PRACTICE EXAM 21: ASE A4 SIMULATION (40 QUESTIONS)

STEERING SYSTEMS DIAGNOSIS AND REPAIR (Questions 1–12)

1. A customer returns for a repeat power steering pump whining complaint 3 weeks after the first repair. The original repair included fluid top-off and bleeding. On this second visit, the fluid is again at minimum level. What is the MOST likely underlying cause?

A. An external fluid leak that has not been identified during the original service visit assessment

B. The power steering pump is failing and producing the whining noise from internal component wear

C. The rack and pinion has an internal bypass preventing proper pressure during normal operation

D. The high-pressure hose has a partial internal collapse affecting the pump's output pressure reading

2. A 2023 vehicle has had a clockspring replaced. After installation, the horn functions normally but the radio steering wheel controls are inoperative. The SRS warning light is OFF. What is the MOST likely cause?

A. The replacement clockspring is defective from the manufacturer and requires another replacement

B. The SRS module has failed during the installation requiring complete replacement with new programming

C. A secondary electrical connector at the clockspring is not fully seated — steering controls and SRS circuits use different connector paths

D. The steering angle sensor requires calibration after the clockspring replacement to restore radio function

3. A recirculating ball gearbox has been rebuilt with new seals. Within 2 weeks, the pitman shaft seal is leaking again. The technician replaced the seal a second time. It fails again within 2 months. What is the MOST likely underlying cause?

A. The replacement seals are from a defective production batch from the supplier affecting sealing

B. The pitman shaft is worn or scored where the seal lip contacts it during normal operation cycles

C. The gearbox mounting bolts are over-torqued causing distortion of the pitman shaft seal bore area

D. The power steering fluid being used is incompatible with the seal material causing premature failure

4. A 2022 vehicle arrives with reduced EPS assist and a DTC for "Steering angle sensor not calibrated." The vehicle has had no recent service. The customer reports the vehicle was parked with a dead battery for 3 weeks before returning it to service. What is the MOST likely cause?

A. The steering angle sensor has failed internally during the extended storage period with the dead battery

B. The EPS control module has failed during the extended power loss requiring replacement with new unit

C. The torque sensor in the column has drifted during the extended storage period requiring replacement

D. The extended power loss cleared the SAS calibration — the SAS requires recalibration to restore service

5. A power steering hose has been replaced due to a leak. Within 1 month, the new hose is leaking at the crimped fitting where it connects to the rack. The technician replaces the hose again. Within 1 month, the second replacement hose leaks at the same fitting. What is the MOST likely cause?

A. Both replacement hoses are defective from the same manufacturer production batch that is failing

B. The rack inlet fitting threads or sealing surface are damaged — replace or repair the rack connection

C. The power steering fluid is contaminated and attacking the new hose crimped fitting seals in use

D. The power steering pump is producing excessive pressure damaging the new hose fittings during service

6. A vehicle with hydraulic power steering has a repeated customer complaint of whining noise. Each service visit, the technician bleeds the system and the whining stops. One month later, the whining returns. Fluid level is consistently at minimum. External inspection shows no visible leak. What is the MOST likely cause?

A. The rack and pinion has an internal leak between the pressure and return galleries — fluid migrates internally and eventually evaporates from the reservoir over time

B. The power steering pump is drawing in air through a loose pressure fitting connection during operation

C. The return line has a pinhole leak that only leaks during operation returning with the fluid back to reservoir

D. The power steering fluid is aging and breaking down producing the whine as it loses its lubricating properties

7. A 2024 vehicle has had its battery replaced after a dead battery condition. The EPS initialization procedure was performed by the technician. One week later, the customer returns complaining the EPS warning light has returned. Scan tool shows P0562 "System voltage low" during cold starts only. Battery tests good at rest. What is the MOST likely cause?

A. The EPS initialization procedure was not performed correctly and requires the procedure be repeated

B. The EPS control module has an internal fault triggered only during cold start voltage conditions

C. The steering angle sensor has failed during the original battery service requiring replacement now

D. The battery CCA (cold cranking amps) is insufficient — voltage drops below EPS threshold during cold crank

8. A power steering fluid shows a pink color with a milky appearance. What is the MOST likely cause?

A. The fluid is within normal specification — pink fluid is typical for certain manufacturer-specific fluids

B. The fluid has oxidized from age and heat — flush and replace with fresh manufacturer-specified fluid

C. Coolant has entered the power steering system — inspect the cooler for internal cross-contamination

D. The fluid has been contaminated with water from condensation — flush and replace during service

9. A steering damper on a pickup truck was replaced 4 weeks ago due to a death wobble complaint. The death wobble has now returned at 50 mph after hitting a pothole. What is the MOST likely underlying cause?

A. Track bar bushings, tie rod ends, and front ball joints have cumulative wear that was not addressed during the original repair

B. The replacement steering damper is defective from the manufacturer and requires warranty replacement

C. The power steering pump pressure has dropped below specification contributing to the death wobble recurrence

D. The alignment is out of specification and causing the death wobble to recur during highway driving

10. An intermediate shaft has been replaced during steering column service. After reinstallation, the steering wheel is 180° off-center when the road wheels point straight ahead. What happened during installation?

A. The steering angle sensor calibration was not performed after the intermediate shaft replacement

B. The new intermediate shaft is defective and the internal U-joints are offset from specification

C. The intermediate shaft was installed 180° out of phase — the shaft can physically install in two orientations

D. The steering wheel was not centered on the splines during the reinstallation after the column service

11. A 2020 truck has had its rack and pinion replaced due to an internal leak. After the repair, the customer reports the steering has a "heavy" feel that was not present before the repair. Scan tool shows no DTCs. What is the MOST likely cause?

A. The wheel alignment was not performed after the rack replacement and the toe setting is slightly off

B. The power steering pump has been damaged during the rack installation requiring pump replacement

C. The steering angle sensor requires calibration after the rack replacement to restore normal steering feel

D. The EPS control module requires initialization after the rack replacement to restore the normal assist level

12. A customer reports that the power steering becomes harder to turn as the engine warms to operating temperature. The steering is normal when cold. Fluid is at specification and clean. Scan tool shows no DTCs. What is the MOST likely cause?

A. The steering angle sensor calibration has drifted during warm operation requiring scan tool calibration today

B. The power steering pump has internal wear that becomes evident as the fluid thins at operating temperature

C. The EPS control module has a firmware fault during warm operation requiring an update from manufacturer

D. The rack pressure spring has backed off allowing fluid bypass during warm operation conditions only

SUSPENSION SYSTEMS DIAGNOSIS AND REPAIR (Questions 13–24)

13. A MacPherson strut has been replaced on the left side of a vehicle. The customer returns one month later complaining of the vehicle "pulling" to the left. Alignment readings are within specification on both sides. What is the MOST likely cause?

A. The right side strut was not replaced — mismatched damping characteristics between the old and new struts cause the pull

B. The left side strut is defective from the manufacturer and requires warranty replacement during this visit

C. The wheel alignment needs to be adjusted toward the right to compensate for the new strut on the left side

D. The tire pressures are unequal and causing the pull despite being within specification during the road test

14. A stabilizer bar end link on one side of a vehicle has been replaced. Two weeks later, the opposite side end link fails. What is the MOST likely underlying cause?

A. The replacement end link was defective causing stress on the opposite side link during normal operation

B. The stabilizer bar itself is bent causing asymmetric loading on both end links during normal operation

C. Both end links were at similar wear states — the opposite side was near failure at the time of original repair

D. The stabilizer bar bushings have failed causing asymmetric loading on the end links during normal operation

15. A coil spring has been replaced on a vehicle. Two months later, the customer reports the vehicle sits lower at the repaired corner than the opposite side. The spring manufacturer is the same as OE specification. What is the MOST likely cause?

A. The replacement spring is defective from the manufacturer and requires warranty replacement during service

B. The spring seat at the repaired corner is damaged and allowing the spring to settle below specification

C. The shock absorber at the repaired corner was not replaced along with the spring during original service

D. The opposite spring was not replaced — the new spring is at spec but the aging spring on the other side has settled further

16. A pickup truck with leaf spring rear suspension has the U-bolts replaced due to a U-bolt that came loose. Two months later, the same side U-bolts are loose again. The technician used new torque-to-yield U-bolts and torqued to specification. What is the MOST likely cause?

A. The replacement U-bolts were defective from the manufacturer production batch during service

B. The leaf spring center bolt has sheared allowing axle movement that loosens the U-bolts over time

C. The U-bolts were not torqued to final specification — the technician missed the torque-plus-angle step

D. The axle housing surface is damaged or corroded reducing the clamping force applied by the U-bolts

17. A ball joint was replaced on a pickup truck. Two months later, the replacement ball joint is showing visible play. The technician replaces it a second time. Two months later, the second replacement joint is also showing play. What is the MOST likely underlying cause?

A. A worn control arm or mounting condition is causing premature ball joint wear — inspect the arm assembly

B. Both replacement ball joints were from a defective production batch from the supplier during service

C. The alignment has shifted out of specification causing premature ball joint wear at the affected corner

D. The power steering system is producing excessive force on the ball joint during operation of the vehicle

18. An air suspension vehicle has had one air spring replaced. Two weeks later, the same corner is sagging overnight. External inspection of the new air spring shows no leaks. The compressor is functional. What is the MOST likely cause?

A. The new air spring is defective from the manufacturer requiring warranty replacement during this visit

B. The air suspension control module has failed triggering the sag during the extended parking period only

C. The air line or valve connection at the replaced corner has a slow leak not evident on external inspection of the spring

D. The ride height sensor at the repaired corner has failed and is causing the module to release air during parking

19. A torsion bar was replaced on a pickup truck. After the repair, the vehicle sits higher than specification. The technician adjusts the preload to reduce ride height. The bar eventually fractures after 6 months of service. What is the MOST likely cause?

A. The torsion bar was defective from the manufacturer and requires warranty replacement at this visit

B. The torsion bar preload adjuster was set beyond the manufacturer's maximum specification during service

C. The customer overloaded the vehicle causing excessive stress on the torsion bar during normal service use

D. The torsion bar was installed on the wrong side — bars are heat-treated for one-direction loading only

20. A shock absorber replacement has been performed. The customer returns one week later complaining of a new clunking noise from the repaired corner. The shock appears properly installed. What should be checked NEXT?

A. The shock absorber mounting bushings — they may have been reused instead of replaced during service

B. The opposite shock absorber — it may need replacement to match the damping characteristics of the new shock

C. The wheel alignment at the repaired corner — it may have shifted during the shock replacement procedure

D. The tire pressure at the repaired corner — it may be producing the clunking at highway speed conditions

21. A wheel bearing has been replaced on a vehicle. Two weeks later, the customer returns complaining of a growling noise during cornering. The noise increases during turns. What is the MOST likely cause?

A. The axle nut was not properly torqued to the torque-plus-angle specification during the initial installation

B. The opposite wheel bearing has failed causing the noise — bearings often fail together at high mileage

C. The brake rotor at the repaired corner was not cleaned on the hub mating surface during installation

D. The CV joint on the same side has failed during the wheel bearing replacement service procedure

22. An adaptive damper has been replaced on the right rear corner. After installation, the vehicle exhibits an audible hissing noise from the repaired corner during damping changes. Scan tool shows the damper responding normally to commands. What is MOST likely the cause?

A. The adaptive damper programming was not completed for the new damper after installation during service

B. The new damper is defective from the manufacturer and the hissing indicates internal fluid leakage during service

C. The hissing is normal for adaptive dampers during electronic valve actuation and is not a concern during service

D. The air suspension system was damaged during the damper replacement causing the hissing noise from air escape

23. A vehicle with all four adaptive dampers replaced 2 months ago returns with a fault code for "left front damper current out of range." Live data shows 0.1 A actual current when 2.0 A is commanded. Wiring tests good. What is the correct repair?

A. Reset the suspension control module — the fault code may have been stored from the installation procedure

B. Replace the control module because the installation disturbed output drivers during the damper service procedure

C. Replace the left front damper — one damper has failed 2 months after the original installation was performed

D. Replace all four dampers again as a matched set to maintain consistent damping characteristics during service

24. A MagneRide damper replacement was performed on the right front corner. After installation, the damper shows "not recognized" on the scan tool. The technician did not perform a programming procedure. What is required?

A. Disconnect the battery for 30 minutes to reset the suspension control module and force relearn automatically

B. Perform the manufacturer-specified programming procedure for the new damper to configure it to the module

C. Drive the vehicle at highway speed for 30 minutes to allow automatic damper identification by the module

D. Replace the new damper — "not recognized" indicates the damper is defective from the manufacturer today

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

25. A vehicle has had its alignment completed. The customer returns 3,000 miles later complaining of rapid inside-edge tire wear on both front tires. Alignment readings are now rechecked and found within specification. What is the MOST likely cause?

A. The alignment specification is incorrect for the vehicle and requires adjustment outside the factory spec

B. The customer drove aggressively causing the tire wear despite the alignment being correct during service

C. The tires are defective from the manufacturer and producing the inside-edge wear during normal service

D. Dynamic alignment shift from worn suspension bushings — static alignment reads correct but shifts under load

26. A vehicle with MacPherson struts has no factory adjustment for camber. The left front camber reads 1.5° more negative than specification. Visual inspection reveals no obvious bent components. The alignment has been correct for 40,000 miles. What is the MOST likely cause?

A. A worn or damaged bushing has allowed camber to shift despite intact appearance during visual inspection today

B. The replacement strut installed 6 months ago is defective and has settled into a different camber position

C. The alignment equipment has drifted out of calibration since the last service visit affecting the measurement

D. The tire pressure on the left front has been different from the right front affecting the apparent camber

27. A vehicle's front alignment shows cross-camber of 1.2° with the left side more positive than the right. After a 6-month service interval, the cross-camber has changed — now the right side is more positive than the left by 0.8°. Visual inspection reveals no impact damage. What is the MOST likely cause?

A. The alignment equipment has drifted out of calibration between the two service visits during this period

B. The customer has driven on rough roads causing the alignment to shift despite no visible damage today

C. Progressive suspension bushing wear — bushings wear asymmetrically over time producing camber shift

D. The tire pressures have changed between service visits producing the apparent alignment shift at wheels

28. A FWD vehicle with torsion beam rear suspension has a rear toe reading 0.30° out of specification on one side. The vehicle has been in service for 12 years. Visual inspection of the torsion beam reveals no obvious bends. What is the MOST likely cause?

A. The alignment equipment requires recalibration before continuing the alignment service procedures today

B. The tire pressures differ between the two rear tires causing the apparent rear toe difference on rack

C. The rear shock absorbers have failed on one side causing the rear toe shift during dynamic load testing

D. Subtle torsion beam damage from a prior impact has shifted the rear toe despite no visible bend present

29. A vehicle has had an alignment performed. The customer returns 1 week later complaining the vehicle pulls to the right. Tire pressures are correct. Alignment readings are verified still within specification. Brake caliper function tests good. What should be checked NEXT?

A. The rear alignment to verify the thrust angle is still zero after the initial alignment service on the vehicle

B. Tire conicity by swapping the front tires left-to-right and observing whether the pull direction changes

C. The front steering knuckles for bent condition producing the pull after the alignment service visit

D. The power steering system for asymmetric assist producing the directional pull after alignment service

30. A vehicle has SAI readings that have changed from 13.0° left and 13.1° right (6 months ago) to 13.3° left and 12.4° right (today). Camber is within specification on both sides. Visual inspection reveals no obvious impact damage. What is the MOST likely cause?

A. The alignment equipment has drifted out of calibration between the two service visits for the customer

B. The tire pressures differ between sides causing the apparent SAI change between the two service visits

C. The right front steering knuckle has been bent from an impact that did not leave visible external damage

D. The ride height differs between the two sides causing the apparent SAI change between the two service visits

31. A vehicle has had its alignment completed. The steering wheel was re-centered during front toe adjustment. Two weeks later, the customer returns complaining that the lane-keep assist system is activating at unpredictable times during straight driving. The forward camera was not moved during alignment. What is MOST likely the cause?

A. The lane-keep assist module has failed requiring replacement with new programming after the alignment service

B. The forward camera requires calibration after the SAS was re-centered — ADAS calibration cascades from the SAS

C. The steering angle sensor is defective and requires replacement along with recalibration of the lane-keep module

D. The alignment was performed incorrectly and must be redone to restore the proper lane-keep assist function

32. A vehicle's rear toe has been adjusted. Thrust angle now reads 0.02°. Total rear toe is within specification. What should the technician do NEXT?

A. Verify that the front caster and camber are within specification before proceeding further with the alignment

B. Readjust the rear toe because 0.02° thrust angle is too high for acceptable alignment during service today

C. Perform the front camber adjustment before any other alignment angle adjustment during the service procedure

D. Proceed with the front toe adjustment with the steering wheel centered relative to the thrust line

33. A vehicle pulls to the left. Alignment shows Left camber +0.1° and Right camber +0.3°. The vehicle should pull to which side based on camber alone?

A. Toward the right — camber pulls toward the more-positive side and the right side is more positive by 0.2°

B. Toward the left — camber pulls toward the less-positive side where the tire carries less lateral load

C. No pull — the camber difference of 0.2° is within normal tolerance and should not produce any pull

D. Toward the rear — camber only affects the rear alignment of the vehicle during highway driving operation

34. A vehicle's alignment is complete with all angles in spec. The steering wheel sits 2° off-center during straight driving. Which is the MOST likely condition?

A. The toe adjustment needs to be redone because the alignment is not complete despite the in-spec readings today

B. The rear toe needs to be readjusted because the thrust angle is causing the off-center steering wheel

C. The toe adjustment produced a slight wheel offset that can be corrected by splitting the toe adjustment between tie rods

D. The steering wheel requires reindexing on the splined shaft because the toe adjustment alone cannot correct wheel position

35. A vehicle has had an alignment performed at another shop. The customer complains of rapid outside-edge tire wear after 5,000 miles. The current alignment rechecks within specification. What is MOST likely the cause?

A. The original shop did not perform the alignment correctly — the previous alignment may have been outside specification

B. The customer has been driving with low tire pressure causing the outside-edge wear during highway driving conditions

C. The tires are defective from the manufacturer producing the outside-edge wear during normal highway use

D. Worn suspension bushings are allowing dynamic alignment shift under load — static alignment is correct

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

36. A tire has been balanced. The customer returns 2 weeks later complaining of a vibration at 60 mph. Rebalancing produces the same results as before — the assembly balances within specification. What should be checked NEXT?

A. The vehicle's wheel bearings for looseness contributing to the vibration at highway speed conditions only

B. The tire pressures at all four wheels to verify they are at the manufacturer-specified placard values

C. The engine mounts for deterioration causing vibration transmission at highway speeds to the vehicle

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

37. A wheel hub assembly has been replaced 2 months ago. The customer returns complaining of a grinding noise from the same corner. The axle nut was torqued to the torque-plus-angle specification during the original installation. What is MOST likely the cause?

A. The new hub assembly has failed — the replacement may have been defective or damaged during shipping

B. The axle nut has loosened despite proper torque — the torque-to-yield nut may have been reused during installation

C. The brake rotor at the repaired corner is producing the grinding noise — rotor issue unrelated to the hub service

D. The CV joint on the same side has failed during the hub replacement service causing the grinding noise

38. A direct TPMS sensor was replaced 6 months ago. The customer returns complaining that the TPMS warning light is now illuminated at random times. The scan tool shows the replaced sensor is communicating but reporting inconsistent pressure values. What is MOST likely the cause?

A. The TPMS module requires reprogramming after the sensor replacement to accept the new sensor's data

B. The tire pressure has dropped causing the TPMS warning to activate intermittently during normal driving today

C. The replaced sensor has failed internally — sensor battery failure can produce inconsistent readings during service

D. The vehicle-specific TPMS relearn procedure was not performed after the sensor replacement during service

39. A tire puncture was repaired with a combination plug/patch from inside the tire 3 months ago. The customer returns complaining the repair is leaking. Inspection reveals the tire has been running under-inflated for extended periods. What is MOST likely the cause?

A. The combination plug/patch repair is defective and requires replacement with a new repair kit during this visit

B. Under-inflation has flexed the sidewall damaging the repair area — the tire likely cannot be repaired again

C. The internal liner of the tire has cracked allowing air migration through the puncture repair during service

D. The repair technician did not properly clean the inner liner during the original repair service procedure

40. A wheel balance was performed using match-mounting to reduce runout. The customer returns 3 months later complaining of a new vibration at highway speed. Rebalancing produces higher weight requirements than the original balance. What is the MOST likely cause?

A. The tire has developed flat spots from prolonged parking in one position during customer use of the vehicle

B. The wheel balancer has drifted out of calibration since the original balance service was performed

C. The customer has been driving with low tire pressure causing the tire to develop new imbalance during driving

D. The tire has developed radial runout from a road hazard impact since the original balance service was performed

Practice Exam 21: Answer Key and Explanations

1. A — When fluid repeatedly drops below minimum between service visits, there is an external leak that was missed during the original service. Pumping fluid whine is the symptom, but the root cause is fluid loss. Use UV dye or clean-and-inspect techniques on subsequent inspections to locate the leak source — it may be intermittent or weeping only under specific conditions.

2. C — Modern clocksprings typically route airbag circuits and steering wheel control circuits through separate connectors or paths. A fully seated airbag connector can coexist with an unseated steering control connector, producing the described symptom (horn works, SRS light off, radio controls dead). Inspect and reseat each connector separately before suspecting module failure.

3. B — When a seal fails repeatedly despite proper replacement with correct parts and fluid, the sealing surface (pitman shaft) is damaged. A worn or scored shaft prevents any new seal from maintaining seal lip contact. The repair is pitman shaft replacement or complete gearbox replacement — not another seal. This is the classic "repeat failure" diagnostic pattern.

4. D — Extended power loss (3 weeks with dead battery) clears certain learned values in the SAS memory, requiring recalibration. The SAS itself has not failed; its stored reference has been lost. After battery recovery, the manufacturer-specified SAS calibration procedure must be performed via scan tool to restore normal operation. No hardware replacement is needed.

5. B — Repeated hose failure at the same fitting location after two hose replacements indicates the rack's inlet fitting itself is damaged or has a defective sealing surface. The hoses are the symptom; the damaged rack connection is the cause. The rack must be inspected and repaired or replaced — installing a third hose will produce the same failure pattern.

6. A — When whining returns, fluid is consistently at minimum, and no external leak is visible, the rack has an internal leak between pressure and return galleries. Fluid migrates internally and is eventually lost through evaporation from the reservoir over time. This is the classic "no external leak but fluid keeps dropping" diagnostic pattern — rack replacement is indicated.

7. D — Cold cranking amps (CCA) can be inadequate even when resting voltage is acceptable. During cold cranking, battery voltage can sag below the EPS module's minimum operating threshold, triggering the P0562 code and EPS warning. Battery load testing — not just voltage measurement — is the correct

diagnostic. This cold-weather-only pattern is a classic CCA-inadequate symptom despite a good resting voltage.

8. C — Pink fluid with a milky appearance is the specific signature of coolant contamination. The cooler or radiator has an internal leak allowing coolant to enter the power steering fluid. This must be addressed immediately — coolant damages power steering components. The cooler should be inspected for internal cross-contamination, and the system flushed completely.

9. A — Death wobble on solid-axle vehicles is caused by combined wear in track bar bushings, tie rod ends, and front ball joints. The original damper replacement addressed only the symptom. The underlying components continue to wear, and the new damper loses effectiveness as those components deteriorate. Root-cause inspection and repair of ALL related components is needed — not just repeat damper replacement.

10. C — Most intermediate shafts will physically install in two orientations 180° apart. When the shaft is installed out of phase, the steering wheel ends up rotated 180° from straight with the road wheels pointing straight — exactly the symptom described. Reference-marking before disassembly prevents this; the fix is always repeat disassembly and proper indexing.

11. A — After rack replacement, wheel alignment is mandatory to restore proper toe and verify tracking. If alignment is skipped or performed incorrectly, the toe setting can be slightly off, producing a "heavy" steering feel that wasn't present before. This is the most common cause of post-rack-replacement steering complaints. Verify alignment was performed correctly.

12. B — Worn pump internals often show their wear more dramatically as fluid thins at operating temperature. The thinner fluid bypasses worn clearances (vanes, cam ring) more easily, reducing output pressure and causing harder steering. The "cold normal, warm hard" pattern is a classic signature of a pump approaching end of life. Pump replacement is indicated.

13. A — Struts must be replaced in pairs on the same axle to maintain matched damping characteristics. A new strut paired with the old opposite strut produces asymmetric damping that the chassis cannot balance, resulting in a pull. Alignment within spec doesn't compensate for asymmetric damping. The opposite strut must be replaced to restore balanced handling.

14. C — Stabilizer end links wear at similar rates on both sides because they see similar service conditions. When one side fails, the opposite is typically near failure. The underlying cause isn't a

defective replacement or bent bar — it's simply that end links were never replaced as a pair. Replacing end links in pairs during the original service prevents the repeat failure.

15. D — Coil springs on the same axle age at similar rates. When only one side is replaced, the aging spring on the other side continues to settle, eventually producing visible height difference. The "new vs. aged" mismatch causes the described symptom. Springs must be replaced in pairs on the same axle to maintain matched spring rates and prevent this outcome.

16. B — When U-bolts come loose repeatedly despite proper torque, the leaf spring center bolt has likely sheared. The center bolt locates the axle on the spring; without it, the axle walks on the spring pack under torque loads. This movement loosens the U-bolts regardless of how correctly they were torqued. Inspecting and replacing the center bolt is the correct fix.

17. A — When replacement ball joints repeatedly fail at the same location, a worn control arm or mounting condition is causing premature wear. The joint itself is the symptom; the arm or mounting surface is the cause. Inspect the control arm for wear, damage, or bent condition. Replacing only the ball joint without addressing the underlying cause produces the repeat failure pattern.

18. C — When a new air spring sags but shows no external leak, the leak is elsewhere — typically at the air line connection or valve at that corner. The soap test on the spring itself will not reveal leaks at fittings or internal valves. Inspect all air line connections and valves at the affected corner for the hidden leak source before suspecting the new spring.

19. D — Torsion bars are heat-treated for one-direction loading and must be installed on the correct side in the correct orientation. Installing on the wrong side or reversed eventually causes fracture from reversed stress patterns. The "higher than spec with attempt to reduce" scenario suggests improper installation (wrong side), which is the classic fracture cause. Check installation orientation.

20. A — Shock absorber mounting bushings wear at similar rates to the shock itself. When a shock is replaced, its mounting bushings should also be replaced to prevent post-service clunking noise. Reusing old bushings with a new shock produces the new clunking complaint. This is standard practice that saves return visits.

21. A — Torque-to-yield axle nuts must be torqued to the full specification (torque + angle). If the angle rotation was skipped during installation, the bearing is under-preloaded and develops play. Cornering

amplifies the play, producing growling. The axle nut must be inspected and properly retorqued — often with a new TTY nut required.

22. C — Hissing during damping changes is normal for adaptive dampers with electronic valves — the valve actuation produces the sound as fluid flows. When the scan tool shows normal damper response and the hissing occurs only during damping changes, the sound is normal operation, not a fault. The technician should recognize normal operating characteristics of specific systems.

23. C — A single damper failing 2 months after all four were replaced indicates one damper has failed — either defective or damaged. The other three are functioning normally based on the scan tool data showing only one code. Replace only the failed damper. Replacing all four again or the control module is unnecessary and wasteful; a single failure is isolated to that component.

24. B — After replacing a MagneRide damper, the new unit typically requires a programming procedure specific to the vehicle and its control module. Without this programming, the module doesn't recognize the new damper as a valid component and shows "not recognized." Battery disconnect, drive cycles, and replacement of the new damper all miss the required programming step.

25. D — When alignment rechecks within specification but abnormal tire wear develops, dynamic alignment shift under load is the cause. Worn suspension bushings (especially control arm and subframe bushings) allow geometry to change when the vehicle is loaded or moving, even though static alignment on the rack is correct. Inspection for worn bushings is the next step.

26. A — When camber drifts over 40,000 miles with no visible component damage, worn bushings are the most common cause. Bushings allow dynamic geometry shift that manifests as progressive alignment drift over time. Visual inspection may not reveal all bushing wear — some require load testing or measurement. Equipment calibration drift over 40K miles is uncommon.

27. C — Progressive suspension bushing wear is the most common cause of alignment shift between service visits. Bushings wear asymmetrically because one side may bear more load than the other based on road conditions and driving patterns. Equipment calibration, road conditions, and tire pressure do not typically produce this specific pattern of cross-camber reversal.

28. D — Subtle torsion beam or trailing arm damage from a prior impact can shift rear toe without producing visible external damage. The beam may be bent only slightly — enough to throw toe off spec

but not enough to catch during visual inspection. A 12-year-old vehicle has likely experienced multiple minor impacts; the damage is accumulated, not visible.

29. B — When alignment is verified correct and brakes test good, the next diagnostic for a pull complaint is tire conicity — swap the front tires left-to-right and observe whether the pull direction changes. If the pull reverses, a tire is at fault (conicity). This is the definitive tire-vs-alignment diagnostic and should be performed before further investigation.

30. C — A change in SAI between service visits, with camber still in spec, indicates the knuckle is bent from an impact that may not have left obvious external damage. SAI is built into the knuckle casting; when SAI changes but camber is still adjustable, the knuckle is bent (camber was adjusted to compensate). Impact damage can be subtle and still shift SAI significantly.

31. B — When the SAS is re-centered during alignment, the forward camera's lane reference may become invalid because ADAS calibration cascades from the SAS's zero-point. The camera was not physically moved, but the reference it relies on has shifted. Forward camera calibration is required after any alignment that re-centers the wheel, even without physical camera disturbance.

32. D — With rear toe adjusted and thrust angle at 0.02° (essentially zero), the next step is to proceed with front toe adjustment relative to the thrust line, with the steering wheel centered. The front caster and camber should have been addressed before rear toe in the correct sequence. Re-adjusting rear toe or performing out-of-sequence work is not needed.

33. A — Camber pull direction goes toward the MORE-positive side. With left camber at +0.1° and right at +0.3°, the right side is more positive by 0.2°, so the vehicle should pull to the right based on camber alone. The question states the vehicle pulls to the left — this mismatch indicates another cause (caster, brake drag, or tire conicity) is actually producing the pull.

34. C — 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 when the wheel sits slightly off-center after toe adjustment. Reindexing, rear toe adjustment, or accepting the offset are all incorrect responses. Simple toe split fixes the wheel position.

35. D — When alignment rechecks correct but abnormal tire wear has occurred, dynamic alignment shift under load from worn suspension bushings is the cause. Static alignment is fine, but the geometry

changes when the vehicle is loaded or moving. This is the same pattern as Q25 — worn bushings producing dynamic shift is a recurring A4 test theme.

36. D — When a wheel balance is consistently within specification but vibration persists, radial or lateral runout is the cause — dimensional deviation that balancing cannot correct. Runout requires measurement with a dial indicator or road-force balancer. Correction is match-mounting, tire replacement, or wheel replacement. This is the standard diagnostic progression.

37. A — A new hub assembly grinding 2 months after installation with proper torque application points to a defective part from the supplier or damage during shipping. Modern hub assemblies are typically high-quality but can fail early. Warranty replacement is the correct action. Axle nut, rotor, and CV joint issues would produce different symptom patterns.

38. C — Inconsistent pressure readings from a sensor that's still communicating indicates the sensor has failed internally — often battery weakness producing erratic transmission. The sensor may work sometimes and fail at other times as the battery weakens. Sensor replacement is required. Module reprogramming, pressure issues, and relearn procedures don't address failing sensor hardware.

39. B — Under-inflation causes sidewall flex that can damage a previously good tire repair. The flexing stresses the repair area, causing it to leak. This typically means the tire cannot be repaired again safely — the repeated flex damage has likely affected the internal structure beyond what a new repair can address. Tire replacement is typically the correct recommendation.

40. D — Higher weight requirements after 3 months indicate the tire has developed new imbalance since the original balance. The most common cause in short-term service is radial runout developed from a road hazard impact (pothole, debris). The impact may not have been dramatic but was sufficient to slightly distort the tire, producing measurable runout and imbalance.