PRACTICE EXAM 15: ASE A4 SIMULATION (40 QUESTIONS)

STEERING SYSTEMS DIAGNOSIS AND REPAIR (Questions 1–12)

1. A vehicle exhibits a squealing noise that occurs only during steering wheel rotation at parking speeds. The noise disappears during straight driving. Fluid level is at specification. What is MOST likely the cause?

A. Internal failure of the power steering pump vane and cam ring assembly

B. Contaminated power steering fluid creating noise during operation only

C. The rack and pinion internal spool valve has failed during steering operation

D. A glazed or slipping serpentine belt loading the pump during steering input

2. A customer reports their 2019 vehicle's steering has become harder to turn only in hot weather above 85°F. In cool weather, the steering operates normally. What is MOST likely the cause?

A. The EPS control module requires a firmware update for warm operation conditions

B. The power steering pump has worn seals that bypass fluid when the fluid thins from heat

C. The steering angle sensor has drifted calibration from warm temperature operation

D. The power steering fluid has degraded from age and requires replacement immediately

3. A technician is removing a steering column on a 2021 vehicle with column-mounted EPS. The negative battery cable has been disconnected. The manufacturer specifies a 15-minute capacitor discharge time. The technician waits 5 minutes before beginning airbag removal. What is the consequence of this decision?

A. The SRS capacitor may still retain enough charge to deploy the airbag during service

B. The EPS control module will lose calibration requiring reprogramming after repair

C. The steering angle sensor will require calibration before vehicle release to customer

D. The clockspring ribbon cable may fail during the column removal procedure steps

4. A hydraulic power steering rack is leaking at the pinion input shaft seal. The leak is active with the engine running. What is the correct repair?

A. Apply seal conditioner to the fluid to swell the pinion seal and stop the leak

B. Replace only the pinion input shaft seal using a dealer seal kit for the rack

C. Replace the rack and pinion assembly because the pinion seal is integral to the unit

D. Add high-viscosity power steering fluid to reduce the flow rate past the worn seal

5. A recirculating ball gearbox has worn sector teeth at the center position. The customer reports the steering wheel has a "tight spot" at the center but feels normal away from center. What is the correct repair?

A. Loosen the sector shaft adjuster slightly to reduce the tight feel at the center position

B. Tighten the sector shaft adjuster to compensate for the wear at the center teeth area

C. Add high-viscosity fluid to the gearbox to provide more cushioning at the worn center

D. Replace or rebuild the gearbox because the sector teeth are worn beyond adjustment

6. An EPS-equipped vehicle has reduced assist intermittently during heavy electrical loads (headlights, rear defrost, heated seats). Battery voltage at rest reads 12.6 V. What should be checked NEXT?

A. The EPS control module for internal failure requiring a complete module replacement

B. Voltage drop on the EPS power feed and ground circuits under maximum electrical load

C. The steering angle sensor calibration using the manufacturer scan tool procedure

D. The serpentine belt tensioner for proper function during high accessory loading

7. A power steering hose has developed a "puffed" or bulged section in its outer rubber cover near the crimped end fitting. What is the correct action?

A. Replace the hose assembly because bulging indicates internal reinforcement failure

B. Inspect the bulge for fluid seepage and leave in service if no leakage is present now

C. Apply a hose clamp around the bulged section to reinforce the damaged area from outside

D. Wrap the bulge with heat-resistant tape to prevent further deterioration in service

8. A clockspring is being installed after SRS service. The clockspring has been centered mechanically per the manufacturer procedure. After steering wheel installation and battery reconnection, the SRS warning light stays illuminated and the horn does not function. What is MOST likely the cause?

A. The SRS module has failed during the installation and requires complete replacement

B. The battery voltage dropped too low during installation and the SRS needs time to reset

C. The clockspring electrical connectors were not properly seated during final assembly

D. The airbag module itself has failed internally and requires a complete replacement

9. A technician performs a power steering pressure test. At idle with the wheels straight, pressure reads 90 psi. Specification is 50–100 psi. When the wheel is held against the stop at full lock, pressure reaches 1,180 psi within 2 seconds. Specification is 1,200 psi at relief. After 10 seconds at full lock, pressure remains at 1,180 psi. What does this test confirm?

A. The pump is slightly below specification and requires replacement to meet service spec

B. The rack has internal bypass preventing pressure from reaching relief specification

C. The flow control valve is stuck partially open limiting pressure at the full lock condition

D. The pump and rack are functioning within normal specification tolerance at all test points

10. A pickup truck with solid-axle front suspension has developed death wobble at 55 mph after hitting a pothole. The steering damper is new — installed 3 weeks ago. What is the MOST likely underlying cause?

A. The new steering damper is defective from the supplier and needs immediate replacement

B. The power steering pump pressure is below specification and contributing to the wobble

C. Track bar bushings, tie rod ends, and front ball joints have cumulative wear producing wobble

D. The front shock absorbers have failed causing excessive wheel motion during driving conditions

11. A 2020 sedan with column-mounted EPS exhibits a clicking sound from inside the dashboard only during low-speed steering. The clicking matches the rate of steering wheel rotation. What is the MOST likely cause?

A. The EPS motor coupling or worm gear has worn within the column-mounted EPS unit

B. The steering angle sensor is producing electrical noise during the wheel rotation cycle

C. The intermediate shaft U-joint has worn bearings producing noise from the column area

D. The power steering pressure switch is cycling electrically during steering input loads

12. A rack-mounted EPS system has a scan tool DTC for "Torque sensor signal invalid." Live data shows the two torque sensor channels reading 2.5 V and 2.6 V at rest. The vehicle has reduced assist and hard steering. What is the correct repair?

A. Clear the DTC and road test — the readings are too close and may be acceptable normal

B. Replace the steering angle sensor which is causing the torque sensor invalid signal

C. Disconnect the battery for 30 minutes to force the EPS module to reset and relearn

D. Replace the rack and pinion assembly — the torque sensor is integrated and not serviceable

SUSPENSION SYSTEMS DIAGNOSIS AND REPAIR (Questions 13–24)

13. A MacPherson strut assembly has been replaced on a vehicle. During the service, the upper strut mount was reused despite being 8 years old. The customer returns 2 months later complaining of a clunking noise during steering input. What is MOST likely the cause?

A. The strut bearing has failed from extended use and requires immediate replacement

B. The strut mount bushing has hardened allowing metal-to-metal contact during steering

C. The upper strut mount has worn bearings producing clunking during steering rotation

D. The new strut is defective and is producing the clunking noise during normal driving

14. A load-carrying ball joint is being inspected. The vehicle is on a two-post lift with wheels hanging free. To accurately measure ball joint wear, the technician must:

A. Grab the tire at 12 and 6 o'clock positions and rock it firmly to detect vertical play

B. Place a pry bar between the lower control arm and frame to unload the joint during test

C. Apply weight to the upper ball joint to load it in the reverse direction during inspection

D. Rotate the tire by hand to feel for any roughness indicating bearing failure during the test

15. A vehicle has developed a harsh ride quality that appeared suddenly after a pothole impact. Tire pressures are correct. Ride height is within specification at all four corners. What is MOST likely the cause?

A. A damaged internal component in a shock absorber or strut from the impact event

B. The alignment has been knocked out of specification from the impact during the incident

C. The tire casing has been damaged from the impact reducing the sidewall flex characteristics

D. The stabilizer bar bushings have cracked from the impact affecting suspension response

16. A coil spring on a vehicle shows a visible crack in one of the upper coils. The vehicle is still drivable and the customer wants a cost estimate. The correct recommendation is:

A. Replace only the cracked spring and perform a ride height check after service is done

B. Grind out the crack and reinforce the spring with welded material for durability

C. Install an aftermarket spring insert to maintain ride height without full replacement

D. Replace the cracked spring and the opposite spring on the same axle as a matched pair

17. An air suspension vehicle has one corner that drops repeatedly overnight. The compressor runs to restore height each time the vehicle is started. Leak testing with soapy water reveals no external leaks at the air spring. What is MOST likely the source of the leak?

A. The compressor is producing insufficient output pressure to maintain system pressure

B. The ride height sensor at that corner is reporting incorrect values to the control module

C. An internal leak in an air valve or connection not accessible to external soap testing

D. The air suspension control module has an internal fault requiring complete replacement

18. A pickup truck with torsion bar front suspension has ride height below specification on both sides. The customer has not added cargo. The correct adjustment procedure requires the vehicle to be positioned:

A. On a two-post lift with the wheels hanging free to unload the torsion bars for easy access

B. At curb weight on level ground with all four wheels firmly on the ground during adjustment

C. On jack stands placed under the lower control arms at the pivot points for clearance

D. With the front wheels on turn plates to allow the suspension to move during adjustment

19. An adaptive damping system has a fault code for "rear right damper current out of range." The wiring harness and connector test good. Scan tool live data shows 0.1 A actual current when 2.0 A is commanded. What is the correct repair?

A. Replace the suspension control module because the output driver has failed internally

B. Replace only the rear right damper since the fault is confirmed at that specific corner

C. Reset the fault code and road test the vehicle to verify if the condition returns during driving

D. Replace both rear dampers as a matched pair to maintain balanced damping across the axle

20. A stabilizer bar end link has been replaced. The ball stud at the end of the new link has a specified torque of 40 ft-lb at ride height. The technician should torque the link:

A. At ride height with the suspension loaded to curb weight on level ground surface

B. On a two-post lift with the wheels hanging free for easier access to the ball stud

C. On jack stands placed under the frame to provide stability during torque application

D. At full suspension droop with the wheels fully extended downward during torquing

21. A multi-link rear suspension has rear toe that cannot be adjusted within specification despite full adjustment range at the eccentric cam. The suspension links appear intact on visual inspection. What is MOST likely the cause?

A. The rear shock absorbers are worn and causing dynamic shift during alignment measurement

B. The alignment equipment requires recalibration for the vehicle model being serviced

C. The rear subframe has shifted from its design position and requires centering with pins

D. The rear tires are mismatched in size affecting the measurement of toe readings at the rack

22. A vehicle has been lifted on a two-post hoist. The technician notices the vehicle has air suspension with active height control. The technician proceeds to remove a control arm without disabling the air suspension. What is the likely consequence?

A. The air suspension may release or inflate during service causing sudden movement or damage

B. The control arm removal will not be possible because the air springs prevent component access

C. The compressor will be damaged from running without hydraulic pressure in the system

D. The air suspension fuse will blow preventing the vehicle from being lowered after the service

23. A customer complains of a squeaking noise from the front suspension during articulation at parking speeds. The noise is absent during highway driving. What component is MOST likely the cause?

A. A failing wheel bearing on the front left side of the vehicle during low-speed rotation only

B. A worn upper strut bearing causing friction during steering wheel rotation at any speed

C. Worn outer CV joint on the driver's side half-shaft producing noise during articulation

D. Dry or cracked stabilizer bar bushings rubbing against the bar during articulation cycles

24. A leaf spring rear suspension has U-bolts that have come loose 500 miles after initial torque to specification. The U-bolts are marked as torque-to-yield. What is the correct action?

A. Retorque the existing U-bolts to specification and release the vehicle to the customer

B. Replace the U-bolts with new torque-to-yield units and torque to specification per manufacturer

C. Apply thread locker to the existing U-bolts and retorque to compensate for service use

D. Tighten the U-bolts 50% beyond specification to ensure they do not loosen again in service

WHEEL ALIGNMENT DIAGNOSIS, ADJUSTMENT, AND REPAIR (Questions 25–35)

25. A vehicle has the following front alignment readings: Left camber +0.5°, Right camber -0.3°. Camber specification is 0° ± 0.75°. Both readings are individually within spec tolerance. The vehicle pulls to the left. What is the cause?

A. The front toe is slightly out of specification and causing the pull despite the camber readings

B. The vehicle has a dragging left front brake caliper causing the pull during highway driving

C. Cross-camber of 0.8° with the left side more positive than the right produces a leftward pull

D. Normal road crown compensation is causing the pull and no alignment correction is needed now

26. A vehicle has front caster readings of Left +2.8° and Right +4.3°. Camber is within specification at both sides. The vehicle pulls at highway speed. In which direction?

A. Toward the left — caster pull goes to the less-caster side of the vehicle during driving

B. Toward the right — the right side has more caster than the left causing rightward pull

C. No pull will occur — caster imbalance does not affect vehicle pull direction at highway speeds

D. The pull direction depends on camber readings not shown in the alignment printout data

27. Excessive negative camber at both front wheels will produce which tire wear pattern?

A. Outside-edge wear with feathering across the tread from inside toward the outside edge

B. Center tread wear with minimal shoulder wear on either side of the tire tread area

C. Cupped or scalloped wear around the tire circumference from worn shock absorbers

D. Inside-edge wear with a smooth feel across the tread — no feathering present on tire surface

28. A vehicle has SAI readings of Left 12.5° and Right 14.2°. Camber readings are within specification on both sides at -0.1°. Specification for SAI is 13.0° ± 0.5°. What does this indicate?

A. The right front steering knuckle is likely bent from an impact event and requires replacement

B. The alignment equipment requires recalibration before continuing the alignment service

C. The tire pressures differ between the two sides affecting the apparent SAI measurements

D. The ride height is different between sides causing the SAI difference on alignment rack

29. A FWD vehicle with torsion beam rear suspension has rear toe reading +0.35° on one side and +0.05° on the other. Specification is 0° to +0.15° per side. What is the correct repair?

A. Adjust the rear toe eccentric cam bolt on the affected trailing arm pivot to bring to spec

B. Install aftermarket adjustable torsion beam mounts to create rear toe adjustment on vehicle

C. Inspect the torsion beam and trailing arm for bent or damaged condition — replace as needed

D. Accept the asymmetric toe and document the condition on the alignment printout for customer

30. After an alignment is complete, the steering wheel sits 8° off-center during straight driving. The vehicle tracks straight without pulling. What is the correct action?

A. Remove the steering wheel and reindex it on the splined shaft to correct the offset

B. Adjust the rear toe to create a thrust angle offset that compensates for the wheel offset

C. Accept the condition because the vehicle tracks straight — the cosmetic offset is acceptable

D. Split the front toe adjustment unequally between tie rods to re-center the steering wheel

31. A technician performs a caster sweep during alignment. The alignment machine reports no change in camber reading during the wheel sweep. What is the MOST likely cause?

A. The vehicle has excessive positive caster at both front wheels of the suspension

B. The wheel runout compensation procedure was skipped or failed during the initial setup

C. The rack pressure spring is adjusted too tightly causing the rack to bind during rotation

D. The power steering pump is producing insufficient pressure during the sweep operation

32. A vehicle's alignment printout shows a thrust angle of +0.55°. The total rear toe is within specification. Which condition exists?

A. The front toe is causing the thrust angle and requires readjustment during service

B. The thrust angle is normal and within tolerance for highway-speed vehicle operation

C. The alignment equipment requires recalibration for accurate thrust angle measurement

D. The left and right rear toe settings are asymmetric creating a non-zero thrust angle

33. A vehicle with lane-keep assist has had an alignment completed. The steering wheel was re-centered during front toe adjustment. The forward camera was not physically moved during the service. Which calibration is required?

A. The steering angle sensor and typically the ADAS forward camera require calibration procedures

B. Only the steering angle sensor requires calibration — the forward camera is isolated from alignment

C. Only the tire pressure monitoring system requires reset after the alignment is completed

D. No calibration is needed because the camera was not physically disturbed during the service

34. A vehicle has no factory adjustment for front camber. The left front camber reads 1.5° more negative than specification. The underlying cause has been determined to be a bent strut from an impact. What is the correct repair?

A. Install an aftermarket camber adjustment kit to compensate for the bent strut condition

B. Leave the camber out of specification and document the condition on the alignment printout

C. Replace the bent strut to restore correct camber — the underlying cause must be repaired

D. Swap the left and right struts to equalize the camber reading between the two sides

35. Included angle differs side-to-side by 1.8° on a vehicle. Camber is within specification on both sides. Specification for included angle is 13.0° ± 0.5°. What does this indicate?

A. The alignment equipment requires calibration before accurate measurements can be obtained

B. A steering knuckle is likely bent from impact damage — the included angle difference confirms

C. Tire pressure differences between sides are affecting the included angle measurements

D. The ride height is different between sides causing the included angle measurement to shift

WHEEL AND TIRE DIAGNOSIS AND SERVICE (Questions 36–40)

36. A vehicle has steering wheel shimmy at 60 mph. All four wheels have been balanced within specification. What should be checked NEXT?

A. Radial and lateral runout on the front wheel-and-tire assemblies using a dial indicator

B. The rear wheel bearings for looseness contributing to the speed-specific shimmy issue

C. The engine mounts for deterioration causing vibration transmission to steering wheel

D. The front brake rotors for thickness variation causing the vibration at highway speeds

37. A TPMS warning light has been illuminated on a 2022 vehicle during cold weather. Scan tool shows all four tire pressures at 27 psi. The placard specification is 32 psi. The ambient temperature has dropped 50°F from the last service. What is the cause?

A. Four simultaneous slow leaks requiring tire inspection for punctures during the service

B. All four TPMS sensor batteries have failed simultaneously and need replacement at this time

C. The TPMS module requires a reset procedure to clear the old pressure data from memory

D. Tire pressure dropped approximately 5 psi from the 50°F ambient temperature decrease

38. A wheel hub assembly with a torque-to-yield axle nut is being installed. The specification reads "220 ft-lb + 60°." This notation indicates:

A. Torque to 220 ft-lb only — the 60° is optional and does not affect clamping force

B. Torque to 220 ft-lb first, then rotate the nut 60° additional for the final specification

C. Torque to 60 ft-lb first, then rotate the nut 220° additional for the final specification

D. The nut can be torqued to any value as long as the rotation is completed at 60° for service

39. A tire puncture is located in the tread area and measures 5/16 inch in diameter. The tire has 6/32 inch tread remaining. The industry-standard maximum repairable puncture diameter is 1/4 inch. What is the correct service action?

A. Repair the puncture using a combination plug/patch from inside the tire — size is acceptable

B. Install an external string plug since the puncture is in the tread area and above size limit

C. Replace the tire because the puncture exceeds the industry-standard repairable size limit

D. Install an interior patch only without plugging since the puncture is only slightly oversized

40. A direct TPMS sensor shows the right front tire at 28 psi on the scan tool. The tire has been verified with a gauge at 35 psi — matching the placard specification. What is the MOST likely cause?

A. The TPMS sensor at the right front has failed internally and reports an incorrect pressure value

B. The TPMS module requires reset using a scan tool to clear old pressure data from memory

C. The tire valve stem is leaking slowly during the measurement process at the sensor location

D. The TPMS sensor battery has failed and is affecting the accuracy of the pressure measurement

Practice Exam 15: Answer Key and Explanations

1. D — A squealing noise only during steering wheel rotation at parking speeds is the classic signature of a glazed or slipping serpentine belt. The pump requires more power during steering input, which loads the belt. A healthy belt doesn't squeal; a glazed or loose belt slips under load and squeals. Belt inspection and tension check is the correct diagnostic.

2. B — Worn pump internal seals allow more bypass as fluid thins at higher temperatures. In cool weather, the thicker fluid maintains adequate flow through the worn clearances; in hot weather, the thinned fluid bypasses the worn seals, reducing output pressure and assist. This temperature-dependent pattern specifically points to pump wear approaching end of life.

3. A — The specified 15-minute SRS capacitor discharge time must be fully respected. Waiting only 5 minutes leaves the backup capacitor with potentially enough charge to deploy the airbag during service. The wait time is specific to each manufacturer's SRS module design; skipping any portion creates a serious injury risk for the technician.

4. C — On most modern rack and pinion assemblies, the pinion input shaft seal is not individually serviceable — it is integral to the rack housing. Rack replacement is the standard repair for pinion shaft seal leaks. Seal kits, conditioner additives, and higher-viscosity fluid are not manufacturer-approved repair methods for this specific failure.

5. D — Worn sector teeth at the center position cannot be compensated by adjustment. Adjusting the sector shaft tighter makes the center tight but causes binding at lock positions; adjusting looser leaves the center loose. The gearbox must be replaced or rebuilt — the teeth themselves are the failure source. Fluid changes don't restore worn gear teeth.

6. B — EPS modules are highly sensitive to supply voltage. Intermittent symptoms during heavy electrical load point to high-resistance connections that only manifest when maximum current flows. Voltage drop testing under load is the correct diagnostic step before condemning EPS hardware. At-rest voltage readings do not reveal load-induced resistance issues.

7. A — A bulged section in the outer rubber cover of a high-pressure hose indicates internal reinforcement failure. The inner braid or pressure layer has broken, allowing fluid pressure to push the outer cover outward. Without internal reinforcement, the hose can rupture without warning. Immediate replacement is required — clamps, tape, or monitoring are all unsafe.

8. C — If the clockspring is correctly centered but the SRS light stays on and the horn doesn't function after installation, the most common cause is unseated electrical connectors. Before replacing modules or airbags, verify every SRS connector is fully seated — this is the fastest fix and the most common oversight. Confirm connections first.

9. D — All three readings are within normal specifications: idle pressure (90 psi vs. 50–100 spec), relief pressure reaching 1,180 psi of the 1,200 psi spec (well within tolerance), and sustained pressure at full lock (confirming no bypass). All indicators confirm pump and rack function normally. Recognizing normal test values is a core A4 skill.

10. C — Death wobble on solid-axle vehicles is almost always caused by combined wear in track bar bushings, tie rod ends, and front ball joints. Replacing only the damper treats the symptom temporarily; the underlying wear causes the new damper to wear out within weeks. Proper diagnosis requires inspecting all related components, not just the damper.

11. A — Clicking from inside the dashboard that matches steering wheel rotation rate is the classic signature of a worn EPS motor coupling or worm gear. The noise originates specifically where the assist motor drives the steering shaft. SAS, intermediate shaft, and pressure switch issues produce different noise patterns or locations — the rotation-matched click is EPS-specific.

12. D — Torque sensor channels at 2.5 V and 2.6 V at rest are only 0.1 V apart, which is within normal tolerance. However, the DTC indicates an implausible signal under some condition. On modern rack-mounted EPS systems, the torque sensor is integrated into the rack and not individually serviceable — rack replacement is the correct repair when the sensor fails.

13. C — The upper strut mount's integrated bearing allows the strut to rotate with the knuckle during steering. After 8 years, the bearing develops wear that produces clunking during steering rotation. Always replace strut mounts and integrated bearings during strut service — reusing aged mounts on new struts typically returns as a complaint within months.

14. B — A load-carrying ball joint must be unloaded before accurate wear inspection. Placing a pry bar between the lower control arm and the frame supports the arm and unloads the joint. Wheels-hanging inspection with no unloading keeps the spring loading the joint, which hides any play that is actually present. Proper setup is essential for accurate inspection.

15. A — Sudden harsh ride after a pothole impact points directly to internal shock or strut damage from the impact. The violent compression can damage internal valves, bend the shock shaft, or fracture internal components. Alignment, tire casing damage, and bar bushings would produce different symptom profiles. Bounce test and shock inspection are the diagnostic steps.

16. D — Cracked coil springs must be replaced, and the opposite spring on the same axle must also be replaced as a pair to maintain matched spring rates. Straightening, welding, and spring inserts are not manufacturer-approved repair methods. Pair replacement ensures matched handling characteristics and prevents an immediate return visit for the other aging spring.

17. C — Overnight leak with no external evidence on the air spring points to an internal leak at a valve, seal, or connection not visible externally. Common culprits include the valve inside the compressor, an internal solenoid, or a connection inside the air distribution block. Compressor output, sensor values, and module faults would produce different symptoms.

18. B — Torsion bar ride height adjustment must always be performed with the vehicle at curb weight on level ground, with all four wheels firmly planted. This positions the suspension in its normal loaded state. Any other position (lift, jack stands, turn plates) produces incorrect preload because the suspension is not in its operational position.

19. D — Adaptive dampers must be replaced in pairs on the same axle regardless of which side shows the fault. Asymmetric damping characteristics between a new damper and an older one cannot be compensated by the control module and produce unpredictable handling. Pair replacement is standard industry practice for all electronically controlled damping systems.

20. A — Stabilizer end link fasteners with rubber bushings must be torqued at ride height with the suspension loaded. Torqueing at full droop or on a lift preloads the bushings in a twisted position, accelerating wear and producing noise. The ride-height torque rule applies to any suspension fastener passing through a rubber bushing — no exceptions.

21. C — When rear toe cannot be brought within specification despite full adjustment range, the rear subframe has shifted from its design position. Modern rear subframes require centering procedures using manufacturer-specified pins; once shifted, eccentric adjusters cannot reach spec. Shocks, equipment calibration, and mismatched tires are less common causes.

22. A — Air suspension vehicles must have the air suspension disabled per manufacturer procedure before lifting. Without disabling, the system may try to release air or inflate springs in response to ride height sensor signals showing extreme droop, potentially overextending components or causing sudden movement. This is a safety-critical step.

23. D — Dry or cracked stabilizer bar bushings rubbing against the bar during suspension articulation produces squeaking specifically during parking-lot speeds (high articulation). At highway speed, the bushings are under different load conditions and don't produce the same noise. This symptom pattern specifically identifies bar bushings versus other wear sources.

24. B — Leaf spring U-bolts marked as torque-to-yield must be replaced with new units whenever they are disturbed. Even if retorqued to specification, a TTY U-bolt that has already yielded cannot maintain proper clamping force over time. Reusing loose U-bolts risks catastrophic axle shift. New U-bolts and proper retorque is the only acceptable repair.

25. C — Cross-camber (side-to-side camber difference) of 0.8° is significant enough to produce a pull toward the more-positive side (the left, in this case). Individual values within tolerance don't tell the whole story — cross-camber drives pull behavior. Memorize: camber pulls toward the more-positive side; caster pulls toward the less-caster side.

26. A — Caster imbalance produces pull toward the LESS-caster side. With left caster at 2.8° and right at 4.3°, the left side has less caster, so the pull goes to the left. Caster pull direction is opposite to camber pull direction — the side with less caster has weaker self-centering force. This opposite relationship is commonly confused.

27. D — Excessive negative camber causes the inside edge of the tire to carry more load than the outside, producing smooth (flat) inside-edge wear. No feathering occurs because the tire doesn't scrub — it only leans. Feathered sawtooth patterns are the signature of toe issues; smooth edge wear is specifically a camber signature.

28. A — Side-to-side SAI mismatch of 1.7° exceeds the 0.5° tolerance — the classic diagnostic signature of a bent steering knuckle, usually from impact damage. SAI is built into the knuckle casting and cannot be adjusted; camber may still be within spec because it was adjusted around the damage, but the underlying bent knuckle remains.

29. C — Torsion beam rear suspensions typically have no rear toe adjustment. When one side reads out of spec, the beam or trailing arm is bent — requiring component replacement, not adjustment. Accepting the asymmetric toe or adding aftermarket adjustment without addressing the bent component are both incorrect repair approaches.

30. D — Splitting the front toe adjustment unequally between left and right tie rods recenters the steering wheel while maintaining correct total toe. This is standard alignment procedure. Reindexing the wheel on its splines is a last resort; adjusting rear toe creates new problems; accepting an 8° offset will generate customer complaints.

31. B — Caster is calculated from camber change during a wheel sweep. If the machine reports no camber change during the sweep, the measurement heads are not properly referenced to the wheels — typically because wheel runout compensation was skipped or failed. Runout compensation must be performed before any valid caster measurement can be taken.

32. D — A thrust angle of 0.55° significantly exceeds the normal tolerance (typically under 0.25°). With total rear toe within specification, this indicates the left and right rear toe settings are asymmetric — one rear wheel toes in more than the other, creating the thrust offset. Rear toe must be symmetric, not just within total spec.

33. A — Alignment with re-centered steering wheel invalidates the SAS's learned zero-point; SAS calibration is mandatory. On lane-keep-assist-equipped vehicles, the forward camera also typically requires calibration because the system depends on accurate vehicle geometry references. Both calibrations are typically required even when the camera is not physically moved.

34. C — When the underlying cause of an out-of-spec alignment angle has been identified (bent strut in this case), the correct repair is fixing the underlying cause — not working around it with aftermarket adjusters. Strut replacement restores correct camber. Aftermarket adjustment kits are for vehicles without factory adjustment when no component damage exists.

35. B — Side-to-side included angle difference of 1.8° exceeds the 0.5° tolerance by a wide margin — definitively identifying a bent knuckle. Included angle = SAI + camber; when camber is equal side-to-side but included angles differ, the knuckle casting itself is bent. Knuckle replacement is required before valid alignment is possible.

36. A — Shimmy at a specific speed with confirmed-balanced wheels points to radial or lateral runout — dimensional deviation that balancing cannot correct. Runout must be measured with a dial indicator or road-force balancer. This is the standard diagnostic progression: rule out balance first (done), then investigate runout. Other causes are less common.

37. D — Tire pressure drops approximately 1 psi per 10°F decrease in ambient temperature. A 50°F drop produces approximately a 5 psi pressure loss — matching the scenario exactly (32 psi placard minus 5 psi drop = 27 psi measured). This is the normal temperature-pressure relationship, not sensor failure, module issues, or slow leaks.

38. B — "220 ft-lb + 60°" is a torque-plus-angle specification: torque to 220 ft-lb first, then rotate the nut an additional 60°. This two-stage method ensures consistent clamping force by combining torque accuracy with angle precision. Both stages are mandatory — skipping either stage leaves the nut under-preloaded and risks bearing failure.

39. C — The industry-standard maximum repairable tread puncture diameter is 1/4 inch (6mm). A 5/16-inch puncture exceeds this limit regardless of tread depth. The tire must be replaced — internal and external repairs both fail at oversize punctures because the tire's structural integrity cannot be restored. Safety, not cost, drives this standard.

40. A — When a TPMS sensor reports an incorrect pressure reading while gauge measurement confirms correct tire pressure, the sensor itself has failed internally. Sensor battery failures typically show as "not reporting" rather than incorrect values. Module resets and valve stem leaks would produce different symptom patterns. The sensor must be replaced and the system relearned.