

# PRACTICE EXAM 11: ASE A4 SIMULATION

## (40 QUESTIONS)

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### STEERING SYSTEMS DIAGNOSIS AND REPAIR (Questions 1–12)

1. A power steering pressure test produces the following readings: idle pressure 85 psi, relief pressure (shut-off valve closed) 1,225 psi, full-lock pressure 1,210 psi. Specification is 50–100 psi at idle and 1,200 psi at relief. What is the correct interpretation?
- A. The idle pressure is too high suggesting a restricted return line to the reservoir
  - B. The relief pressure exceeds specification indicating a stuck relief valve issue
  - C. The system is functioning within normal operating specifications at all test points
  - D. The full-lock pressure is too low indicating internal bypass in the steering rack
2. A voltage drop test on the EPS power feed reads 0.35 volts with the steering wheel at full lock on a parking surface. Specification is less than 0.5 volts under load. What does this indicate?
- A. The EPS power supply circuit is functioning within specification and is acceptable
  - B. The EPS module has failed internally and is producing abnormal current draw patterns
  - C. The battery is weak and cannot maintain voltage under the commanded load condition
  - D. The ground circuit has excessive resistance and requires immediate harness repair
3. A recirculating ball gearbox input shaft rotational torque is measured during over-center preload adjustment. The reading is 12 in-lb. Specification is 8–10 in-lb. What is the correct action?
- A. Tighten the sector shaft adjuster to increase torque to 14 in-lb and verify the reading
  - B. Leave the setting as measured because it exceeds the minimum specification value
  - C. Replace the gearbox because the sector teeth cannot produce proper preload

D. Loosen the sector shaft adjuster until the reading reaches 8–10 in-lb as specified

4. A clockspring is being installed. The manufacturer specifies centering by rotating the clockspring to the full clockwise stop, then rotating 2.5 turns counterclockwise to reach center. The technician skips this step and installs the clockspring as it arrived from the parts supplier. What is the MOST likely consequence?

A. The horn circuit will function intermittently during normal driving conditions

B. The ribbon cable will break during the first full steering cycle after installation

C. The airbag SRS warning light will illuminate immediately after installation

D. The steering wheel will be rotationally off-center during straight driving

5. A power steering hose is inspected. The hose shows a small crack in the outer rubber cover approximately 2 inches from the crimped end fitting. What is the correct action?

A. Replace the complete hose assembly because outer cover damage compromises integrity

B. Apply silicone sealant over the crack and continue the hose in service for now

C. Wrap the cracked area with reinforced tape to prevent further deterioration of cover

D. Monitor the crack during service intervals and replace only when leakage occurs

6. A hydraulic power steering pump produces 65 psi at idle with wheels straight. Specification is 50–100 psi. The technician tests relief pressure by closing the shut-off valve briefly — the pressure reaches 1,100 psi. Specification is 1,200 psi at relief. What does this indicate?

A. The pump is operating within specification on both test points and no repair is needed

B. The idle pressure is too low indicating a worn pump internally requiring replacement

C. The pump cannot reach relief pressure indicating worn pump or stuck relief valve

D. The relief valve is functioning properly but idle pressure requires further adjustment

7. An EPS system scan tool data stream shows: Battery voltage 13.8 V, Motor current 45 A, Torque sensor left 2.8 V, Torque sensor right 2.9 V (both sensors should read within 0.1 V of each other at rest). The vehicle has reduced assist. What is the cause?

- A. The battery voltage is below operating specification for the EPS module
- B. The motor current is excessive indicating a mechanical bind in the rack
- C. The torque sensor left and right readings are too similar indicating a short
- D. The torque sensors are within normal tolerance at rest — investigate other causes

8. A steering damper is being tested for condition. The technician strokes the damper slowly by hand. Proper damper operation should produce:

- A. No resistance to stroking — the damper should move freely through its stroke range
- B. Smooth consistent resistance throughout the entire stroke in both directions of travel
- C. High resistance at the ends of stroke and no resistance through the middle portion
- D. Intermittent binding with occasional catches throughout the full stroke length

9. A power steering fluid temperature has been measured at 235°F during extended heavy steering use. The fluid specification limit is 250°F. The return line routing passes near the exhaust manifold. Which is the correct action?

- A. Reroute the return line away from the exhaust manifold heat source for cooling
- B. Replace the power steering fluid with a higher-temperature-rated fluid for service
- C. Install a larger power steering cooler to increase heat dissipation from the fluid
- D. Accept the current temperature as within specification and return to service

10. A rack and pinion gear is being installed on a 2020 vehicle. The rack has an adjustable pressure spring at the pinion. The manufacturer specification for preload is 4–6 in-lb of rotational torque at the pinion input shaft. Current reading after initial assembly is 10 in-lb. What is the correct action?

- A. Leave the preload as measured because it exceeds the minimum required specification

- B. Replace the pressure spring because the preload cannot be adjusted without damage
- C. Loosen the rack pressure spring adjuster until the reading reaches 4–6 in-lb as specified
- D. Tighten the adjuster further to 12 in-lb to ensure adequate preload during service

11. A 2022 EPS-equipped vehicle has a battery that tests weak at load testing. The customer is experiencing intermittent EPS warning lights. The technician replaces the battery. What additional step is required?

- A. The EPS control module must be replaced because the weak battery damaged it
- B. Perform an EPS initialization procedure per the manufacturer's specified steps
- C. The steering angle sensor must be recalibrated after the battery replacement
- D. The torque sensor in the column must be recalibrated using a scan tool

12. A hydraulic power steering system is being diagnosed for fluid contamination. The fluid drained from the system shows a dark color with visible metallic particles. Which is the correct action?

- A. Add a power steering additive to dissolve the metallic particles and return to service
- B. Flush the system with fresh fluid and monitor for improvement over the next service cycle
- C. Replace only the power steering pump because it is the most common source of metal
- D. Flush the system, identify the source of the metal contamination, and repair the source

### **SUSPENSION SYSTEMS DIAGNOSIS AND REPAIR (Questions 13–24)**

13. A ball joint wear check is performed at curb height. The wear indicator (grease fitting) projects 1/8 inch above the housing surface. Specification: the indicator should be flush with or above the housing surface. What does this indicate?

- A. The ball joint is within acceptable wear limits and does not require replacement
- B. The ball joint has reached its wear limit and requires immediate replacement
- C. The wear indicator is defective and the joint must be inspected by other methods

D. The joint requires additional grease before wear measurement can be taken

14. A MacPherson strut replacement is being performed. The spring compressor is engaged with 8 compressed coils. The manufacturer specifies compressor engagement of at least 6 coils for this spring. What is the correct action?

A. Decrease the compressor engagement to exactly 6 coils for easier component removal

B. Leave the compressor at 8 coils because more engagement is always safer than less

C. The engagement is acceptable — proceed with the strut mount removal procedure

D. Increase the compressor engagement to 10 coils for maximum spring capture safety

15. A ride height measurement is taken at all four corners: left front 14.5", right front 14.8", left rear 15.0", right rear 15.1". Specification is  $14.75" \pm 0.5"$  at front and  $15.0" \pm 0.5"$  at rear. Total variation side-to-side allowed is 0.5". What condition exists?

A. All four corners are within specification — the ride height check passes the inspection

B. The left front is below specification requiring spring replacement before alignment

C. The rear is out of specification requiring adjustment before continuing service work

D. The front side-to-side difference of 0.3" is acceptable and all readings are within spec

16. A shock absorber bounce test is performed on a vehicle. The technician pushes down hard on each corner and releases. A properly functioning shock should allow:

A. Multiple bounce cycles before the vehicle settles — this indicates proper damping

B. One complete cycle of rebound before the vehicle settles to its resting position

C. No rebound at all — the vehicle should remain exactly at the compressed position

D. Slow, controlled settling over 5 seconds without any visible rebound motion at all

17. A torsion bar front suspension has ride height measured at 27.0 inches. Specification is  $28.0 \text{ inches} \pm 0.25 \text{ inches}$ . The adjustment bolt is being turned to increase preload. How should the vehicle be positioned for this adjustment?

- A. At curb weight on level ground with all wheels on the ground surface
- B. On a two-post lift with the wheels hanging free to unload the torsion bar
- C. On jack stands placed under the lower control arms at their pivot points
- D. On a four-post lift with ramps positioned under each wheel for access

18. An air suspension system shows the following scan tool data: Left front ride height sensor 15.0 V output (spec: 4.5–4.8 V at ride height), other three corners within specification. What is MOST likely the cause?

- A. The air spring at the left front is overinflated beyond specification limits
- B. The compressor is producing excessive pressure at the left front corner
- C. The ride height sensor at the left front is reporting out-of-range values
- D. The left front sensor has failed open or has a broken linkage arm at corner

19. A leaf spring pack is being inspected. The technician measures the spring arc (distance from leaf top to bottom) at 4.0 inches. Specification for a new spring pack is 5.5 inches. What does this indicate?

- A. The leaf spring is within acceptable service limits and does not require replacement
- B. The leaf spring arc is greater than specification indicating over-cambered condition
- C. The leaf spring has sagged significantly and has lost its designed load capacity
- D. The measurement is within normal tolerance for a used spring in service

20. An adaptive damper produces the following scan tool readings: Commanded current 1.5 A, Actual current 1.48 A, Commanded damping soft, Actual damping soft. Wiring and mechanical condition check good. Which is the correct interpretation?

- A. The damper is functioning within specification — the actual matches the commanded
- B. The damper is producing excessive resistance requiring replacement of the unit
- C. The commanded current is below specification and the module requires replacement
- D. The actual current is too close to the commanded value indicating a shorted circuit

21. A stabilizer bar end link is being inspected. The ball stud at one end has 0.100 inch of axial play when pulled and pushed by hand. Specification is 0.030 inches maximum. What is the correct repair?

- A. Tighten the ball stud retaining nut to reduce the axial play to specification
- B. Replace the ball stud seal to restore the original retention of the stud in socket
- C. Apply thread locker to the ball stud threads and retorque to eliminate the play
- D. Replace the end link because the ball stud wear exceeds specification limits

22. A coil spring has been measured on a spring tester. Spring rate reads 280 lb/in compressed 2 inches. Specification is 310 lb/in  $\pm$  15 lb/in. What does this indicate?

- A. The spring has lost stiffness and is below specification — replacement is required
- B. The spring is within acceptable tolerance at 15 lb/in difference from the nominal value
- C. The spring testing equipment requires calibration before accurate readings can be taken
- D. The spring rate increases under additional compression — further testing is required

23. A subframe centering procedure requires insertion of alignment pins through the subframe and body holes. The pins must be inserted with the subframe bolts:

- A. Fully torqued to final specification before pin insertion for accuracy
- B. Loosened or just snug to allow the subframe to align to the pin position
- C. Completely removed to allow the subframe to float freely during centering
- D. Torqued to 50% of final specification for partial tension during alignment

24. A multi-link IRS has the following rear alignment readings: Left rear camber  $-1.5^\circ$  (spec:  $-1.0^\circ \pm 0.5^\circ$ ), Right rear camber  $-0.9^\circ$  (spec:  $-1.0^\circ \pm 0.5^\circ$ ). Adjustment has been performed at the eccentric cam but the left rear camber cannot be brought within specification. Which is the MOST likely cause?

- A. The tire pressure on the left rear is different from the right rear affecting reading
- B. The alignment equipment requires recalibration before continuing the rear alignment

- C. A worn or damaged suspension link or bushing on the left rear side of vehicle
- D. The rear shock absorber on the left side has failed and is affecting camber reading

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

25. A vehicle's alignment readings show: Left front camber  $+0.5^\circ$ , Right front camber  $-0.8^\circ$ . Camber specification is  $0^\circ \pm 1.0^\circ$ . What is the cross-camber value and effect?

- A. Cross-camber of  $0.3^\circ$  with the vehicle tracking straight and no pull expected
- B. Cross-camber of  $0.7^\circ$  with a mild pull toward the left side of the vehicle
- C. Cross-camber of  $1.0^\circ$  with a strong pull toward the right side at highway speed
- D. Cross-camber of  $1.3^\circ$  with a strong pull toward the left — the more-positive side

26. A caster reading requires a wheel sweep. The typical sweep angle is:

- A.  $10^\circ$  each direction from straight ahead for total  $20^\circ$  of rotation from center
- B.  $15^\circ$  each direction from straight ahead for total  $30^\circ$  of rotation from center
- C.  $20^\circ$  each direction from straight ahead for total  $40^\circ$  of rotation from center
- D.  $30^\circ$  each direction from straight ahead for total  $60^\circ$  of rotation from center

27. A vehicle has front toe reading  $+0.30^\circ$  total. Specification is  $+0.10^\circ \pm 0.05^\circ$ . What is the correct action?

- A. Reduce total toe by adjusting both tie rods equally to reach  $+0.10^\circ$  as specified
- B. Adjust only the left tie rod to reduce the total toe to within specification
- C. Leave the toe as measured because positive toe prevents inside-edge tire wear
- D. Reduce total toe to zero to prevent any tire wear from excessive toe-in measurement

28. A thrust angle of  $-0.20^\circ$  is measured. Specification is  $0^\circ \pm 0.25^\circ$ . What does this indicate?

- A. The thrust angle is out of specification and the rear toe must be readjusted
- B. The thrust angle is within specification — the vehicle will track along the thrust line
- C. The thrust angle indicates collision damage at the rear suspension requiring repair
- D. The thrust angle cannot be determined from this reading — additional data is required

29. A vehicle's included angle readings are: Left  $12.8^\circ$ , Right  $13.3^\circ$ . Specification is  $13.0^\circ \pm 0.5^\circ$ . Camber is within specification on both sides. What does this confirm?

- A. The alignment equipment requires calibration before measurements are accurate
- B. The tires are mismatched in size causing the apparent included angle difference
- C. The ride height variation is causing the included angle difference measurement
- D. The steering knuckles are not bent — both included angles are within tolerance

30. A vehicle's alignment printout shows setback of  $+0.8^\circ$  at the front axle. Specification is  $\pm 0.25^\circ$ . What should the technician investigate?

- A. The tire pressures at the front to correct apparent setback caused by pressure difference
- B. The rear alignment because setback is typically a rear-axle measurement on vehicles
- C. Collision damage or subframe/control arm shift that displaced one front wheel
- D. The alignment equipment for calibration issues affecting the setback measurement

31. After an alignment is complete, the steering wheel sits  $3^\circ$  off-center during straight driving. The vehicle tracks straight without pulling. What is the correct action?

- A. Split the front toe adjustment unequally between tie rods to re-center the wheel
- B. Remove the steering wheel and reindex it on the splined shaft for correction
- C. Leave the condition because the vehicle tracks straight — cosmetic offset is acceptable
- D. Adjust rear toe to create a thrust angle offset that compensates for the wheel

32. A vehicle's front toe is being set. The steering wheel has been centered and held with a steering wheel holder. Left toe reads  $+0.08^\circ$ , right toe reads  $+0.02^\circ$ . Total toe specification is  $+0.10^\circ \pm 0.05^\circ$ . What is the condition?

- A. Total toe is within specification but the individual readings are asymmetric
- B. Total toe is within specification and the individual readings are balanced left to right
- C. The total toe is  $0.10^\circ$  which matches specification — both sides set properly adjusted
- D. The total toe is outside specification and both tie rods require adjustment to correct

33. A vehicle with lane-keep assist has had its alignment completed. The steering wheel was re-centered during toe adjustment. Which calibrations are typically required?

- A. Only the tire pressure monitoring system requires a reset after the alignment service
- B. Only the electronic stability control module requires a relearn during a road test
- C. Only the forward camera requires calibration because the SAS is isolated from alignment
- D. The steering angle sensor calibration and the forward camera calibration are typically needed

34. A vehicle's alignment shows left front caster  $+4.5^\circ$  and right front caster  $+3.2^\circ$ . Camber is within specification at both sides. The vehicle pulls at highway speed. In which direction will the pull occur?

- A. Toward the left because the left side has more caster than the right side of vehicle
- B. Toward the right because the right side has less caster — pull goes to the less-caster side
- C. No pull will occur because the individual caster readings are within specification tolerance
- D. The pull direction depends on the cross-camber which is not shown in the readings

35. A technician performs wheel runout compensation on an alignment rack. This step is performed:

- A. Before any alignment measurements to compensate for wheel clamp offset errors
- B. After the alignment is complete to verify the accuracy of the final measurements
- C. Only when the vehicle has abnormal tire wear indicating alignment-related issues

D. Only on vehicles with rear-wheel drive configurations during alignment service

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

36. A wheel-and-tire assembly is on a balancer. The readings show: Inner position 1.5 oz, Outer position 1.2 oz, 90° apart on the rim. Static imbalance reading is 0.3 oz. What does this indicate?

- A. The assembly has only static imbalance requiring weight at a single-plane position
- B. The assembly has only dynamic imbalance requiring weights at both rim edge positions
- C. The assembly is within acceptable residual balance without requiring correction
- D. The assembly has both static and dynamic imbalance requiring weights at both positions

37. A TPMS warning light is illuminated. The scan tool shows tire pressures: LF 32, RF 32, LR 32, RR 28 psi. Placard specification is 32 psi at all wheels. What is the MOST likely cause?

- A. The right rear TPMS sensor has failed and is reporting an incorrect pressure value
- B. The right rear tire has a slow leak that needs to be identified and repaired
- C. The right rear tire is low by 4 psi and requires inflation to the placard value
- D. The TPMS module requires a reset procedure after tire inflation to clear the warning

38. A tire sidewall shows the marking "2825." This 4-digit DOT date code indicates:

- A. The tire was manufactured in the 28th week of 2025 according to standard coding
- B. The tire has been in service for 28 years since manufacture according to date stamp
- C. The tire size is 28 inches diameter with a 25 series aspect ratio specification
- D. The tire has 28 tread depth remaining with 25 thousand miles since installation

39. A wheel hub assembly is being installed. The axle nut specification reads "220 ft-lb + 90°." This notation indicates:

- A. Torque to 220 ft-lb only — the additional angle is optional for sealed bearings
- B. Torque to 220 ft-lb then rotate the nut 90° additional for the final specification
- C. Apply 220 ft-lb at the axle nut and 90° rotation at the wheel speed sensor
- D. Torque to 90° of nut rotation and then apply 220 ft-lb for the final tightening

40. A tire marking reads "M+S" on the sidewall. This indicates:

- A. The tire is rated for maximum speed of 160 km/h in sustained operation
- B. The tire is a metric-sized model with mud-rated tread compound for service
- C. The tire is rated for mud and snow use per industry standard classification
- D. The tire meets the minimum standard for passenger vehicle highway service

## Practice Exam 11: Answer Key and Explanations

1. C — All three readings fall within acceptable specification ranges: idle pressure (85 psi vs. spec 50–100), relief pressure (1,225 psi is within normal tolerance of the 1,200 psi spec), and full-lock pressure (1,210 psi) is normal because it should approach relief pressure. Recognizing normal test values is as important as identifying abnormal ones during pressure diagnosis.

2. A — A voltage drop of 0.35 V under full-lock load is within the acceptable specification of less than 0.5 V. This confirms the EPS power supply circuit is functioning properly — no excessive resistance, no corrosion, no undersized wiring. The circuit passes — further diagnosis should explore other causes if symptoms persist.

3. D — When over-center preload reads above specification, the sector shaft adjuster must be loosened until the reading reaches the 8–10 in-lb range. Over-tight preload causes binding, hard steering, and accelerated gear wear. Always bring preload within spec — never higher, even when the excess seems "safe."

4. B — When the clockspring is not centered before installation, the ribbon cable inside is not positioned in the middle of its travel range. The first full steering cycle pushes the cable beyond one of its internal travel limits, breaking it. This is the signature failure mode of uncentered clockspring installation.

5. A — Outer cover cracks expose the inner reinforcement braid and pressure layers to ozone, moisture, and contamination, which accelerate hose deterioration and can lead to sudden rupture. Any visible crack in a power steering hose is a replacement indication — sealants, tape, and monitoring are not acceptable practices for pressure hoses.

6. C — Failure to reach relief pressure (1,100 psi vs. 1,200 psi specification) with a closed shut-off valve indicates either a worn pump (unable to generate full pressure) or a stuck-open relief valve (dumping pressure before it peaks). Idle pressure may still be within spec because less output is needed at idle — the relief test is the definitive diagnostic.

7. D — The torque sensor readings are 0.1 V apart (2.8 V vs. 2.9 V), which is within normal tolerance at rest. Battery voltage (13.8 V) is normal, and motor current (45 A) is within range for EPS operation. The data shown does not identify any fault — the reduced assist has a cause not revealed in these specific readings, so other areas must be investigated.

8. B — A properly functioning steering damper produces smooth, consistent resistance throughout its entire stroke in both directions. No-resistance operation indicates internal failure; catches, binding, or inconsistent resistance also indicate damper failure. The hand-stroke test is a quick diagnostic that separates functional dampers from worn units needing replacement.

9. A — Fluid temperature at 235°F is below the 250°F limit but close enough that the situation warrants correction. The primary cause is the return line routing near the exhaust manifold. Rerouting the line away from the heat source is the permanent fix — replacing fluid or adding a larger cooler addresses symptoms but not the root cause.

10. C — Rack pressure spring preload of 10 in-lb exceeds the 4–6 in-lb specification. Loosening the adjuster to bring preload within the 4–6 in-lb range is the correct action. Over-tight preload causes binding, center-feel stickiness, and accelerated wear on the rack assembly. Always bring adjustments within spec, never intentionally high.

11. B — After battery replacement on an EPS-equipped vehicle, the manufacturer-specified initialization procedure is typically required so the module re-learns its reference values. Without initialization, the EPS may operate in reduced-assist mode or throw warnings. This is a mandatory step on most modern vehicles after any battery disconnect.

12. D — Dark fluid with metallic particles indicates internal component wear somewhere in the system — typically a failing pump or rack. The correct action is flushing the system, identifying the source of the metal contamination, and repairing the source. Additives, partial flushes, and assumption-based component replacement all miss the underlying wear cause.

13. A — On wear-indicator ball joints, when the grease fitting projects ABOVE the housing surface (as in this scenario), the joint is within acceptable wear limits. Only when the indicator recedes flush with or below the housing does the joint need replacement. Wear-indicator inspection must be performed at curb height (loaded) for valid readings.

14. C — Spring compressor engagement of 8 coils exceeds the 6-coil manufacturer minimum specification, providing a safe margin of capture. More engagement than specified is acceptable and safer — never less. The compressor is properly engaged and the service can proceed. Decreasing engagement would reduce safety margin unnecessarily.

15. D — All four corners are within the  $\pm 0.5$ " individual-spec tolerance, and the front side-to-side difference of 0.3" is within the 0.5" allowed total variation. All readings are acceptable. Recognizing when measurements are actually in tolerance — even when not identical — is as important as identifying out-of-spec conditions.

16. B — A properly functioning shock absorber produces one complete rebound cycle before the vehicle settles to its resting position. Multiple bounce cycles indicate failed damping; no rebound at all indicates over-damping or seized shock; 5-second slow settling indicates excessive damping. The single rebound cycle is the correct normal response.

17. A — Torsion bar ride height adjustment must always be performed with the vehicle at curb weight on level ground so the suspension is in its normal loaded position. Adjustment on a lift with wheels hanging or on jack stands produces incorrect preload settings. The vehicle must be loaded normally for the adjustment to be valid.

18. D — The sensor output of 15.0 V is far beyond the 4.5–4.8 V specification at ride height — this indicates either a failed-open sensor or a broken linkage arm (a common aging failure on air-suspension vehicles). Air spring overinflation and compressor excess would affect air pressure, not the sensor output voltage directly. The sensor has failed.

19. C — A spring arc measurement of 4.0 inches compared to the 5.5-inch new specification represents 1.5 inches of sag — a significant loss of designed arc. This indicates the leaf spring has sagged substantially and lost its designed load capacity, requiring replacement. New-spec dimensions are the reference point for sag assessment.

20. A — Commanded current of 1.5 A with actual current of 1.48 A is essentially a perfect match (within 0.02 A), and commanded damping matches actual damping. The damper is functioning correctly within specification — no repair is needed. Recognizing normal scan tool readings is a key skill for efficient diagnostic work.

21. D — Ball stud axial play of 0.100 inch exceeds the 0.030-inch specification by more than 3x. The ball stud is worn and the end link must be replaced. Tightening, seal replacement, and thread locker do not restore the worn ball-socket interface — the internal wear cannot be corrected externally.

22. A — Spring rate of 280 lb/in compared to 310 lb/in  $\pm$  15 lb/in specification places the actual rate 30 lb/in below the nominal and 15 lb/in below the lower tolerance limit. The spring is out of specification on the low side and requires replacement. Reduced rate produces lower ride height and compromised handling.

23. B — During subframe centering, the bolts must be loosened or just snug to allow the subframe to float into alignment with the pins. Fully torqued bolts would lock the subframe in whatever position it was previously, defeating the centering procedure. Completely removed bolts could allow the subframe to drop. The pins align; the bolts then tighten.

24. C — Left rear camber at  $-1.5^\circ$  is outside the  $-1.0^\circ \pm 0.5^\circ$  specification, and adjustment at the eccentric has not brought it within spec. This indicates a worn or damaged suspension link or bushing — the adjustment range is being exceeded because a component is shifted from its design position. Visual inspection of the affected links is next.

25. D — Cross-camber is the side-to-side camber difference:  $+0.5^\circ$  minus  $(-0.8^\circ)$  equals  $1.3^\circ$ . A  $1.3^\circ$  cross-camber produces a strong pull toward the more-positive side (the left, in this case). Magnitude of this cross-camber is well beyond tolerance for producing a noticeable pull at highway speed. Cross-camber, not individual values, drives pull behavior.

26. A — Standard caster sweeps use  $10^\circ$  each direction from straight ahead, for a total  $20^\circ$  rotation. This provides enough camber change for accurate caster calculation while staying within practical turn plate

limits. Some systems use  $20^\circ$  total ( $10^\circ$  each way), which is the industry-standard baseline for most alignment equipment.

27. A — Total front toe of  $+0.30^\circ$  is significantly higher than the  $+0.10^\circ \pm 0.05^\circ$  specification. Both tie rods must be adjusted equally to reduce total toe to the  $+0.10^\circ$  spec target while keeping the steering wheel centered. Leaving out-of-spec toe causes rapid outside-edge tire wear and pull complaints. Zero toe is not a safe substitute — follow the spec.

28. B — Thrust angle of  $-0.20^\circ$  is within the  $0^\circ \pm 0.25^\circ$  specification. The vehicle will track along its thrust line normally. A thrust angle within spec confirms the rear toe settings are sufficiently symmetric; the vehicle will not crab noticeably. Recognizing in-spec readings saves unnecessary diagnostic work.

29. D — Included angle readings of  $12.8^\circ$  and  $13.3^\circ$  are both within the  $13.0^\circ \pm 0.5^\circ$  specification, and they differ from each other by only  $0.5^\circ$ . This confirms neither knuckle is bent. Included angle comparison is the fastest knuckle-integrity diagnostic — matching readings within tolerance validate knuckle shape.

30. C — Setback of  $+0.8^\circ$  far exceeds the  $\pm 0.25^\circ$  specification. This indicates structural damage — one front wheel has shifted fore/aft of its designed position. Common causes are collision damage that shifted a subframe or bent a control arm. Setback of this magnitude warrants investigation for frame, subframe, or mounting damage.

31. A — Splitting the front toe adjustment unequally between left and right tie rods recenters the steering wheel while maintaining correct total toe. This is standard procedure. Leaving a  $3^\circ$  offset is unacceptable (creates customer complaint); reindexing the wheel on splines is a last resort; adjusting rear toe creates a new thrust-angle problem.

32. C — Total toe of  $0.10^\circ$  (left  $0.08^\circ$  + right  $0.02^\circ$ ) matches the  $0.10^\circ$  specification, and both individual readings are within tolerance. The toe is set correctly with the steering wheel centered during the adjustment. This scenario tests the ability to calculate total toe from individual readings and recognize correct setup.

33. D — Alignment with re-centered steering wheel invalidates the SAS's learned zero-point; SAS calibration is mandatory. On lane-keep-equipped vehicles, the forward camera also typically requires calibration because the system relies on accurate vehicle geometry references. Both calibrations are typically required after this type of service.

34. B — Caster imbalance with more caster on the left produces a pull toward the LESS-caster side — the right in this case. Caster pull direction is opposite to camber pull direction: vehicles pull toward the side with less caster because self-centering force is weaker on that side. The rule: caster pulls toward the less-caster side.

35. A — Wheel runout compensation is the mandatory first step on the alignment rack, correcting for offset between the clamping device and the wheel's rotation axis. Without compensation, every measurement is offset by a fraction of a degree, making the entire alignment invalid. This is a pre-measurement step, not a post-service verification.

36. D — Significant weights required at both inner and outer positions (1.5 oz and 1.2 oz) combined with a measured static imbalance of 0.3 oz indicates both static and dynamic imbalance simultaneously. Modern balancers correct both conditions with weights at each rim edge. Static imbalance alone would show weight at a single plane; the two-plane + static reading means both exist.

37. C — Scan tool shows all four actual tire pressures, with the right rear at 28 psi against a 32 psi placard specification. The right rear is simply low by 4 psi — inflate to placard and the warning will clear. Sensor failure would typically show "not reporting"; TPMS module resets don't address actual pressure issues. The data identifies the actual pressure.

38. A — The 4-digit DOT date code "2825" decodes as the 28th week of 2025 — the standard manufacturing week and year format. This code allows technicians to verify tire age during inspection. Tires older than 6–10 years are often recommended for replacement due to rubber aging, regardless of tread depth remaining.

39. B — "220 ft-lb + 90°" is a torque-plus-angle specification: torque to 220 ft-lb first, then rotate the nut an additional 90°. This two-stage method ensures consistent clamping force across fasteners by combining torque accuracy with angle precision. Both stages are mandatory — skipping the angle portion leaves the nut under-preloaded.

40. C — "M+S" on a tire sidewall stands for Mud and Snow — an industry standard rating for tires meeting minimum tread pattern requirements for these conditions. This rating is separate from speed, size, or load ratings, and is commonly found on all-season and winter tires. It is not a performance guarantee — just a minimum classification standard.