bypasses. Corrosion at a connector terminal between the relay and motor is the most common cause of circuit resistance that appears in the current-monitored circuit but not in a direct battery test.

40. B. Air in ABS HCU accumulator releasing pressure into wheel circuit after stop — When the ABS pump cycles during ABS activation, fluid is moved between the wheel circuits and the HCU internal accumulator. If air is present in the accumulator, the air remains under pressure after the stop. This pressurized air-fluid mixture in the accumulator slowly releases into the brake circuit after the stop — maintaining caliper pressure and keeping the brakes applied beyond the stop. As the trapped pressure slowly dissipates over 30 seconds, the brakes release. A follow-up brake bleed with scan tool solenoid actuation purges the air from the HCU accumulator.

41. B. Remove tone ring, clean all anti-seize compound, press to correct depth — Anti-seize compound is specifically designed to prevent press-fit adhesion and to allow components to be separated easily in the future. Applied to a tone ring press fit, anti-seize compound eliminates the interference fit that holds the ring in its correct position. The ring cannot be left at 3mm short of depth — it will migrate further during operation and create an incorrect air gap. All compound must be thoroughly removed before pressing the ring to the correct depth to achieve the required retention force.

42. B. Frontal collision sufficient to deploy airbags requires AEB sensor inspection and recalibration — A frontal impact forceful enough to deploy airbags affects the front of the vehicle — exactly where the AEB radar and camera sensors are located. The impact can physically displace, damage, or contaminate these sensors. Even if the sensors appear intact, their mounting angle may have changed from the body deformation caused by the collision. AEB cannot function safely without correctly aimed sensors — a displaced camera or radar that detects objects at incorrect angles could either fail to detect a real threat or activate AEB unnecessarily. Sensor inspection and recalibration are mandatory post-collision safety procedures.

43. B. Shoe rocks on backing plate — changed geometry, reduced contact efficiency, noise — The raised contact pads on the backing plate position the shoe web at the correct angle and height relative to the drum interior. When a contact pad is worn smooth, the shoe web contacts the backing plate surface directly — the shoe can rock slightly inward at that contact point. This rocking changes the shoe's approach angle to the drum, alters the effective contact patch between shoe and drum, reduces braking efficiency at the affected shoe position, and generates noise from the shoe movement within its increased clearance.

44. B. Signal circuit open or short to ground — sensor supply and signal voltage testing required — A brake pressure sensor that reads 0 psi in both static and dynamic conditions is not functioning — a working pressure sensor will read some pressure above 0 when the pedal is firmly applied. A 0-psi reading at all times suggests the signal wire is either open (no voltage reaching the module) or shorted to ground (signal wire pulled to ground regardless of sensor output). Testing the sensor supply voltage (reference voltage) and signal voltage at the HCU connector while applying the brakes identifies whether the sensor has power and is generating a signal — or whether a circuit fault is preventing the signal from reaching the module.

45. C. Inform customer of current status, project replacement timeframe, schedule follow-up inspection — The most professional response balances honest current-status reporting with forward-looking service planning. Pads at 3mm are within specification but have limited remaining life. The professional adds value by projecting — based on observed wear rate — when replacement will be needed, and scheduling a proactive inspection to confirm pad status before they reach minimum unexpectedly between regular service intervals. This prevents the customer from discovering minimum pads at the worst possible time (before a road trip, during high-use periods) and demonstrates proactive maintenance expertise.