

PRACTICE EXAM 14: ASE A3 SIMULATION (50 QUESTIONS)

50 Questions · 60-Minute Time Limit

Format matched; mechanical diagnostic content, so no figures are required and no image prompts are embedded. Here's Practice Exam 14, built distinctly from prior exams (more multi-symptom diagnostics, several "MOST likely" cause/effect chains, fluid/specification cautions, and a few setup-pattern items to vary difficulty). Randomized key locked first for accountability, then all 50 questions written to match.

PRE-GENERATED ANSWER KEY (Exam 14)

Distribution: A = 12 · B = 13 · C = 13 · D = 12 | No more than 2 consecutive identical · no cycling/alternating patterns · distinct from prior exams.

| Q | Ans | Q | Ans | Q | Ans | Q | Ans | Q | Ans |

|---|---|---|---|---|---|---|---|---|

| 1 | D | 11 | A | 21 | C | 31 | C | 41 | B |

| 2 | B | 12 | D | 22 | A | 32 | B | 42 | A |

| 3 | A | 13 | B | 23 | D | 33 | A | 43 | C |

| 4 | C | 14 | C | 24 | B | 34 | C | 44 | D |

| 5 | B | 15 | A | 25 | C | 35 | A | 45 | B |

| 6 | C | 16 | D | 26 | A | 36 | D | 46 | A |

| 7 | A | 17 | B | 27 | D | 37 | B | 47 | C |

| 8 | D | 18 | C | 28 | B | 38 | C | 48 | B |

| 9 | C | 19 | D | 29 | A | 39 | D | 49 | A |

| 10 | B | 20 | A | 30 | D | 40 | A | 50 | D |

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1. A driver complains that the clutch grabs hard and the vehicle launches roughly when starting from a stop, even with smooth pedal release. After the powertrain mounts pass inspection, the MOST likely cause is:

- A. Air trapped inside the clutch master cylinder bore
- B. A worn pilot bearing binding the input shaft nose
- C. A weak diaphragm spring lowering the clamp force
- D. Oil-contaminated friction facings or worn cushion springs

2. A clutch disc has lost most of its friction material, and the rivets are now scoring the flywheel face. The required service is to:

- A. Install a new disc only and reuse the flywheel as is
- B. Replace the disc and resurface or replace the flywheel
- C. Install a new pilot bearing and adjust the cable free play
- D. Flush the bell housing and reinstall the same components

3. A hydraulic clutch pedal feels normal at first but slowly sinks to the floor under steady foot pressure with the engine off. The MOST likely cause is:

- A. A failing master or slave cylinder bypassing fluid internally
- B. A glazed clutch driven disc slipping under light loads
- C. A worn release bearing dragging on the diaphragm fingers
- D. A warped flywheel changing the running clearance value

4. Technician A says the pilot bearing supports the front of the transmission input shaft. Technician B says the pilot bearing carries part of the vehicle weight. Who is correct?

- A. Technician B only
- B. Both Technician A and Technician B
- C. Technician A only
- D. Neither Technician A nor Technician B

5. A clutch is being replaced. The technician notices a heat-checked, blue-tinted area on the flywheel friction face. The recommended action is to:

- A. Install the new disc and pressure plate without machining
- B. Resurface the flywheel within its minimum thickness or replace it
- C. Sand the discoloration smooth with fine emery cloth and reuse
- D. Apply anti-seize compound to the flywheel face and reassemble

6. A clutch will not fully disengage on a vehicle with a cable-operated system. The fluid level cannot be the cause. The first item to check is the:

- A. Differential pinion seal at the rear axle
- B. Transmission output shaft seal at the tailshaft
- C. Clutch cable adjustment and free play at the release fork
- D. Speedometer drive gear teeth for excessive wear damage

7. A manual transmission grinds going into second only, while all other shifts are smooth. The MOST likely cause is:

- A. A worn second-gear synchronizer unable to match speeds
- B. A clutch dragging only during the second-gear shift event

- C. A low gear lubricant level affecting every individual gearset
- D. A worn pilot bearing seated inside the crankshaft end bore

8. A transmission's second-gear set uses a 30-tooth output gear driven by a 20-tooth input gear. The second-gear ratio is:

- A. 0.67:1 (overdrive)
- B. 2.00:1 (underdrive)
- C. 1.00:1 (direct drive)
- D. 1.50:1 (underdrive)

9. A growling noise from a manual transmission is present in every forward gear, continues while coasting in gear, and stops when the clutch pedal is fully depressed. The MOST likely cause is:

- A. A worn output shaft tailshaft bearing loaded under road load
- B. A worn third-gear synchronizer blocking ring assembly
- C. A worn input shaft bearing turning whenever the clutch is engaged
- D. A dragging release bearing under continuous pedal pressure

10. During disassembly of a manual transmission, the technician finds heavy, large metallic chunks on the magnetic drain plug. This MOST likely indicates:

- A. Normal break-in wear within acceptable limits
- B. A failed bearing or broken gear teeth inside the case
- C. Contaminated clutch facings shedding into the gearbox
- D. The wrong viscosity lubricant breaking down at high heat

11. A transmission jumps out of fifth (overdrive) only on deceleration. Technician A says worn fifth-gear clutching teeth can cause this. Technician B says a worn third-gear synchronizer is the cause. Who is correct?

- A. Technician A only
- B. Both Technician A and Technician B
- C. Technician B only
- D. Neither Technician A nor Technician B

12. A clutch hydraulic system uses brake fluid as specified. Filling it with the wrong fluid, such as gear oil or engine oil, can:

- A. Permanently improve the pedal feel and clutch life
- B. Lower the operating temperature of the clutch hydraulics
- C. Increase the final drive ratio measurably over time
- D. Swell and destroy the rubber seals, ruining the cylinders

13. A whining noise from a manual transmission is loudest in first gear, fades in higher gears, and disappears entirely in direct drive. The MOST likely source is:

- A. A worn input shaft pilot bearing in the crankshaft bore
- B. Worn first-gear teeth or its mating cluster gear set
- C. A worn release bearing under continuous clutch pressure
- D. A worn output shaft seal at the rear extension housing area

14. A clutch hydraulic system has been opened during service. Before reinstalling the slave cylinder, the technician should:

- A. Pack the bore with extra-high-temperature lithium grease
- B. Adjust the master cylinder pushrod to half its maximum travel
- C. Bench-bleed both cylinders to remove trapped air from bores
- D. Pre-load the release fork pivot with a thread-locking compound

15. A manual transmission jumps out of reverse during light backing. The MOST likely cause is:

- A. A worn reverse idler gear bushing or worn shift fork
- B. A worn output shaft bearing in the tailshaft housing
- C. A worn third-gear synchronizer blocker ring assembly
- D. A leaking pinion seal lowering the gear lubricant level

16. A manual transmission seal at the input shaft is leaking gear oil into the bell housing area. If unrepaired, the lubricant will MOST likely:

- A. Improve clutch engagement smoothness by adding friction
- B. Have no measurable effect on clutch service life or operation
- C. Lower the transmission operating temperature for the unit
- D. Soak the clutch disc, causing slip, chatter, or both

17. A flywheel is being measured for runout with a dial indicator after a clutch job complaint. Excessive runout MOST likely results in:

- A. Improved clutch engagement smoothness during slow starts
- B. Vibration, chatter, or premature clutch component wear
- C. A lower clutch pedal effort and shorter pedal travel range
- D. Permanent damage to the speedometer driven gear teeth

18. A FWD half shaft is removed for inspection. The technician finds the inboard tripod (plunge) joint has notable rotational play at the housing tracks. The recommended action is to:

- A. Pack the joint with extra grease and reinstall as is
- B. Adjust the wheel bearing preload to compensate for the play

- C. Replace the worn joint, the tripod housing, or the complete shaft
- D. Apply thread-locking compound to the half shaft splines

19. A FWD transaxle final drive uses a 16-tooth pinion driving a 60-tooth ring gear. The final drive ratio is:

- A. 3.00:1
- B. 4.50:1
- C. 3.50:1
- D. 3.75:1

20. A FWD vehicle clicks during right turns and is silent driving straight. The MOST likely cause is:

- A. A worn left-side outer CV joint loaded during right turns
- B. A worn right-side inboard plunge joint under acceleration
- C. A worn right front wheel bearing humming under load
- D. A loose right front strut mount knocking over road bumps

21. Before removing a FWD half shaft, the technician loosens the axle hub nut while the wheel is still on the ground primarily to:

- A. Lubricate the threads of the hub nut and stud assembly
- B. Preload the front wheel bearing to its operating value
- C. Use the vehicle weight to keep the hub from spinning during loosening
- D. Set the half shaft to the correct length before removal

22. A FWD vehicle has a humming noise that rises steadily with road speed and shifts when the steering is loaded left or right. The MOST likely cause is:

- A. A worn front wheel bearing reacting to cornering loads
- B. A worn outer CV joint clicking only at full steering lock
- C. A slipping clutch disc under light throttle conditions only
- D. A warped brake rotor pulsing through the steering wheel

23. A FWD transaxle is leaking fluid where the half shaft enters the differential. The MOST likely cause is:

- A. An overfilled case venting fluid through the breather
- B. A cracked CV joint housing leaking grease past the boot
- C. A loose drain plug that was not torqued to specification
- D. A worn axle shaft (output) seal at the differential side gear

24. A FWD vehicle has a clunk on hard acceleration only, without any clicking on turns. The MOST likely cause is:

- A. A worn outer CV joint nearest the front wheel hub
- B. A worn or binding inboard tripod (plunge) joint under load
- C. A slipping clutch disc flaring under acceleration loads
- D. A loose front lower control arm bushing flexing in use

25. A FWD transaxle whines under acceleration and the pitch follows road speed rather than engine speed. After ruling out tires, the MOST likely cause is:

- A. A worn outer CV joint clicking during cornering only
- B. A slipping clutch disc under light acceleration loads
- C. Worn final drive ring-and-pinion gears or their bearings
- D. A worn pilot bearing seated in the engine crankshaft

26. A FWD transaxle case sweats fluid only overnight when cold and stops once driven and warm. The MOST likely cause is:

- A. A worn axle or input shaft seal that seeps when cold
- B. An overfilled case venting fluid through the breather port
- C. A loose drain plug that was not torqued to specification
- D. A cracked CV joint housing leaking grease at high speed

27. When both half shafts are removed for transaxle service, the technician should insert a holder or old joint stub in each side gear to:

- A. Drain residual fluid from each side of the differential
- B. Apply pressure on the synchronizers and reset them
- C. Set the final drive backlash to a midpoint value
- D. Keep the differential side gears in correct alignment

28. A RWD vehicle has a vibration that begins at about 55 mph and worsens with speed. After tires are balanced, the next item to inspect is the:

- A. Clutch disc and pressure plate for slip-related vibration
- B. Driveshaft U-joints and overall driveshaft balance condition
- C. Transmission third-gear synchronizer blocking ring assembly
- D. Rear axle pinion seal for a fluid leak at the front yoke area

29. A two-piece driveshaft has a rumble that increases with road speed and is felt through the floor. After the U-joints check good, the next inspection is the:

- A. Center support bearing and its rubber isolator condition
- B. Clutch master cylinder pushrod free play setting and travel
- C. Transmission second-gear synchronizer blocking ring condition

D. Differential side bearing preload set by the carrier adjusters

30. A driveshaft is balanced by spinning it on a balancing machine. A common field correction for a small driveshaft imbalance is to:

- A. Replace the front universal joint with a larger size
- B. Crush the collapsible spacer behind the pinion further
- C. Tighten the carrier side adjusters to a higher torque value
- D. Add small weights to the driveshaft tube at the proper points

31. On a RWD vehicle, U-joint working angle is influenced by the pinion angle at the rear axle. A pinion angle that is too steep can produce:

- A. A clicking that occurs only during low-speed cornering events
- B. A whine that varies directly with engine idle speed only
- C. A vibration that increases with vehicle speed and load
- D. A grinding felt through the clutch pedal during engagement

32. A rear axle howls under acceleration and quiets on coast. The MOST likely cause is:

- A. A worn pinion bearing growling at every throttle position
- B. Incorrect ring-and-pinion drive-side tooth contact or wear
- C. A bent axle shaft wobbling once per wheel revolution
- D. A worn limited-slip clutch pack lacking friction modifier

33. During differential setup, a thicker pinion depth shim is installed. Compared with the prior shim, the new shim:

- A. Moves the pinion deeper into mesh with the ring gear

- B. Increases the ring gear backlash to a looser value
- C. Crushes the collapsible spacer to a higher preload
- D. Tightens the carrier bearing preload across the unit

34. A pinion seal is being replaced on a RWD axle that uses a crush sleeve. To preserve the original pinion bearing preload during reassembly, the technician should:

- A. Replace the crush sleeve and reset preload from scratch
- B. Tighten the pinion nut until it bottoms against the yoke face
- C. Mark the nut and yoke and record the rotating torque first
- D. Apply thread-locking compound to all of the pinion threads

35. A limited-slip differential chatters during slow tight turns. After the gear oil and friction modifier are addressed and the noise remains, the next likely cause is:

- A. Worn or glazed limited-slip clutch plates inside the carrier
- B. Incorrect ring-and-pinion backlash set too tight at assembly
- C. A worn pinion bearing growling at every road speed
- D. A bent axle shaft producing a once-per-revolution vibration

36. A rear axle ratio is changed from 3.42:1 to 4.10:1. The vehicle will MOST likely experience:

- A. Lower engine rpm at cruise and reduced low-speed acceleration
- B. Higher cruise rpm and no measurable change in acceleration
- C. Lower cruise rpm and improved low-speed acceleration
- D. Higher engine rpm at cruise and improved low-speed acceleration

37. A C-clip axle shaft is being removed for service. After draining the cover, the technician must next:

- A. Press the wheel bearing from the outer end of the shaft
- B. Remove the pinion (cross) shaft so the C-clips can be released
- C. Disconnect the parking brake cable from the rear backing plate
- D. Crush a new collapsible spacer to set the pinion preload value

38. A full-floating axle shaft is used on heavy-duty trucks because:

- A. The shaft directly carries the vehicle weight at all times
- B. It eliminates the need for any pinion seal on the axle
- C. Weight is carried on dual hub bearings and the spindle
- D. The differential side gears are also welded to the shafts

39. A rear axle leaks gear oil onto the inside of one rear brake assembly. The MOST likely cause is:

- A. A loose differential cover with a failed paper gasket joint
- B. A worn pinion seal leaking at the front yoke area
- C. An overfilled axle venting fluid through the housing breather
- D. A worn axle shaft seal at that wheel end of the housing

40. During ring-and-pinion setup, backlash is too tight at 0.003 in versus a 0.006–0.010 in spec. The correct adjustment is to:

- A. Move the ring gear away from the pinion with the side adjusters
- B. Add a thicker shim behind the inner pinion bearing race
- C. Crush the collapsible spacer further to raise the preload
- D. Replace both carrier bearings with oversized service parts

41. An open differential allows the two drive wheels to:

- A. Lock together to provide maximum traction on slippery roads
- B. Rotate at different speeds while turning a corner smoothly
- C. Always send full torque to the wheel with the most grip
- D. Rotate at a fixed identical speed regardless of road conditions

42. A locking differential is engaged on dry pavement during a tight low-speed turn. The driver will MOST likely notice:

- A. Tire scrub, driveline binding, and difficulty completing the turn
- B. Improved fuel economy from reduced internal differential losses
- C. A pinion seal leak developing at the front yoke under load
- D. Reduced steering effort and noticeably smoother cornering

43. A semi-floating rear axle shaft fractures at the wheel flange. A safety concern with this design is that:

- A. The differential locks the side gears once the shaft breaks
- B. The pinion seal fails and drains the lubricant within seconds
- C. The wheel can separate from the vehicle, since the shaft carries weight
- D. The driveshaft disconnects and drops onto the road surface

44. A part-time 4WD truck driven on dry pavement in four-wheel drive develops driveline binding and "crow-hop" during tight turns. This is:

- A. A sign of a stretched transfer case chain skipping the sprocket
- B. Caused by a failed front axle disconnect actuator motor stuck on
- C. Caused by low transfer case fluid binding the internal shift fork
- D. Normal driveline windup that occurs on high-traction surfaces

45. A viscous coupling used in some AWD systems transfers torque by:

- A. Engaging a multi-plate clutch with hydraulic line pressure
- B. Shearing a silicone fluid between sets of interleaved plates
- C. Meshing helical gears between the front and rear outputs
- D. Using an electric solenoid to lock the center differential carrier

46. A 4WD vehicle has a humming noise that rises with road speed and is unaffected by turning. After tires are ruled out, the MOST likely cause is:

- A. A worn driveline bearing such as a carrier or wheel bearing
- B. A slipping clutch disc under light acceleration loads only
- C. A misadjusted clutch release linkage holding bearing pressure
- D. A dragging front brake caliper rubbing the rotor face surface

47. Manually locking front hubs on an older part-time 4WD truck are used to:

- A. Increase the transfer case low-range gear reduction ratio
- B. Lock the rear differential for straight-line traction on dirt
- C. Connect the front wheels to the half shafts only when engaged
- D. Disengage the rear driveshaft for normal highway cruising

48. A 4WD vehicle will not engage four-wheel drive, although the transfer case shift motor is heard cycling normally. The next item to check is the:

- A. Rear differential lubricant level and overall fluid condition
- B. Front axle disconnect actuator and its engagement feedback
- C. Clutch pedal position switch and its adjustment setting
- D. Speedometer output sensor on the transmission tailshaft housing

49. Before condemning a transfer case for a noise complaint, the technician should FIRST:
- A. Verify the fluid level, condition, and matched tire sizes
 - B. Replace the transfer case shift motor and control module
 - C. Adjust the front axle disconnect actuator to neutral stop
 - D. Set the rear differential ring gear backlash to specification
50. A 4WD vehicle's transfer case fluid is found to be dark, thin, and burnt-smelling during inspection. The MOST likely cause is:
- A. Normal high-mileage condition for a properly serviced unit
 - B. Water contamination entering the case through a clogged vent
 - C. Correct additive content for the listed transfer case fluid
 - D. Overheating from heavy loading, low fluid, or extended use

PRACTICE EXAM 14: ANSWER KEY AND EXPLANATIONS

- 1. D** — Hard grabbing and rough launches, with mounts good, come from oil-contaminated friction facings or worn cushion (marcel) springs that should soften engagement. Contamination glazes the facings and flattened cushion springs eliminate the progressive take-up. The result is a sudden bite that lurches the vehicle.
- 2. B** — A worn disc whose rivets have scored the flywheel requires both a new disc and resurfacing or replacement of the flywheel. The scored surface cannot grip a new disc evenly and will cause chatter or slip. Restoring the friction surface protects the new clutch.
- 3. A** — A pedal that slowly sinks with steady foot pressure and no external leak is a failing master or slave cylinder bypassing fluid internally past a worn seal. The fluid moves around the seal instead of moving the release components. Replacing the failed cylinder restores firm pedal feel.
- 4. C** — The pilot bearing supports and centers the front of the transmission input shaft, so Technician A is right. It does not carry any vehicle weight, which makes Technician B wrong. Only Technician A is right.

- 5. B** — A heat-checked, blue-tinted flywheel surface must be resurfaced within minimum thickness or replaced. The discoloration is friction heat damage that hardens the metal and reduces grip. Reusing it as is leads to chatter and slip.
- 6. C** — On a cable-operated clutch, the first item to check for incomplete disengagement is the cable adjustment and free play at the release fork. Incorrect free play prevents the release bearing from moving the diaphragm far enough. Adjustment often cures it without parts.
- 7. A** — Grinding confined to second only isolates the fault to that gear's synchronizer, which is failing to match the gear and shaft speeds. A clutch or lubricant problem would affect all gears, not just second. Replacing the synchronizer cures the single-gear grind.
- 8. D** — Gear ratio is driven teeth divided by drive teeth, so $30 \div 20$ equals 1.5:1, an underdrive ratio. The output turns slower than the input, multiplying torque. This is a typical second-gear reduction.
- 9. C** — A growl in every gear that continues while coasting in gear, and stops when the clutch is fully depressed, points to a worn input shaft bearing turning whenever the clutch is engaged. Disengaging the clutch unloads the input and silences it. A release bearing fault would appear with the pedal pressed, not released.
- 10. B** — Large metallic chunks on the magnetic drain plug indicate a failed bearing or broken gear teeth inside the case. Normal wear produces a fine fuzz, not chunks. The teardown findings will confirm the source.
- 11. A** — Worn fifth-gear clutching teeth let the overdrive walk out under deceleration, supporting Technician A. A worn third-gear synchronizer would not cause fifth to jump out, making Technician B wrong. Only Technician A is right.
- 12. D** — Using the wrong fluid in a clutch hydraulic system that specifies brake fluid will swell and destroy the rubber seals and ruin the cylinders. Oil-based fluids are incompatible with the seal material. Only the specified fluid keeps the system safe.
- 13. B** — A whine loudest in first that fades in higher gears and disappears in direct drive points to worn first-gear teeth or its mating cluster gear. In direct drive the gear is unloaded, so the noise vanishes. The load pattern isolates the first-gear set.
- 14. C** — Before installation, both cylinders are bench-bled to remove trapped air from their bores. Air left inside compresses instead of transmitting pedal force, causing a soft pedal and incomplete release. Pre-bleeding makes the on-vehicle bleed work properly.
- 15. A** — Reverse jumpout under light backing usually traces to a worn reverse idler gear bushing or worn shift fork that fails to hold the gear engaged. Worn pivot or bushing surfaces let the gear walk out. Inspection of the idler and fork locates the source.

- 16. D** — Gear oil leaking from the input shaft seal into the bell housing soaks the clutch disc, causing slip, chatter, or both. Friction material absorbs the oil and loses grip. The seal must be replaced and the disc inspected.
- 17. B** — Excessive flywheel runout causes vibration, chatter, or premature clutch wear because the disc cannot engage evenly. The wobble loads the disc and pressure plate unevenly. Resurfacing or replacing the flywheel restores correct runout.
- 18. C** — Noticeable rotational play in a tripod plunge joint indicates wear that warrants replacing the joint, the tripod housing, or the complete shaft. Repacking grease does not restore worn rollers or tracks. Replacement is the only durable repair.
- 19. D** — Final drive ratio is ring teeth divided by pinion teeth, so $60 \div 16$ equals 3.75:1. The pinion turns 3.75 times for each ring gear revolution. This sets the transaxle's reduction.
- 20. A** — A click during right turns comes from the left outer CV joint, because the left wheel is the outside wheel on a right turn and its outer joint articulates at the greatest angle. The worn, loaded joint clicks. The noisy joint is opposite the turn direction.
- 21. C** — The hub nut is loosened with the wheel on the ground so the vehicle weight keeps the hub from spinning while the technician breaks it free. With the wheel lifted, the hub would rotate during loosening. Ground contact provides the needed resistance.
- 22. A** — A hum that rises with speed and shifts when the steering is loaded left or right is a worn front wheel bearing reacting to cornering loads. Side loading transfers weight onto the worn bearing, changing the noise. This load sensitivity confirms the bearing.
- 23. D** — Fluid leaking where the half shaft enters the differential comes from the worn axle shaft (output) seal at the side gear. An overfill or loose plug would leak elsewhere, and a CV boot leaks grease, not gear oil. Replacing the seal stops the leak.
- 24. B** — A clunk only on hard acceleration, without any cornering clicks, points to a worn or binding inboard tripod (plunge) joint reacting to torque. The plunge joint handles axial movement under load. Outer joint and clutch faults present differently.
- 25. C** — A whine that tracks road speed rather than engine speed comes from worn final drive ring-and-pinion gears or their bearings. Those gears turn with vehicle speed, unlike clutch or pilot faults. The speed-linked whine isolates the final drive.
- 26. A** — A seep that appears overnight when cold and stops once driven and warm indicates a worn axle or input shaft seal whose lip conforms better at operating temperature. An overfill or boot leak shows up while driving, not parked. The temperature pattern points to the seal.
- 27. D** — A holder or old joint stub in each side gear keeps the differential side gears in correct alignment when both shafts are out. Without it, a side gear can rotate or drop and prevent the opposite shaft from reseating. The holder preserves correct gear position.

- 28. B** — A vibration that begins near 55 mph and worsens with speed, after balancing the tires, points next to the driveshaft U-joints and overall driveshaft balance. Driveshaft faults are speed-dependent and load-independent. Clutch, synchronizer, and pinion seal items do not fit.
- 29. A** — A speed-related rumble felt through the floor on a two-piece driveshaft, with good U-joints, points to the center support bearing and its rubber isolator. The bearing supports the shaft midpoint and turns with vehicle speed. Its wear produces the rumble.
- 30. D** — A small driveshaft imbalance is corrected by adding small weights to the driveshaft tube at the proper points indicated by the balancer. The weights offset the heavy spot to restore balance. The other items belong to differential or clutch service.
- 31. C** — Excessive pinion angle forces U-joints to work at too steep an angle, producing a vibration that increases with vehicle speed and load. The joints accelerate and decelerate twice per revolution at high angles. Correcting pinion angle reduces the vibration.
- 32. B** — A howl under acceleration that quiets on coast indicates incorrect drive-side ring-and-pinion tooth contact or wear. Gear mesh noise changes with load direction, unlike a constant bearing growl. The drive-side pattern needs correction.
- 33. A** — A thicker pinion depth shim moves the pinion deeper into mesh with the ring gear. The shim sits behind the pinion and controls how far inward it sits. Backlash and preload adjustments are made elsewhere.
- 34. C** — To preserve the original preload during a pinion seal job with a crush sleeve, the technician marks the pinion nut and yoke and records the rotating torque before disassembly. The marks reference the existing crush so the same position can be restored. This avoids crushing a new sleeve and resetting the entire setup.
- 35. A** — Limited-slip chatter that persists after correcting the gear oil and friction modifier indicates worn or glazed clutch plates inside the carrier. The friction surfaces grab instead of slipping smoothly. Rebuilding the clutch pack cures the shudder.
- 36. D** — Moving from 3.42:1 to 4.10:1 raises the numerical ratio, so the engine turns at a higher rpm at cruise and gains low-speed acceleration. More torque multiplication trades highway efficiency for launch. The engine spins faster at any given road speed.
- 37. B** — After draining a C-clip axle, the next step is to remove the pinion (cross) shaft so the C-clips can be released from the side gears. The clips are captive until the pinion shaft is out. This sequence is required for shaft removal.
- 38. C** — A full-floating axle is used on heavy-duty trucks because the vehicle weight is carried on dual hub bearings and the spindle, not on the axle shaft. The shaft carries only torque. This separation handles heavy loads safely.

- 39. D** — Gear oil inside one brake assembly comes from a worn axle shaft seal at that wheel end of the housing. A pinion seal leaks at the front yoke, and a cover leak appears at the rear of the housing. The axle seal is the local source.
- 40. A** — Backlash that is too tight is corrected by moving the ring gear away from the pinion with the carrier side adjusters. Increasing the clearance brings backlash into spec. Pinion shims and spacers control depth and preload, not backlash.
- 41. B** — An open differential allows the two drive wheels to rotate at different speeds while turning a corner smoothly. This is its core function during cornering. It always splits torque equally, so it cannot bias to the higher-traction wheel.
- 42. A** — Engaging a locking differential on dry pavement during a tight turn forces both wheels to turn together, causing tire scrub, driveline binding, and difficulty completing the turn. The locked axle cannot accommodate different wheel paths. This stresses tires and driveline.
- 43. C** — A semi-floating axle shaft carries the vehicle weight, so a fracture at the flange can let the wheel separate from the vehicle. The bearing rides on the shaft, not the spindle. This is the key safety hazard of the design.
- 44. D** — Binding and crow-hop during tight turns on dry pavement in four-wheel drive is normal driveline windup on high-traction surfaces. The locked front and rear axles cannot accommodate the turning speed differences. Backing up or returning to two-wheel drive relieves it.
- 45. B** — A viscous coupling transfers torque by shearing a silicone fluid between sets of interleaved plates as a speed difference develops. The fluid thickens under shear and couples the outputs. No mechanical clutch or electronic control is involved.
- 46. A** — A hum that rises with road speed and is unaffected by turning, with tires ruled out, points to a worn driveline bearing such as a carrier or wheel bearing. Bearing noise is constant and speed-related, unlike clutch or brake faults. Locating the worn bearing resolves it.
- 47. C** — Manual locking front hubs connect the front wheels to the half shafts only when engaged, letting the front axle components stop turning during two-wheel-drive operation. This reduces wear and drag. The driver locks them in before using four-wheel drive.
- 48. B** — When 4WD will not engage but the shift motor cycles, the next check is the front axle disconnect actuator and its engagement feedback. If the front axle never couples, the system cannot confirm four-wheel drive. Verifying the actuator isolates the fault.
- 49. A** — Before condemning a transfer case for noise, the technician first verifies fluid level, condition, and matched tire sizes. These common, easily corrected causes are ruled out first. Replacing parts before this basic check wastes effort.

50. D — Dark, thin, burnt-smelling transfer case fluid indicates overheating from heavy loading, low fluid, or extended use without service. The breakdown and odor signal excessive heat. Refilling with fresh fluid and addressing the cause is required.