PRACTICE EXAM 5: ASE A4 SIMULATION (40 QUESTIONS)

STEERING SYSTEMS DIAGNOSIS AND REPAIR (Questions 1–12)

1. A 2019 Ford F-150 has a steering column being removed for clockspring replacement. The technician disconnects the negative battery cable, waits 2 minutes, then begins removing the airbag. Has the correct procedure been followed?

A. Yes, the procedure is correct because the battery was disconnected first

B. No, the specified SRS capacitor discharge time must be met before work

C. Yes, because the airbag is deactivated instantly when the battery is disconnected

D. No, because the ignition key must remain in the run position during service

2. A technician observes 140 psi at idle on the pump outlet and 1,250 psi when the wheel is held against the stop at full lock. Specification is 1,200 psi at relief. What is the correct interpretation?

A. The system is over-pressurizing and the pump relief valve has failed open

B. The idle pressure is too high indicating a restricted return line back to reservoir

C. The flow control valve is stuck closed causing pressure buildup at idle

D. The system is functioning within normal specification at both test points

3. An intermediate shaft is being reinstalled between a steering column and a rack. The technician did not reference-mark the shaft before removal. What is the likely outcome?

A. The shaft will fit correctly because it only installs one way on most vehicles

B. The steering wheel will be slightly off-center by a few degrees from straight

C. The shaft may install 180 degrees out of phase with the wheel at six o'clock

D. The U-joint needle bearings will bind due to incorrect phase orientation

4. A 2022 vehicle with rack-mounted EPS has a DTC for "torque sensor signal mismatch." Scan tool data shows the two torque sensor channels reading different values at rest. What is the correct repair?

A. Replace the EPS rack assembly because the integrated torque sensor has failed

B. Replace the steering angle sensor and perform calibration via scan tool command

C. Reset the EPS module by disconnecting the battery for 30 continuous minutes

D. Inspect the wiring harness at the column for chafing or pinched conductors

5. During a power steering fluid exchange on a 2015 Honda Accord, the technician uses a generic "universal power steering fluid." Three months later, the rack develops internal leaks. What is the most likely cause?

A. The fluid exchange introduced air that damaged the internal rack seals

B. The rack was already near end of service life at the time of fluid change

C. The flush procedure applied too much pressure and damaged the rack internally

D. Incorrect fluid type caused seal swelling or degradation in the rack assembly

6. A recirculating ball gearbox is being adjusted. With the pitman arm removed and the steering wheel at center, the technician measures the input shaft rotational torque during over-center preload setup. Specification is 8 in-lb. Current reading is 3 in-lb. What should be done?

A. Leave the preload as-is because the reading is below the maximum specification

B. Tighten the sector shaft adjustment screw until the reading reaches 8 in-lb

C. Reinstall the pitman arm first, then measure the rotational torque at the wheel

D. Replace the gearbox because the worn sector teeth prevent proper preload setting

7. A power steering pump produces a loud growling noise at idle. Fluid level is correct and no air bubbles are visible in the reservoir. What is the most likely cause?

A. The pump is worn internally and cannot maintain flow against the relief valve

B. The serpentine belt is glazed and slipping on the power steering pump pulley

C. The return line from the gear to reservoir has a partial internal restriction

D. The cooler in the return line has frozen preventing fluid flow during cold operation

8. A pickup truck's steering system includes a steering damper mounted between the axle and the drag link. The truck develops a death wobble complaint. The damper is leaking fluid and has been condemned. Which additional components should be inspected before completing the repair?

A. The rear axle bearings and rear drum brake hardware for looseness

B. The engine mounts and transmission mounts for worn or collapsed rubber

C. Track bar bushings, tie rod ends, front ball joints, and wheel balance

D. The EPS module wiring harness and the steering angle sensor connection

9. A 2020 sedan with column-mounted EPS has a clockspring being replaced. After installation, the driver's airbag warning light stays on and scan tool shows "driver airbag resistance out of range." What is the most likely cause?

A. The SRS module has failed and needs programming with the new clockspring

B. The battery voltage dropped below the threshold during SRS self-test procedure

C. The driver's airbag module is defective and triggering the resistance code error

D. The clockspring was installed but the ribbon cable was damaged during centering

10. An EPS-equipped vehicle's steering effort has become noticeably heavier over the past week. The customer reports no warning lights have illuminated. Scan tool data shows EPS motor current is at expected levels during steering input. What should be checked NEXT?

A. Battery condition and voltage drop on the EPS power feed circuit under load

B. The steering rack mounting bolts for loose torque allowing the rack to shift

C. The tire pressures on all four wheels to identify unequal inflation conditions

D. The serpentine belt tensioner for proper operation during engine loading

11. A technician reassembles a steering wheel onto an SRS-equipped vehicle. Which action is correct regarding the retaining nut?

A. Use the original retaining nut because it maintains the factory torque specification

B. Replace with any compatible nut of matching thread pitch and diameter

C. Torque the nut to the manufacturer's specified value with a calibrated wrench

D. Install the nut to tight-snug condition without measuring the final torque

12. A vehicle with hydraulic power steering has developed a slow fluid leak over three months. The fluid level gradually drops below minimum between visits. The technician cannot find any visible external leak. What is the most likely cause?

A. The rack and pinion has an internal leak between pressure and return circuits

B. The power steering cooler has an internal leak bypassing fluid into the engine oil

C. The pump shaft seal is leaking slowly past the rear housing of the pump unit

D. Normal fluid consumption occurs in hydraulic systems over long service periods

SUSPENSION SYSTEMS DIAGNOSIS AND REPAIR (Questions 13–24)

13. A front strut assembly is being installed on a 2021 vehicle. The upper strut mount has three studs that must engage with holes in the strut tower. The technician notes the studs are in a non-symmetric pattern. What is the significance?

A. The mount must be oriented correctly to maintain proper camber and caster

B. The non-symmetric pattern prevents the mount from rotating during operation

C. The mount can be installed in any orientation as long as the studs engage

D. The orientation only affects the bearing alignment with no geometric effect

14. A vehicle exhibits a clunk from the front end only during hard braking. The brake system has been inspected and found in good condition. Which suspension component is most likely the cause?

A. Worn outer tie rod end allowing movement during brake torque application

B. Failed strut bearing causing friction change during deceleration only

C. Worn stabilizer bar end link on the side experiencing the clunk noise

D. Worn front lower control arm bushing allowing fore-aft wheel movement

15. A wear-indicator ball joint is inspected with the vehicle at curb height. The grease fitting projects 1/16 inch above the joint housing surface. What does this indicate?

A. The ball joint has reached its wear limit and requires immediate replacement

B. The ball joint is within acceptable wear limits and does not require replacement

C. The wear indicator has failed and the joint must be inspected by other means

D. The vehicle must be lifted to obtain an accurate wear indicator reading

16. A 2018 SUV with four-corner air suspension arrives with one corner completely dropped. The compressor runs when commanded but the affected corner does not rise. The technician checks the ride height sensor and finds the plastic linkage arm has broken. What is the effect?

A. The air spring will overinflate because the sensor reports minimum height

B. The module will default to maximum compressor output to compensate for the error

C. The module cannot determine corner height and will not command inflation

D. The system will use sensors at other corners to estimate the affected height

17. Technician A says subframe mounting bolts are often torque-to-yield and should be replaced when removed. Technician B says subframe centering pins must be used when loosening the subframe for component replacement. Who is correct?

A. Both Technicians A and B

B. Technician A only

C. Technician B only

D. Neither Technician A nor B

18. A multi-link IRS on a 2020 sedan has four separate links at each rear wheel. The customer complains of rear-end clunking over bumps. Visual inspection reveals cracked rubber on the upper lateral link bushing. What is the correct repair?

A. Replace only the upper lateral link with the worn bushing

B. Replace the upper lateral link on both sides of the vehicle

C. Replace only the bushing using a press if the part is separately available

D. Replace both upper lateral links to maintain balanced suspension characteristics

19. Leaf spring U-bolts have been retorqued during maintenance. The specification is 120 ft-lb. The technician torques them to 150 ft-lb to "make sure they stay tight." What is the likely consequence?

A. Improved clamping force on the spring pack extending spring service life

B. Stretched U-bolt threads compromising clamping force over time

C. No change because U-bolts are designed with significant torque safety margin

D. Reduced spring pack flex causing improved ride quality at highway speed

20. A coil spring on a strut assembly has been compressed using a spring compressor. The technician removes the strut mount retaining nut. What should be observed if the spring compressor is properly engaged?

A. The upper strut mount should rise approximately 1 inch after nut removal

B. The spring should expand upward until it contacts the upper spring perch

C. The spring remains captured by the compressor with no expansion observed

D. The strut body should drop free from the spring after nut removal

21. A vehicle equipped with MagneRide (magnetorheological dampers) has a fault code for right front damper open circuit. The technician tests the damper circuit and confirms the open. What is the correct repair?

A. Repair the wiring harness and recheck damper operation with scan tool

B. Replace only the right front damper since it is confirmed as failed

C. Replace both front dampers together to maintain matched characteristics

D. Replace the suspension control module because the output circuit has failed

22. A passenger vehicle's front ride height measures 3/4 inch below specification on both sides equally, while the rear is within specification. What is the most likely cause?

A. Worn front strut mounts that have compressed with age and mileage

B. Sagged front coil springs from age and cumulative mileage on the vehicle

C. Low tire pressure on both front tires causing apparent low ride height

D. Failed front stabilizer bar bushings preventing proper suspension leveling

23. A leaf spring eye bushing at the front of a leaf spring has worn, elongating the spring eye. What effect does this create?

A. The rear axle shifts laterally during cornering and lane change maneuvers

B. The vehicle sits lower at the rear on the affected side of the vehicle

C. The leaf spring cannot flex vertically under normal road impact loading

D. The wheelbase on that side changes as the axle walks forward or rearward

24. A pickup truck with torsion bar front suspension has ride height adjusted. The specification is 35 inches from ground to the wheel opening center. Current reading is 37 inches — 2 inches too high. The technician should:

A. Loosen the torsion bar adjuster to reduce preload and lower ride height

B. Tighten the torsion bar adjuster to increase preload and raise ride height

C. Replace the torsion bars because preload adjustment has reached its limit

D. Swap the torsion bars left-to-right to equalize the ride height on both sides

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

25. A vehicle has front camber readings of left +0.3° (spec: 0° ± 0.5°) and right +0.2°. The vehicle pulls to the right during straight driving. Tire pressures are correct. What is the most likely cause?

A. Asymmetric camber causing the pull toward the positive side of the vehicle

B. A tire with conicity causing the vehicle to lead toward one direction

C. Caster imbalance between the left and right front sides of the vehicle

D. A dragging rear brake on the right side causing directional pull forward

26. Before checking caster, the technician must:

A. Perform wheel runout compensation on each wheel to zero out clamp error

B. Install new outer tie rod ends to eliminate any play in the linkage system

C. Adjust front toe to a preliminary straight-ahead position for measurement

D. Replace the steering angle sensor to ensure accurate position reference

27. A vehicle's alignment printout shows thrust angle of 0.15° and setback of 0.8° at the front axle. Which condition is more likely to indicate collision damage?

A. The thrust angle reading because it indicates rear axle misalignment

B. The setback reading because it indicates fore-aft wheel position shift

C. Both readings equally indicate collision damage requiring repair

D. Neither reading is within the range that indicates collision damage

28. A FWD vehicle with torsion beam rear suspension has a rear alignment showing 0.40° more toe-in on the left rear than the right rear. Specification allows 0° to +0.15° toe-in total. What is the correct action?

A. Adjust the rear toe eccentric cam bolt on the affected trailing arm

B. Reduce left rear tire pressure to shift the measured toe reading

C. Accept the condition and document it on the alignment printout as-is

D. Inspect the torsion beam and trailing arm for bent or damaged conditions

29. A vehicle has front toe reading total +0.30° (specification: +0.10° ± 0.05°). After correction, the technician observes the steering wheel is now off-center by 8° to the right. What is the correct action?

A. Split the toe adjustment unequally between the two tie rods to re-center

B. Leave the condition and allow the customer to re-center by habit over time

C. Remove the steering wheel and reindex it on the shaft splines as needed

D. Adjust the rear toe to create a thrust angle offset that cancels the error

30. A vehicle's alignment service is complete. The ADAS forward camera has not been touched, but the alignment changed the rear toe significantly. Does the ADAS forward camera require recalibration?

A. No, the ADAS camera is only affected by windshield replacement or bumper work

B. No, the ADAS camera is isolated from alignment and requires no calibration

C. Yes, because ADAS operation depends on accurate front and rear geometry

D. Yes, but only if the vehicle is driven at highway speed after the alignment

31. SAI is measured at 13.5° on the left front and 12.0° on the right front. Camber on both sides is within specification. What does the SAI difference indicate?

A. The steering knuckle on the left front is bent, likely from impact damage

B. The wheel bearing on the left front is worn and affecting the SAI reading

C. The tire pressure on the left front is different from the right front tire

D. The ride height difference between sides is affecting the SAI measurement

32. A vehicle has been aligned to specification. The customer returns complaining of rapid inside-edge wear on both front tires after 3,000 miles. Alignment is rechecked and found unchanged. What is the most likely cause?

A. The customer drives aggressively and exceeds the tires' load capacity

B. The tires are directional and have been rotated to reverse their rotation

C. Dynamic alignment shift from worn suspension bushings allowing camber change

D. The tire pressures are set above the placard specification by the customer

33. A vehicle's toe-out on turns is measured at 20° outside and 23° inside. The specification is 20° outside to 23° inside. Both sides read within spec. What does this confirm?

A. The rear toe is within specification at both wheels of the vehicle

B. The scrub radius is positive at both front wheels of the vehicle

C. The vehicle has excessive positive caster at both front wheel positions

D. The steering arms on both knuckles are within geometric specification

34. A technician completes an alignment. The printout shows all primary angles within specification. The thrust angle is 0.02°. What does the thrust angle reading confirm?

A. The front suspension is free of any bent components after service

B. The rear toe settings are symmetric and the thrust line matches centerline

C. The scrub radius is within specification at both front wheel positions

D. The steering axis inclination is correct on both sides of the vehicle

35. A vehicle has developed a pull to the left. Alignment readings are: left camber +0.1°, right camber +0.1°, left caster +3.2°, right caster +4.5°. What is the cause?

A. The equal camber readings cannot cause a pull in either direction of travel

B. The vehicle has excessive caster split causing pull toward the less-caster side

C. A brake drag on the left side is causing the pull toward that direction

D. Asymmetric caster — more caster on right pulls toward left (less-caster) side

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

36. A technician installs a new Gen 3 hub assembly on a vehicle with a driven front wheel. The axle nut torque specification is 240 ft-lb and the nut is marked as torque-to-yield. The technician torques the old nut to 240 ft-lb and installs it. What is the likely consequence?

A. The axle nut will maintain proper clamping force for normal service life

B. The axle nut will loosen over time due to normal operating vibration

C. The reused torque-to-yield nut cannot maintain proper clamp load preload

D. The wheel bearing will fail prematurely due to excessive preload on the races

37. A direct TPMS system has one sensor that is not communicating. The scan tool shows the sensor as "not reporting." What should be checked FIRST?

A. The sensor battery condition, which has a typical 5-10 year service life

B. The tire pressure to verify the sensor is not being deactivated by pressure

C. The TPMS module itself for internal failure causing the communication loss

D. The wheel speed sensor at that corner which may affect sensor operation

38. A wheel balancer indicates 2.0 oz of weight needed at the inner position and 1.8 oz at the outer position, with the two positions approximately 180° apart. This reading indicates:

A. The wheel has radial runout requiring match-mounting to correct the issue

B. The wheel has acceptable residual balance within the passenger specification

C. Static imbalance only, which can be corrected at a single weight position

D. Dynamic imbalance requiring weights at both inner and outer rim edges

39. A customer reports steering wheel shimmy at 65 mph that disappears when coasting in neutral without engine drive. What is the most likely cause?

A. Front wheel dynamic imbalance causing shimmy at that specific speed range

B. A worn CV joint producing vibration only under drive torque application

C. A worn wheel bearing causing growl and shimmy at the affected wheel

D. Tire cupping from worn shocks causing speed-specific vibration in front

40. A tire has a puncture located 1/2 inch from the edge of the tread where it meets the shoulder. The puncture is 3/16 inch in diameter. What is the correct service action?

A. Repair the puncture with a combination plug/patch from the inside

B. Replace the tire because the puncture is outside the repairable area

C. Install an external string plug to seal the puncture without dismounting

D. Repair with an interior patch only since the puncture is small in diameter

Practice Exam 5: Answer Key and Explanations

1. B — SRS capacitor discharge times vary by manufacturer — typically 1 to 10 minutes — and must be verified in service information before work begins. Two minutes may or may not be adequate; the specific wait time is not universal. The SRS module's backup capacitor can deploy an airbag after battery disconnect if the wait time is insufficient.

2. D — Low idle pressure (140 psi) is normal because the pump is not under load, and the 1,250 psi at full lock is essentially at the 1,200 psi specification (within normal measurement tolerance). Both readings confirm the pump, relief valve, and gear are functioning correctly. Recognizing normal test values is as important as identifying failures.

3. C — Most intermediate shafts can physically install in two orientations 180° apart. Without reference marks, the shaft often installs out of phase, putting the steering wheel at the six o'clock position with the road wheels straight. Always reference-mark before disassembly — this is one of the most common A4 test patterns.

4. A — Torque sensor signal mismatch on modern P-EPS or R-EPS systems almost always requires rack assembly replacement because the torque sensor is integrated into the rack as a non-serviceable unit. Wiring, SAS, and battery issues would produce different codes. Modern EPS racks are sealed assemblies with no field-serviceable components.

5. D — Honda power steering racks require Honda-specified fluid. Universal/generic PSF contains incompatible additives that cause seal swelling or degradation in Honda rack assemblies, often manifesting as leaks 2–6 months after the incorrect fluid installation. Always verify manufacturer-specific fluid requirements before any PSF service.

6. B — When rotational torque at the input shaft is below specification during over-center preload adjustment, the sector shaft adjustment screw needs to be tightened until the reading reaches spec. This is the standard over-center preload procedure: input torque through the gear at center, with pitman removed, adjusted to the specified value.

7. A — Loud growling at idle with correct fluid level and no visible air is the signature of internal pump wear — worn vanes, scored cam ring, or damaged bearings. Belt slipping produces a different sound (squeal), return line restriction causes foaming, and cooler freezing causes a different failure pattern. Pump replacement is indicated.

8. C — Death wobble on solid-axle trucks involves multiple worn components acting together. Replacing only the damper treats the symptom temporarily. Track bar bushings, tie rod ends, front ball joints, and wheel balance must all be inspected because the damper wears out trying to compensate for these other failures. Root-cause repair is the standard.

9. D — A resistance-out-of-range code on the driver airbag after clockspring replacement points directly to the clockspring. The ribbon cable inside can be damaged during installation (rotating past the internal limits, handling improperly during centering), changing the circuit resistance the SRS module measures. Reinspect and replace the clockspring if damaged.

10. A — EPS motors draw up to 80+ amps; any voltage drop or weak battery reduces assist. When motor current reads "expected" but effort is heavy, the module is commanding correctly but the delivered power is insufficient due to supply-side issues. Voltage drop testing under load is the correct diagnostic before condemning hardware.

11. C — Steering wheel retaining nuts must be torqued to the manufacturer's specification with a calibrated torque wrench. Under-torque allows the wheel to loosen; over-torque can damage the steering shaft threads or the column itself. Tight-snug, generic nuts, or reusing damaged nuts are all incorrect practices.

12. A — An internal rack leak (between pressure and return circuits) causes slow fluid loss over weeks with no external leak visible. The fluid is consumed by cycling between internal galleries; some volume leaks past the rack seal and is eventually lost through the reservoir cap as vapor or residue. External leak absence points to internal bypass.

13. A — Non-symmetric strut mount stud patterns exist specifically to force correct orientation, because strut mount position affects camber and caster. Installing the mount rotated to a different position changes these angles significantly. Always verify original orientation before removal and install in the same position on reassembly.

14. D — A clunk only under hard braking (brakes verified good) points to a worn front lower control arm bushing. Brake torque tries to pull the control arm fore-aft against its pivot; a worn bushing allows fore-aft movement producing the clunk. Tie rods, strut bearings, and stabilizer links don't respond to braking torque the same way.

15. B — When the wear indicator projects above (or even with) the housing surface, the joint is still within acceptable wear limits. Only when the indicator recedes flush with or below the housing is the joint considered worn out. Wear-indicator inspection must be performed at curb height (loaded), and a projecting indicator means the joint is healthy.

16. C — A broken ride height sensor linkage means the module cannot determine the actual corner height. Most systems respond by refusing to inflate rather than risk overinflation to a destructive level. Confirming a broken linkage arm (common failure on aging luxury SUVs) and replacing it (and calibrating) is the repair.

17. A — Both technicians are correct. Subframe bolts are commonly torque-to-yield and must be replaced when removed. Centering pins are specified in service information to lock the subframe to its design position during tightening — skipping them shifts the subframe enough to make alignment uncorrectable.

18. B — Lateral links should be replaced in pairs on the same axle. Unequal wear characteristics between left and right links cause asymmetric dynamic geometry and uneven handling. Bushings alone are typically not serviceable on modern multi-link suspensions, and replacing only one side is false economy that produces return visits.

19. B — Overtorquing U-bolts stretches the threads beyond their designed clamping range, compromising long-term clamping force. U-bolts are often torque-to-yield and the spec is not arbitrary — it reflects the correct clamping load. Overtorque gives the illusion of "tighter" while actually weakening the fastener over time.

20. C — When a spring compressor is properly engaged, the compressed spring stays captured when the strut mount nut is removed — no expansion, no launch. This is the whole purpose of the compressor: to fully capture spring energy so components can be safely removed. Any visible spring expansion after nut removal means the compressor is inadequate.

21. C — MR dampers must be replaced in pairs on the same axle. Asymmetric damping characteristics between new and old MR dampers cannot be compensated by the control module, producing unpredictable handling. Replacing both front dampers ensures matched response. This pair-replacement rule applies to all adaptive damping systems.

22. B — Equal ride height below spec on both front corners with the rear normal is the signature of sagged front coil springs. The springs have shortened with age and cumulative mileage, dropping the front evenly. Strut mounts, tire pressure, and bar bushings would produce different or asymmetric symptoms — springs produce bilateral, equal sag.

23. D — An elongated leaf spring eye allows the axle to walk forward and rearward on that side, changing the effective wheelbase. The symptom is asymmetric wheelbase (wheel positions different front-to-rear side-to-side) rather than ride height or lateral shift. This is specific to elongated front eye wear on leaf-spring rear axles.

24. A — To lower a ride height that's too high, the torsion bar adjuster must be loosened, reducing the bar's installed preload and allowing the suspension to settle lower. Tightening would raise height further. Swapping bars left-to-right would cause eventual fracture. Bar replacement is only needed if the adjustment range is exhausted.

25. C — Camber is essentially equal (0.1° difference is within normal measurement tolerance and would not cause a noticeable pull). The pull must originate from something else — in context, caster imbalance is the common alignment cause not yet verified. The question tests recognition that equal camber cannot be the cause of a strong pull.

26. A — Wheel runout compensation must be performed before any caster measurement because caster is calculated from camber change during a wheel sweep. Without compensation, the baseline clamping error corrupts both static camber and the sweep readings. Skipping compensation invalidates every subsequent measurement.

27. B — Setback (fore-aft offset between wheels on the same axle) is a specific indicator of collision damage that shifted a subframe or bent a control arm. Thrust angle has multiple causes (worn bushings, tire pressure, rear axle damage), while setback almost always indicates structural shift. Setback is the more direct collision indicator.

28. D — Torsion beam rear suspensions typically have no rear toe adjustment. Rear toe out of spec on these vehicles means the beam is bent or the trailing arm is damaged — requiring component replacement. "Adjusting" a non-existent adjuster or accepting the out-of-spec reading are both incorrect approaches on torsion beam designs.

29. A — Splitting the toe adjustment unequally between left and right tie rods recenters the steering wheel while maintaining correct total toe. This is standard procedure, not a workaround. Reindexing the wheel on splines is a last resort. Creating offsetting thrust angle errors is never acceptable — it introduces a new problem.

30. C — ADAS forward camera requires calibration after alignment service that significantly changes geometry, because the lane-keep system uses vehicle geometry plus camera imaging to interpret lane position. Rear toe changes affect the thrust line, which affects how the front camera's lane reference maps to actual vehicle tracking. Calibration is mandatory.

31. A — Side-to-side SAI differences exceeding 0.5° indicate a bent steering knuckle — usually from impact damage (curb, pothole, collision). SAI is built into the knuckle casting and cannot be adjusted; the 1.5° difference in this question is diagnostic of a bent component. Replacing or repairing the knuckle is the only fix.

32. C — Rapid inside-edge wear with alignment that reads correct on the rack points to dynamic alignment shift under load. Worn suspension bushings allow camber (or toe) to change when the vehicle is loaded or moving, even though static alignment is fine. Inspection for worn bushings (control arm, subframe) is the next diagnostic step.

33. D — Toe-out on turns (Ackermann) is determined by the steering arm geometry built into the knuckle. When TOOT is within specification at the required reference angle, both steering arms are geometrically correct. TOOT does not directly indicate toe, scrub radius, or caster — it specifically validates steering arm geometry.

34. B — A thrust angle of 0.02° confirms that the rear toe settings are essentially symmetric and the thrust line matches the geometric centerline. This means the vehicle will track straight without crabbing, and front toe set relative to the thrust line will produce a centered steering wheel. Thrust angle is specifically a rear-axle measurement.

35. D — Caster split with more caster on the right produces a pull toward the LEFT (the less-caster side). Caster pull direction is opposite to camber pull direction. Equal camber readings can't cause the pull, so caster asymmetry is the cause — the side with less caster has less self-centering force, producing pull to that side.

36. C — Torque-to-yield axle nuts stretch during their initial torque cycle and cannot maintain proper clamping force when reused. The nut may feel tight at 240 ft-lb, but the designed preload is not achieved. This can lead to bearing failure, wheel looseness, or axle nut backout. Always install new TTY nuts — no exceptions.

37. A — TPMS sensor batteries typically last 5–10 years. When a sensor stops reporting, battery failure is the most common cause — especially on vehicles 7+ years old. Tire pressure, module failure, and wheel speed sensor issues are less common causes; always check the most likely cause first before pursuing rare alternatives.

38. D — Weights required at both inner and outer rim edges, 180° apart, is the classic signature of dynamic (two-plane) imbalance. Static imbalance requires only single-plane correction. The 180° opposition of the inner and outer weights reveals the wobbling force couple that dynamic imbalance creates; correcting both planes is required.

39. B — Vibration only under drive torque (disappears in neutral coast) is the signature of a worn CV joint. Wheel balance, bearings, and cupped tires produce vibration in both drive and coast conditions because they don't depend on torque transmission. The "drive only" characteristic is specifically diagnostic of CV joint issues.

40. B — Punctures in the shoulder area (where tread meets sidewall) are outside the repairable zone per industry standards. Only tread-area punctures can be safely repaired, and only when smaller than 1/4 inch with no run-flat damage. A shoulder puncture requires tire replacement — any attempt at repair can fail catastrophically at speed.