PRACTICE EXAM 13: ASE A3 SIMULATION (50 QUESTIONS)

50 Questions · 60-Minute Time Limit

1. A clutch is being inspected during a transmission removal. The technician notices the diaphragm spring fingers are worn unevenly with deep grooves where the release bearing rides. The MOST likely cause of this wear is:

A. An incorrect clutch disc installed during the last service

B. Engine oil contamination soaking into the friction facings

C. A worn or misaligned release bearing dragging across the fingers

D. Excessive crankshaft end play allowing the flywheel to wander

2. A clutch pedal returns slowly and feels heavy after each press on a cable-operated clutch. The MOST likely cause is:

A. A binding, frayed, or corroded clutch release cable

B. Air trapped inside the clutch master cylinder bore

C. A worn pilot bearing seizing on the input shaft nose

D. A glazed friction disc slipping under light acceleration

3. A clutch is replaced, and the new disc develops a chatter complaint within a few hundred miles. Technician A says oil from an unrepaired rear main seal can soak the new disc. Technician B says a contaminated disc and worn powertrain mounts can both cause chatter. 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

4. All of the following components are normally replaced as a set during a clutch job EXCEPT the:

A. Clutch driven (friction) disc with new friction facings

B. Release bearing inside the bell housing assembly

C. Pilot bearing or bushing pressed into the crankshaft

D. Flywheel ring gear installed at the engine factory

5. A self-adjusting cable clutch has lost its ability to take up wear. The driver will MOST likely notice:

A. A loud grinding noise from the bell housing at idle

B. Gradually increasing pedal effort and reduced disengagement

C. A clutch pedal that sinks slowly to the floor at idle

D. Slippage that worsens noticeably during downhill braking

6. A manual transmission gear lubricant analysis turns up fine ferrous particles spread evenly on the magnetic drain plug, with no large chunks. This finding MOST likely indicates:

A. Normal break-in or accumulated wear within acceptable limits

B. A cracked transmission case leaking near the bell housing

C. Contaminated clutch friction facings shedding into the case

D. A failed input shaft seal letting engine oil enter the gearbox

7. A transmission's fifth gear has 20 teeth on the input cluster gear and 16 teeth on the mainshaft gear. The fifth-gear ratio is closest to:

A. 1.25:1 (underdrive)

B. 1.00:1 (direct drive)

C. 1.50:1 (underdrive)

D. 0.80:1 (overdrive)

8. A growling noise is present in second and third gears, fades almost completely in fourth (direct), and returns in fifth (overdrive). The MOST likely cause is:

A. Worn synchronizer blocking rings on the upper shift hub

B. A worn input shaft pilot bearing in the crankshaft bore

C. Worn countershaft (cluster) bearings loaded in indirect gears

D. A worn output shaft tailshaft bearing loaded in direct drive

9. Before pressing a new synchronizer hub onto the mainshaft, the technician should:

A. Coat the gear teeth with high-strength thread-locking compound

B. Confirm the hub is oriented correctly and not installed reversed

C. Adjust the shift fork to its midpoint to set neutral position

D. Tighten the mainshaft nut to set the final gear-mesh backlash

10. A manual transmission jumps out of fourth gear during deceleration only. Technician A says worn fourth-gear clutching teeth can cause this. Technician B says a worn second-gear synchronizer is the most common cause. Who is correct?

A. Technician A only

B. Technician B only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

11. A clicking, knocking noise from the bell housing area, present at idle in neutral and quieted by depressing the clutch pedal, MOST likely points to:

A. A worn output shaft bearing under road load conditions

B. A dragging release bearing under continuous pedal pressure

C. A worn input shaft bearing or worn pilot bearing at idle

D. Normal engine combustion noise transmitted through the case

12. A manual transmission leaks gear oil at the speedometer drive housing on the tailshaft. The MOST likely cause is:

A. A worn O-ring or seal on the speedometer drive sleeve

B. An overfilled gearbox forcing oil out through the vent

C. A cracked extension housing near the transmission mount

D. A loose drain plug at the bottom of the main case

13. A transmission shifts hard into all gears when cold but improves once warm. After ruling out clutch drag, the next likely cause is:

A. Worn synchronizers in every single gear position at once

B. A bent shift rail that binds only at cold temperatures

C. A low gear lubricant level starving the synchronizers

D. The wrong viscosity or incorrect specification gear oil

14. A manual transmission's third-gear synchronizer brass blocker ring is found cracked during teardown. The correct service action is to:

A. Polish the cracked ring smooth and reinstall as is

B. Replace the blocker ring along with related worn parts

C. Apply gear oil to the crack and reassemble the unit

D. Machine the cone surface deeper to clear the damage

15. A clutch master cylinder is being bench-bled before installation primarily to:

A. Remove trapped air from the bore for proper initial operation

B. Set the pushrod adjustment for correct pedal free play value

C. Test the cylinder bore for internal scoring with hand pressure

D. Increase the operating fluid temperature before installation

16. A vehicle equipped with a hydraulically released clutch and a concentric slave cylinder (CSC) needs the clutch line replaced. After replacement, the system MUST be:

A. Adjusted by setting cable free play at the release fork

B. Tested by running the vehicle through every forward gear

C. Bled thoroughly, often using a power bleeder for full release

D. Left alone, as CSC systems are self-bleeding by design

17. A manual transmission rattles loudly at idle with the clutch engaged, and the noise quiets the moment the pedal is depressed. The MOST likely cause is:

A. A worn output shaft tailshaft bearing under road load

B. Normal neutral gear rattle from engine torsional pulses

C. Cracked synchronizer hub teeth in the third-fourth assembly

D. A worn pilot bearing seized against the input shaft nose

18. A FWD vehicle's outer CV boot is intact, but a clicking is heard during tight low-speed turns. The MOST likely cause is:

A. A worn inboard tripod plunge joint loading under acceleration

B. A loose front wheel bearing with excessive radial play

C. A worn lower control arm bushing flexing during cornering

D. A worn outer CV joint with wear inside an intact boot

19. A FWD transaxle final drive has a 14-tooth pinion and a 52-tooth ring gear. The final drive ratio is closest to:

A. 3.71:1

B. 3.50:1

C. 4.00:1

D. 4.25:1

20. A FWD vehicle has a shudder under hard acceleration that disappears off throttle, with no clicking on turns. The MOST likely cause is:

A. A worn outer CV joint nearest the front wheel hub

B. A slipping clutch disc flaring under acceleration load

C. A worn or binding inboard tripod (plunge) CV joint

D. A worn front wheel bearing humming under cornering

21. When a FWD half shaft is removed for service, the inner joint stub is retained inside the differential by:

A. A press-fit roller bearing on the splined end

B. A threaded collar that screws onto the splines

C. A locking pin through the side gear and stub

D. A snap ring engaging a groove in the side gear

22. A FWD vehicle has a hum that rises with speed and changes when the steering is loaded left or right. After tires check out, the MOST likely cause is:

A. A worn front wheel bearing reacting to cornering load

B. A worn outer CV joint clicking at full steering lock

C. A slipping clutch disc under light throttle conditions

D. A dragging brake caliper rubbing the rotor surface

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

A. A worn clutch release bearing under continuous load

B. A worn outer CV joint clicking on tight turns only

C. Worn final drive ring-and-pinion gears or their bearings

D. A worn pilot bearing seated in the engine crankshaft

24. A FWD transaxle case shows a small drip at the right inner joint, and the fluid level is below the fill plug. The MOST likely leak source is:

A. The transaxle vent releasing fluid during operation

B. The right axle (output) shaft seal at the differential

C. The outer CV boot slinging grease at highway speed

D. A cracked final drive ring gear weeping under load

25. A FWD vehicle with high-output engine pulls noticeably to one side under hard acceleration and self-centers off throttle. The MOST likely cause is:

A. A worn outer CV joint on one of the front half shafts

B. A leaking power steering pressure hose at the rack

C. A dragging front brake caliper on the opposite side

D. Unequal half-shaft lengths producing torque steer

26. Engaging the clutch in a FWD vehicle produces a clunk that occurs only at the moment the disc grips. After mounts are confirmed good, the MOST likely cause is:

A. A worn clutch release bearing dragging on the diaphragm

B. A glazed clutch disc slipping under light throttle inputs

C. Excessive lash in worn CV joints or input shaft splines

D. A low transaxle fluid level starving the gear set of oil

27. A torn outer CV boot is found with grease thrown around the wheel well. The joint is still quiet. The recommended service is to:

A. Replace the boot and repack, or replace the joint or shaft

B. Add fresh CV grease and reseal the boot with new clamps

C. Wait until the joint becomes noisy before any repair

D. Replace the wheel bearing and brake rotor on that side

28. A FWD transaxle leaks fluid that drips from a seam at the bottom of the case, between the two halves. The MOST likely cause is:

A. A worn axle shaft seal at one of the differential sides

B. A failed case-half gasket or sealant joint between halves

C. A worn input shaft seal behind the clutch release bearing

D. An overfilled transaxle venting fluid through the breather

29. A RWD vehicle has a vibration that begins at about 40 mph and worsens with speed. After balancing the tires, the next item to inspect is the:

A. Clutch disc and pressure plate for slip-related vibration

B. Transmission third-gear synchronizer blocking ring set

C. Driveshaft for runout, worn U-joints, and balance condition

D. Rear axle bearing for sideways play in the housing bore

30. A clunk is heard from the driveline of a RWD vehicle each time the transmission is engaged from neutral into drive or reverse. The MOST likely cause is:

A. A slipping clutch disc near its wear limit

B. A worn output shaft tailshaft bearing under load

C. A low rear axle lubricant level starving the gears

D. Worn universal joints or excessive slip-yoke spline play

31. A driveshaft is being installed with universal joints at front and rear. To minimize vibration, the joints must be:

A. Phased so the yokes at each end are aligned with each other

B. Installed with the front joint advanced 90 degrees ahead

C. Installed with the rear joint advanced 90 degrees ahead

D. Allowed to find their own position during the first drive

32. A two-piece driveshaft has a rumble that rises with road speed and is felt through the floor pan. After the U-joints check good, the next item to inspect is the:

A. Clutch master cylinder pushrod free play setting

B. Center support bearing and its rubber isolator mount

C. Differential pinion seal for a lubricant leak at the yoke

D. Front wheel bearing preload on each side of the axle

33. A double-cardan (CV) joint at the transmission end of a driveshaft is used primarily to:

A. Allow the slip yoke to change the driveshaft length

B. Increase the rear axle gear ratio for stronger acceleration

C. Provide a mounting point for the center support bearing

D. Reduce vibration where the driveshaft works at a steep angle

34. A rear axle howls under acceleration but quiets on coasting. The MOST likely cause is:

A. Incorrect ring-and-pinion drive-side tooth contact or wear

B. A worn pinion bearing growling at every throttle position

C. A bent axle shaft producing a once-per-revolution wobble

D. A worn limited-slip clutch pack lacking friction modifier

35. During differential setup, gear marking compound shows the pinion contact riding deep into the tooth root on the drive side. The correct adjustment is to:

A. Move the ring gear away from the pinion with adjusters

B. Crush the collapsible spacer to raise pinion bearing preload

C. Move the pinion outward with a thinner depth setting shim

D. Replace both axle shafts and their wheel bearings together

36. A pinion seal is leaking on a RWD axle that uses a crush sleeve. When replacing the seal, the technician marks the pinion nut and yoke before disassembly so that:

A. A new collapsible spacer is no longer required at reassembly

B. The original rotating torque and bearing preload can be restored

C. The ring gear backlash is automatically reset to specification

D. The contact pattern is preserved without using marking compound

37. A limited-slip differential chatters during slow tight turns. The FIRST item to address is the:

A. Ring-and-pinion backlash measured between the gear teeth

B. Pinion bearing preload set by the collapsible spacer crush

C. Gear oil condition and the friction-modifier additive content

D. Carrier bearing preload set by the carrier side adjuster nuts

38. A rear axle ratio change from 3.55:1 to 3.08:1 results in:

A. Lower engine rpm at cruise and reduced low-speed acceleration

B. Higher engine rpm at cruise and improved low-speed acceleration

C. No measurable change in cruise rpm or acceleration response

D. Higher engine rpm at cruise and reduced low-speed acceleration

39. A C-clip axle shaft can be pulled from the housing only after the technician removes the:

A. Brake rotor and the wheel speed sensor wiring harness

B. Parking brake cable from the rear backing plate assembly

C. Wheel bearing pressed onto the outer end of the shaft

D. Differential cover and the pinion (cross) shaft retainer

40. A semi-floating axle shaft can release the wheel from the vehicle if the shaft fractures because the:

A. Differential gears lock when the shaft suddenly breaks

B. Vehicle weight is carried on the axle shaft and its bearing

C. Wheel bearing rides on the spindle, not on the axle shaft

D. Shaft is welded to the brake drum during manufacturing

41. During ring-and-pinion setup, the contact pattern shows the pinion riding too far toward the tooth heel and high on the face. The correct adjustment is to:

A. Increase ring gear backlash with the carrier side adjusters

B. Replace both carrier bearings with oversized service parts

C. Crush the collapsible spacer further to raise pinion preload

D. Move the pinion deeper into mesh with a thicker depth shim

42. A drive axle's lubricant turns milky white during a routine inspection. The MOST likely cause is:

A. Excessive heavy loading breaking down the oil additives

B. Water contamination entering through a submerged vent

C. Normal high-mileage condition for a properly serviced axle

D. Correct additive content for a limited-slip differential

43. A locking differential is being engaged while the vehicle is 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 steering response and reduced cornering effort

C. A pinion seal leak developing at the front yoke area

D. Increased fuel economy from reduced differential losses

44. A part-time 4WD truck is hard to shift out of four-wheel drive after running on dry pavement. The MOST likely cause is:

A. A failed front axle disconnect motor stuck in engaged position

B. Low transfer case fluid causing the shift fork to seize fully

C. Driveline windup binding the transfer case until tension is relieved

D. A worn transfer case chain skipping over the drive sprocket

45. An AWD vehicle binds and scrubs tires during slow, tight turns on dry pavement, even with matched tire sizes. The MOST likely cause is:

A. A failed center differential or coupling that cannot allow speed difference

B. A worn front wheel bearing growling under cornering load

C. A leaking pinion seal lowering the rear axle fluid level

D. A worn outer CV joint clicking at full steering lock only

46. A 4WD vehicle has a humming noise that rises with road speed and is present in a straight line, with no change in turning. After ruling out tires, the MOST likely cause is:

A. A slipping clutch disc under light acceleration loads

B. A misadjusted clutch release linkage holding the bearing

C. A dragging front brake caliper rubbing the rotor face

D. A worn driveline bearing such as a wheel or carrier bearing

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

A. Provide additional gear reduction for low-speed pulling

B. Connect the front wheels to the half shafts only when engaged

C. Lock the rear differential during straight-line driving

D. Disengage the rear driveshaft during highway cruising

48. A transfer case is shifted into low range. Compared with the high range, the vehicle in low range will have:

A. The same wheel speed and the same engine torque output

B. A higher final wheel speed at the same engine rpm value

C. A lower wheel speed and increased available torque

D. A locked rear differential for straight-line traction only

49. Before condemning a 4WD transfer case for a fluid leak, the technician should FIRST:

A. Replace the transfer case shift motor and control module

B. Adjust the front axle disconnect actuator to neutral stop

C. Set the rear differential ring gear backlash to specification

D. Verify the fluid level, check for an overfill, and clean the vent

50. A 4WD vehicle's transfer case chain has stretched and is skipping on the sprocket teeth. The MOST likely symptom is:

A. A pinion seal leak developing at the front yoke under load

B. A growling or rattling from the transfer case under torque

C. A clicking noise heard only during low-speed tight turns

D. A whining noise that varies directly with engine idle speed

PRACTICE EXAM 13: ANSWER KEY AND EXPLANATIONS

1. C — Uneven, grooved wear on the diaphragm fingers where the release bearing rides is produced by a worn or misaligned release bearing dragging across the fingers. The bearing should ride smoothly on a flat thrust face, not gouge into the metal. Replacing the bearing and any worn pivot or fork is required.

2. A — A heavy pedal that returns slowly on a cable clutch points to a binding, frayed, or corroded release cable. The added internal friction resists pedal travel both in and out. Lubricating or replacing the cable restores normal feel.

3. B — Both technicians are right: an unrepaired rear main seal lets engine oil soak the new disc, and a contaminated disc and worn powertrain mounts can each cause chatter. Each scenario produces shudder during engagement. Both items must be ruled out.

4. D — The flywheel ring gear is not part of a routine clutch set, so it is the exception. The disc, pressure plate, release bearing, and pilot bearing are normally replaced together to match wear. The ring gear is changed only when its teeth are damaged.

5. B — A self-adjusting cable clutch that has lost its take-up develops gradually increasing pedal effort and reduced disengagement as the disc wears. The unchecked slack changes lever geometry. The driver feels the symptom progress over weeks.

6. A — Fine ferrous particles spread evenly on the magnetic drain plug with no chunks reflect normal break-in or accumulated wear caught by the magnet. The magnet exists to trap exactly this kind of debris. The finding alone does not justify a teardown.

7. D — Gear ratio is driven teeth divided by drive teeth, so 16 ÷ 20 equals 0.80:1, an overdrive ratio. The output turns faster than the input, lowering engine rpm at cruise. This identifies fifth as overdrive.

8. C — Noise in the indirect gears that fades in direct and returns in overdrive identifies worn countershaft bearings, which are loaded in every gear except direct. In fourth (direct) the countershaft is unloaded, so the noise drops; overdrive reloads it. The load pattern isolates the cluster bearings.

9. B — Synchronizer hubs are often directional, so the technician confirms orientation before pressing the hub onto the shaft. Installed backward, the hub may prevent full sleeve travel or damage the synchronizer. Following the marking ensures correct assembly.

10. A — Worn fourth-gear clutching (dog) teeth let the gear walk out under deceleration, supporting Technician A. A worn second-gear synchronizer would not cause fourth to jump out, so Technician B is wrong. Only Technician A is right.

11. C — A click or knock at idle in neutral that quiets when the clutch pedal is pressed points to a worn input shaft bearing or pilot bearing turning while the engine drives the input. Disengaging the clutch unloads those components. Their wear creates the idle noise.

12. A — A leak at the speedometer drive housing on the tailshaft comes from a worn O-ring or seal on the speedometer drive sleeve. That seal contains lubricant where the sleeve enters the case. Replacing the small O-ring stops the leak.

13. D — Hard cold shifts that improve with warmth, after clutch drag is ruled out, point to the wrong viscosity or wrong specification gear oil. Thick or non-spec lubricant resists synchronizer movement when cold. Using the listed fluid restores cold shift quality.

14. B — A cracked brass blocker ring must be replaced along with related worn parts. Polishing or oiling a cracked ring cannot restore its function, and machining the cone changes setup geometry. New parts are the only correct repair.

15. A — Bench-bleeding a clutch master cylinder removes trapped air from the bore so it operates correctly when installed. Air left in the cylinder compresses instead of moving fluid. Pre-bleeding makes vehicle bleeding easier and ensures full pedal travel.

16. C — A concentric slave cylinder system must be bled thoroughly, often with a power bleeder, after a line replacement because the CSC's internal geometry traps air. Inadequate bleeding leaves a soft pedal and incomplete release. Thorough bleeding is essential.

17. B — A rattle at idle with the clutch engaged that quiets when the pedal is pressed is normal neutral gear rattle excited by engine torsional pulses. Pressing the pedal disconnects the engine pulses from the gears, silencing the noise. This is a normal condition, not a failure.

18. D — A clicking on tight low-speed turns with an intact boot points to a worn outer CV joint wearing internally despite the boot remaining sealed. The joint can wear from age or contamination that occurred before inspection. Replacement of the joint or shaft is required.

19. A — Final drive ratio is ring teeth divided by pinion teeth, so 52 ÷ 14 equals approximately 3.71:1. The pinion turns 3.71 times for each ring gear revolution. This is the closest listed ratio.

20. C — A shudder under hard acceleration that vanishes off throttle, without turning clicks, points to a worn or binding inboard tripod (plunge) joint. The plunge joint handles axial movement under torque and shudders when worn. The outer joint instead clicks on turns.

21. D — The inner joint stub is retained inside the differential by a snap ring engaging a groove in the side gear. Prying or pulling releases the snap ring, freeing the shaft. No press fit, threaded collar, or pin is used.

22. A — A hum that rises with speed and shifts when the steering is loaded reflects a worn front wheel bearing reacting to cornering loads. Side load transfers weight onto the worn bearing, changing the noise. This load sensitivity is the key indicator.

23. C — A whine that follows road speed rather than engine speed comes from worn final drive ring-and-pinion gears or their bearings. Those parts turn with vehicle speed, unlike clutch or pilot faults. The speed-linked whine isolates the final drive.

24. B — A drip at the right inner joint with low transaxle fluid traces to the right axle (output) shaft seal at the differential. The vent and outer boot do not release gear oil there, and a cracked ring gear is far less likely. Replacing the seal stops the loss.

25. D — Torque steer pulling under acceleration and self-centering off throttle is driven mainly by unequal half-shaft lengths, which twist unevenly under load. The uneven twist produces uneven tractive effort. Equal-length designs reduce the pull.

26. C — A clunk only at the moment the disc grips, with mounts good, indicates excessive lash in worn CV joints or input shaft splines. The free play takes up suddenly as torque applies. Worn splines and joints produce this engagement clunk.

27. A — A torn outer boot slinging grease, even with a quiet joint, calls for replacing the boot and repacking, or replacing the joint or shaft. Resealing a contaminated joint or waiting for noise guarantees failure. Prompt service prevents joint destruction.

28. B — A leak at a seam at the bottom of the case between the two halves comes from a failed case-half gasket or sealant joint. The other listed seals leak in different locations. Resealing the case halves stops it.

29. C — A vibration that begins near 40 mph and worsens with speed, after balancing the tires, points next to the driveshaft for runout, worn U-joints, and balance. Driveshaft faults are speed-dependent and unaffected by load. Clutch and synchronizer faults do not fit.

30. D — A clunk each time the transmission engages from neutral into drive or reverse comes from worn universal joints or excessive slip-yoke spline play taking up lash. The free play slams as torque applies. Inspecting the joints and yoke locates the source.

31. A — On a driveshaft with a U-joint at each end, the yokes at each end must be phased in alignment with each other so the speed fluctuations of the two joints cancel. Out-of-phase assembly introduces vibration. Correct phasing keeps output velocity steady.

32. B — 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.

33. D — A double-cardan CV joint at the transmission end is used where the driveshaft operates at a steep angle, since the paired joints cancel speed fluctuation. This reduces vibration at high working angles. It is unrelated to slip yokes, ratio, or center bearings.

34. A — 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.

35. C — A pinion contact riding deep into the tooth root on the drive side means the pinion sits too deep and must be moved outward with a thinner depth shim. Repositioning the pinion centers the pattern. Backlash and preload adjustments do not fix depth.

36. B — Marking the pinion nut and yoke before disassembly lets the technician restore the original rotating torque and bearing preload at reassembly. The marks reference the existing crush on the collapsible spacer. This preserves preload without crushing a new spacer.

37. C — Limited-slip chatter on tight turns is first addressed by checking the gear oil condition and friction-modifier content. The additive lets the clutch plates slip smoothly instead of grabbing. Fresh, correct fluid usually cures the shudder.

38. A — Moving from 3.55:1 to 3.08:1 lowers the numerical ratio, so engine rpm at cruise drops and low-speed acceleration is reduced. Less torque multiplication trades launch for highway efficiency. The engine spins slower at any given road speed.

39. D — A C-clip axle shaft is freed only after removing the differential cover and the pinion (cross) shaft so the 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.

40. B — A semi-floating axle carries the vehicle weight on the shaft and its bearing, so a broken shaft can let the wheel separate from the vehicle. The bearing rides on the shaft, not on the spindle. This is the key safety concern of the design.

41. D — A pattern riding toward the tooth heel and high on the face indicates the pinion sits too far out and must move deeper with a thicker depth shim. Repositioning the pinion centers the pattern. Backlash and preload adjustments do not fix depth.

42. B — Milky white gear oil indicates water contamination, often entering through a submerged or clogged axle vent. Water emulsifies the oil into the milky mixture. Clearing the vent and flushing the housing addresses it.

43. 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.

44. C — Difficulty shifting out of four-wheel drive after dry pavement is caused by driveline windup binding the transfer case until the stored tension is relieved. The locked axles cannot accommodate turning differences on high-traction surfaces. Backing up briefly often releases the bind.

45. A — Binding and tire scrub during slow tight turns on dry pavement, with matched tire sizes, indicates a failed center differential or coupling that cannot allow front-to-rear speed difference. The driveline winds up and binds. The center unit must permit that difference.

46. D — A hum that rises with road speed and persists straight ahead, after tires are ruled out, points to a worn driveline bearing such as a wheel or carrier bearing. Bearing noise is constant and speed-related, unlike clutch or brake faults. Locating the worn bearing resolves it.

47. B — Manual locking front hubs connect the front wheels to the half shafts only when the driver engages them. Releasing them lets the front axle components stop turning during two-wheel-drive operation. This reduces wear and drag.

48. C — Low range provides gear reduction in the transfer case, lowering wheel speed at any given engine rpm and increasing the torque available at the wheels. It trades road speed for mechanical advantage. This is its purpose in heavy-load and off-road use.

49. D — Before condemning a transfer case for a leak, the technician first verifies fluid level, checks for an overfill, and cleans the vent. An overfilled case or clogged vent commonly pushes fluid past seals and looks like a failure. These quick checks rule out simple causes.

50. B — A stretched transfer case chain skipping on the sprocket teeth produces a growling or rattling under torque load. The chain-on-sprocket noise is load-dependent and originates inside the case. Replacing the chain and sprockets cures it.