

PRACTICE EXAM 15: ASE G1 SIMULATION — 55 QUESTIONS

1. A customer states that the vehicle's engine stalls at idle but restarts immediately. The engine runs normally above 1,000 RPM. The technician connects a scan tool and reads idle RPM at 450. The specified idle speed is 700 ± 50 RPM. Which of the following is the MOST likely cause?

- A. A weak fuel pump that cannot maintain pressure at low RPM
- B. An idle speed that is too low due to a dirty throttle body, malfunctioning idle air control, carbon-restricted air passages, or a vacuum leak that the PCM cannot fully compensate for
- C. A misfiring spark plug that only affects idle combustion
- D. A faulty crankshaft position sensor that drops signal at low RPM

2. A vehicle's headlights dim and the engine sputters momentarily when the electric cooling fan turns on. This occurs only at idle. Which of the following would cause this condition?

- A. A fan relay with corroded contacts creating a high-resistance connection
- B. A fan motor with a partially shorted winding drawing excessive current
- C. A properly functioning fan motor on a vehicle with a normal idle compensation system
- D. A poor engine-to-chassis ground connection that is shared by the fan motor and the charging/ignition systems — the high current draw of the fan through the high-resistance ground creates a voltage drop that affects all circuits sharing that ground path

3. Technician A says that the correct spark plug gap for a vehicle should be verified with a wire-type feeler gauge before installation, even on pre-gapped plugs. Technician B says that pre-gapped spark plugs should never be checked or adjusted because the manufacturer sets the gap precisely at the factory. Who is correct?

A. Technician A only — pre-gapped plugs can be damaged during shipping and handling, and the gap should always be verified against the vehicle manufacturer's specification before installation; if adjustment is needed, the ground electrode should be carefully bent, never the center electrode

B. Technician B only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

4. A vehicle has a slow air leak in one tire. The technician dismounts the tire and submerges the wheel and tire assembly in water. Bubbles appear at the valve stem base where it meets the wheel rim. Which of the following is the correct repair?

A. Apply rubber cement to the outside of the valve stem base and reinstall the tire

B. Tighten the valve core to stop the leak at the stem base

C. Replace the entire valve stem — a leak at the stem base indicates the rubber grommet seal has deteriorated and the valve stem must be replaced to restore the seal between the stem and the wheel

D. Apply a bead sealer around the valve stem base and reinflate

5. A vehicle's engine produces a single, loud backfire through the intake manifold during a cold start attempt. The engine does not start. Which of the following is the MOST likely cause?

A. A clogged fuel filter preventing fuel delivery

B. Incorrect ignition timing or a jumped timing belt/chain — a backfire through the intake occurs when the intake valve is open during the ignition event, meaning the spark is firing at the wrong point in the engine cycle

C. A faulty oxygen sensor sending incorrect signals during startup

D. A restricted exhaust system creating backpressure that forces combustion gases through the intake

6. A vehicle has a P0440 (EVAP System Malfunction) and the technician finds that a previous shop replaced the gas cap. The new gas cap does not have the same number of seal ridges as the original. Which of the following could this cause?

- A. No effect — all gas caps seal identically regardless of design
- B. The incorrect gas cap will cause fuel to leak from the filler neck during refueling
- C. The new gas cap may seal differently but will not affect the EVAP system
- D. The non-matching gas cap may not seal to the filler neck's specification, creating a leak path that the EVAP monitor detects as a system malfunction — OEM gas caps are designed with specific seal geometry for each filler neck design

7. A technician needs to determine whether a noise is coming from the engine or the transmission on a rear-wheel-drive vehicle. Which of the following tests would BEST isolate the source?

- A. With the vehicle safely on a lift and the transmission in Neutral, start the engine and listen — if the noise is present, it is engine-related; if absent, shift into Drive and listen again; if the noise appears only in gear, it is transmission or drivetrain-related
- B. Rev the engine to 3,000 RPM in Park and observe whether the noise matches a specific engine speed
- C. Remove the serpentine belt and start the engine briefly to isolate belt-driven accessories
- D. Perform a stethoscope test on the oil pan and transmission pan

8. A vehicle's A/C system has been diagnosed as undercharged. The technician recovers the remaining refrigerant and finds it weighs 12 ounces. The system specification calls for 24 ounces. Before recharging, which of the following must be done FIRST?

- A. Add 12 ounces of refrigerant to bring the total to 24 ounces
- B. Recharge the system to full capacity and monitor for pressure decay

C. Locate and repair the leak that caused the system to lose half its charge — adding refrigerant to a system with a known leak wastes refrigerant, violates EPA regulations regarding intentional venting, and guarantees the problem will recur

D. Evacuate the system and recharge with the full 24 ounces without leak testing

9. A vehicle's exhaust has visible white smoke at startup that clears within 2 minutes on a cold, humid morning. Engine coolant level has not changed. Which of the following is the correct interpretation?

A. A small head gasket leak that only occurs when the engine is cold

B. An injector leaking fuel into the cylinder overnight, producing white fuel vapor

C. Condensation burning off from inside the exhaust system, which is normal on cold mornings

D. This is normal condensation — water vapor condenses inside the cold exhaust system overnight and is vaporized as the exhaust heats up during the first minutes of operation; stable coolant level confirms no internal coolant leak

10. A vehicle's power steering system requires a specific synthetic fluid. The technician adds conventional ATF because the specified fluid is not available. Which of the following is a potential consequence?

A. No consequence — ATF and synthetic power steering fluid are interchangeable

B. The incorrect fluid can cause seal swelling or shrinkage, pump damage, hose deterioration, or loss of steering assist — different fluid chemistries interact differently with the specific seal and hose materials used in each system

C. The steering gear will overheat from the increased friction of conventional ATF

D. The power steering pump will produce excessive noise but no damage will occur

11. A customer brings in a vehicle for a noise complaint. The technician cannot reproduce the noise during a road test. Which of the following is the MOST appropriate next step?

- A. Ask the customer to ride along and point out exactly when and under what conditions the noise occurs — the customer knows the vehicle better than the technician and can identify the specific driving conditions, road surfaces, speeds, and maneuvers that trigger the noise
- B. Disassemble the front suspension to visually inspect for wear
- C. Tell the customer to return when the noise becomes constant and easier to diagnose
- D. Replace the most common noise-producing components as a precaution

12. A vehicle's scan tool PID data shows the ECT sensor reading 185°F while the vehicle's dashboard gauge shows the needle at the midpoint (normal) position. The technician uses an infrared thermometer at the thermostat housing and reads 195°F. Which of the following is correct?

- A. The scan tool is faulty because it disagrees with the gauge
- B. The infrared thermometer is the most accurate and the other two are wrong
- C. All three readings can be simultaneously valid — the scan tool reads the PCM's sensor (which may be in a slightly cooler location), the gauge reads from a separate gauge sender (at a different engine location), and the infrared reads the surface temperature of the housing; minor differences between measurement locations and methods are expected and normal
- D. The 10°F difference between the scan tool and infrared reading indicates a sensor calibration fault

13. A vehicle's battery terminals are clean and tight, the battery tests good, and the starter motor tests good. The vehicle occasionally fails to crank — turning the key produces no response at all. Other times it starts normally. Which of the following is the MOST likely cause?

- A. A weak battery that passes load testing but has intermittent internal plate contact
- B. A faulty starter solenoid with an internal contact that is welded intermittently
- C. An alternator with a failing diode that intermittently drains the battery
- D. An intermittent fault in the starter control circuit — the neutral safety switch, clutch pedal switch, ignition switch, starter relay, or the wiring between them has a connection that makes contact inconsistently

14. A vehicle's tires are worn to the tread wear indicators (2/32nds). The customer asks if the tires can pass a safety inspection. Which of the following is correct?

- A. The tires pass because the tread wear indicators are only advisory
- B. The tires are at the legal minimum in most jurisdictions — they will technically pass inspection at exactly 2/32nds, but the technician should strongly recommend immediate replacement because wet traction, hydroplaning resistance, and stopping distance are severely compromised at this tread depth
- C. The tires fail inspection because the minimum legal depth is 4/32nds
- D. The tires are illegal and the vehicle should not be driven until they are replaced

15. A vehicle's engine runs rough only when the A/C is turned on at idle. Turning the A/C off restores smooth idle. There are no DTCs. Which of the following should the technician check FIRST?

- A. Whether the PCM is commanding an idle speed increase when the A/C is engaged — if the idle compensation (through the IAC, electronic throttle, or timing advance) is not activating, the engine cannot support the additional compressor load at idle RPM
- B. The A/C compressor clutch gap, which may be too tight and causing drag
- C. The A/C refrigerant charge level
- D. The evaporator temperature sensor for an incorrect reading

16. A vehicle has a vibration felt in the steering wheel at 65 mph that was not present one week ago. No work has been performed on the vehicle. The tires are properly inflated. Which of the following is the MOST likely cause?

- A. A worn tie rod end that developed play over the past week
- B. An engine mount that failed within the last week
- C. A bent rim from a pothole impact

D. A wheel balance weight that has fallen off a front wheel — balance weights are attached with adhesive or clip-on retention and can detach from road vibration, impacts, or corrosion; loss of a single weight produces an immediate onset vibration at a specific speed range

17. A vehicle's scan tool shows the following freeze frame for a P0302 (Cylinder 2 Misfire): RPM 2,800, vehicle speed 62 mph, engine load 78%, ECT 198°F, STFT -1%, LTFT +2%. What is significant about the operating conditions when this code set?

A. The code set during cold engine operation, indicating a cold-start misfire

B. The negative STFT indicates a rich condition causing the misfire

C. The code set during moderate-to-heavy load at highway speed — this suggests the misfire occurs under load rather than at idle, pointing toward causes that worsen under cylinder pressure: a compression problem, a weak ignition coil that cannot fire under high cylinder pressure, or an injector that cannot deliver adequate fuel at high demand

D. The fuel trim values are abnormal and indicate a fuel system fault

18. Technician A says that a wheel alignment should be performed after replacing front struts. Technician B says that replacing struts does not affect alignment angles. Who is correct?

A. Technician A only — replacing struts changes the suspension geometry because the strut-to-knuckle bolt holes allow some positional variation during reinstallation; even slight differences in where the knuckle sits on the strut body change camber and toe angles, requiring realignment after strut service

B. Technician B only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

19. A vehicle's brake rotor has a minimum thickness specification of 0.980 inches stamped on its hub. The technician measures the rotor at 0.995 inches. The customer asks to have the rotors machined. Which of the following is the correct decision?

A. The technician must calculate whether the rotor has enough material to machine AND remain above the minimum specification — with only 0.015 inches of material above the discard limit, machining both sides (typically removing 0.010–0.015 per side minimum) would bring the rotor below the minimum specification; the rotor should be replaced rather than machined

B. Machine the rotor since it is currently above minimum thickness

C. Machine only one side of the rotor to stay above the minimum

D. The stamped minimum thickness is a recommendation, not a requirement

20. A vehicle's engine has a persistent misfire on cylinder 1. The technician performs a compression test: cylinder 1 reads 90 psi while cylinders 2–4 read 155 psi. A wet test on cylinder 1 raises the reading to 145 psi. What has the wet test confirmed?

A. The head gasket on cylinder 1 has failed

B. The exhaust valve on cylinder 1 is burned

C. The intake valve on cylinder 1 is not seating properly

D. The piston rings on cylinder 1 are worn — the oil temporarily sealed the ring-to-cylinder wall gap, and the dramatic pressure increase (90 to 145 psi) confirms the compression loss is through the rings, not the valves or head gasket

21. A customer's vehicle has a check engine light. The scan tool shows P0455 (EVAP System — Large Leak Detected). The technician tightens the gas cap and clears the code. One week later, the customer returns with the same code. Which of the following should the technician do NEXT?

A. Replace the gas cap since tightening did not resolve the issue

B. Clear the code again and advise the customer to ensure the cap clicks when tightened

C. Perform a smoke test on the EVAP system to locate the actual leak source — the initial cap tightening was a reasonable first step, but the code's return indicates the leak is NOT the cap; systematic testing is now required to identify the actual leak point

D. Replace the EVAP canister since it is the most common failure after the gas cap

22. A vehicle's engine oil has been changed using the correct specification oil. The oil life monitor has NOT been reset. Which of the following is the consequence?

- A. The engine will run on the old oil's protection parameters until the monitor is reset
- B. The oil life monitor will continue counting down from where it stopped and will trigger a premature maintenance reminder — the customer will be alerted for an oil change far earlier than necessary, wasting time and potentially money on an unnecessary service
- C. The PCM will adjust fuel injection timing based on the old oil life percentage
- D. No consequence — the oil life monitor automatically detects fresh oil and resets itself

23. A vehicle has a grinding noise from the right front wheel that occurs at all times — driving, braking, and coasting. The noise does not change with steering input. The technician removes the wheel and finds that the brake pad backing plate is contacting the rotor. The pads still have 5 mm of friction material. Which of the following caused this contact?

- A. The brake pad was installed backward with the backing plate against the rotor instead of the friction material
- B. A brake pad that shifted in the caliper bracket due to missing or broken anti-rattle clips — the pad migrated from its correct position, tilting the backing plate into contact with the rotor while the friction material is no longer centered on the rotor face
- C. The caliper piston seized in the extended position
- D. The brake rotor is warped and contacting the pad at one point per revolution

24. A vehicle's engine has a rhythmic clicking noise at idle. The technician uses a stethoscope and isolates the noise to the fuel injector area. The clicking is consistent and tracks with engine RPM. Which of the following is correct?

- A. The injector has a stuck pintle that is clicking against its seat
- B. The injector is clogged and the clicking indicates restricted fuel flow

C. The clicking indicates the injector body has cracked and needs replacement

D. Fuel injectors normally produce an audible clicking sound as the solenoid opens and closes the pintle at each firing event — this is the normal operating sound of a functioning injector, not a fault; each injector pulses once per engine revolution on a sequential system, producing a rhythmic click at engine speed

25. A vehicle's front brakes have been grinding for "a while" according to the customer. The technician removes the wheel and finds the brake pads are completely worn through — bare metal backing plates have been grinding against the rotor. The rotor is deeply scored. Which of the following describes the complete repair scope?

A. Replace the brake pads only and return the rotors to service since they are still above minimum thickness

B. Replace the pads and machine the rotors to restore the friction surface

C. Replace the pads, replace the rotors (deep scoring typically cannot be machined out without going below minimum thickness), inspect the calipers for heat damage and piston seal integrity, inspect the brake hoses for heat damage, check the brake fluid for contamination from overheating, and test-drive to verify proper operation — extended metal-to-metal contact damages multiple components beyond just the pads and rotors

D. Replace the pads and rotors only

26. A vehicle's automatic headlights turn on during the day when driving through a tree-lined road with intermittent shadows. The customer finds this annoying. Which of the following is the correct explanation?

A. The ambient light sensor is defective and overreacting to minor light changes

B. This is normal operation — the ambient light sensor detects the reduction in light level caused by the shadows and activates the headlights as designed; some systems have adjustable sensitivity settings that can be changed through the vehicle's menu or a scan tool to reduce sensitivity to brief light changes

C. The headlight relay is chattering due to an electrical fault

D. The daytime running lights are malfunctioning and activating the headlight circuit

27. A technician is replacing an engine coolant temperature sensor. After installing the new sensor, the engine runs rich at idle, the cooling fan runs continuously, and the check engine light is on. The scan tool shows the ECT reading -40°F . Which of the following is the MOST likely cause?

- A. The new sensor's electrical connector is not fully seated or has a bent pin — the open circuit causes the PCM to read maximum resistance (coldest possible temperature), commanding maximum cold-start fuel enrichment (rich idle) and maximum cooling fan speed as a failsafe
- B. The replacement sensor is defective and reading a shorted value
- C. The thermostat is stuck open, preventing the engine from warming up
- D. The PCM requires a relearn after sensor replacement

28. A vehicle has a noise from the rear that sounds like a howl between 40 and 55 mph during acceleration. The noise disappears during coasting and above 55 mph. Which of the following is the MOST likely source?

- A. A worn rear wheel bearing that resonates in a specific speed range
- B. Rear tire tread noise that is affected by road surface conditions
- C. A worn rear differential mount allowing the differential to shift under acceleration
- D. Rear differential ring and pinion gears with a drive-side wear pattern — the noise occurring ONLY during acceleration (drive-side gear loading) within a specific speed range and disappearing during coast (coast-side loading) and above that speed range is the signature of ring and pinion gear mesh issues

29. A vehicle's battery keeps discharging. The technician finds an aftermarket alarm system installed. The alarm system's LED indicator on the dashboard blinks when the vehicle is parked. A parasitic draw test with the alarm system fuse pulled drops the draw from 380 mA to 35 mA. Which of the following is the correct conclusion and action?

- A. The alarm system is defective and must be completely removed from the vehicle
- B. The blinking LED is consuming 345 mA and should be disconnected

C. The aftermarket alarm system is the source of the excessive draw — the system is not entering its low-power sleep mode properly, or it was wired incorrectly; the alarm must be diagnosed and repaired by a qualified installer, or removed if the customer agrees

D. The alarm system draw is normal for aftermarket security systems

30. A vehicle with disc/drum brakes has a soft brake pedal that slowly sinks to the floor when steady pressure is applied at a stoplight. The master cylinder reservoir is full. There are no external leaks. Which of the following is the MOST likely cause?

A. A rear wheel cylinder leaking internally inside the brake drum where it is not visible externally

B. An internal leak in the master cylinder — the primary or secondary piston seals are bypassing fluid internally rather than pushing it to the calipers/wheel cylinders; fluid circulates inside the cylinder without building pressure, and the pedal slowly sinks under sustained foot pressure

C. Air trapped in the ABS hydraulic modulator

D. A proportioning valve stuck in the open position

31. A vehicle's check engine light is flashing while the engine runs rough at highway speed. The customer calls and asks if they can continue driving to the shop, which is 15 miles away. Which of the following is the correct advice?

A. A flashing check engine light indicates a catalyst-damaging misfire is occurring — the customer should reduce speed, avoid heavy acceleration, and drive directly to the shop or pull over if the condition worsens; continued driving at highway speed under load with an active severe misfire risks destroying the catalytic converter and potentially causing an exhaust fire

B. A flashing light is the same urgency as a steady light — continue driving normally

C. Turn the vehicle off immediately and have it towed

D. The flashing light resets itself and the customer can continue driving at highway speed

32. A vehicle's engine has been diagnosed with a faulty mass airflow sensor. The technician replaces the sensor. After replacement, the engine idles high at 1,200 RPM and the scan tool shows the new MAF reading is higher than expected at idle. Which of the following is the MOST likely cause?

A. The replacement MAF sensor is defective from the factory

B. The PCM needs to relearn the new sensor's baseline

C. The engine has a vacuum leak that was previously compensated for by the old MAF's inaccurate reading — the new, accurate sensor reveals the leak that the faulty sensor was masking

D. The new MAF sensor is reading correctly, and the high idle is caused by a vacuum leak or air leak after the sensor that was present before the replacement but was masked by the old faulty sensor's underreporting of airflow — with the new sensor accurately measuring actual airflow (including the leak), the PCM sees the correct total air but the unmetered leak portion causes the idle to rise

33. A vehicle's power window operates very slowly going up but at normal speed going down. The glass moves smoothly with no binding when operated by hand with the motor disconnected. Which of the following is the MOST likely cause?

A. A window regulator that binds only in one direction due to a worn cable or guide

B. A faulty power window switch that limits voltage in one direction

C. A binding window channel that creates friction only on the upward stroke

D. A failing window motor that is losing torque — the motor produces enough force to lower the window (gravity assists) but cannot generate sufficient torque to raise the window against gravity at normal speed; the motor's brushes, commutator, or internal magnets have degraded, reducing output in the direction that requires the most force

34. A vehicle's steering wheel shakes during braking from 60 mph. The technician inspects the brakes and finds the rotors have lateral runout of 0.003 inches. The specification allows 0.002 inches maximum. Before replacing the rotors, which of the following should the technician try FIRST?

A. Machine the rotors on a bench lathe to remove the runout

B. Remove the rotors, clean the hub mounting surfaces, and reinstall the rotors in a different index position — runout is often caused by contamination between the rotor and hub, not by a defective rotor; re-indexing (rotating the rotor one bolt hole position) often eliminates the runout by changing the relationship between the rotor and any high spot on the hub

C. Replace the wheel bearings since hub surface runout originates from bearing play

D. Install thicker brake pads to absorb the rotor movement

35. A vehicle's engine has a P0300 (Random Misfire) that occurs only during light rain. The engine runs perfectly in dry conditions. Which of the following is the MOST likely cause?

A. Moisture is entering the ignition system through cracked coil boots, deteriorated spark plug wire insulation, or a cracked distributor cap — high-voltage ignition components develop invisible micro-cracks that allow humid air to provide a conductive path for spark to leak to ground rather than jumping the plug gap

B. Water is entering the fuel tank through the fuel cap vent

C. The MAF sensor is reading incorrectly due to humid air entering the intake

D. The PCM's barometric pressure reading is skewed by the low atmospheric pressure during rain

36. A vehicle has an evaporative emission system leak. During a smoke test, the technician sees smoke rising from the area of the fuel tank. Access to the top of the fuel tank requires dropping the tank. Which of the following is the correct approach?

A. Add a fuel tank sealer product to eliminate the leak without dropping the tank

B. Assume the leak is at the gas cap and replace the cap without further investigation

C. The tank must be lowered to access the leak source — common leak points on the tank top include the fuel pump module O-ring seal, the fuel level sender gasket, the EVAP line fittings, and the rollover valve; these components cannot be inspected or repaired without physical access to the tank top

D. Pressurize the fuel tank with compressed air to locate the exact leak point

37. A vehicle's engine has a steady check engine light with codes P0301, P0302, P0303, and P0304 — all four cylinders are misfiring. The engine runs very rough but does start. Which of the following is LEAST likely to cause simultaneous misfires on ALL cylinders?

- A. Severely low fuel pressure from a failing fuel pump
- B. A massive vacuum leak at the intake manifold gasket
- C. A worn camshaft lobe on cylinder 2 — a single worn cam lobe would affect only one cylinder, not all four; all-cylinder misfires require a systemic cause that affects every cylinder simultaneously
- D. Contaminated fuel with excessive water content

38. A vehicle's A/C system gauge readings show: low side 45 psi, high side 300 psi. Normal specification is low side 25–35 psi, high side 200–250 psi. Both readings are ABOVE specification. Which of the following is the MOST likely cause?

- A. A restriction in the high-pressure liquid line
- B. The system is overcharged with refrigerant OR the condenser is not rejecting heat effectively (inoperative condenser fan, blocked condenser airflow, or extremely high ambient temperature) — both conditions cause excessive pressure on both sides because the refrigerant cannot be adequately condensed
- C. The compressor is operating at reduced capacity
- D. The expansion valve is stuck open, flooding the evaporator

39. A customer asks the technician to diagnose a noise. After diagnosis, the technician determines the noise is coming from the exhaust heat shield. The repair involves simply tightening two bolts. The customer asks whether this should be covered under their aftermarket warranty. Which of the following is the correct response?

- A. The technician should refer the customer to their warranty provider — the shop's responsibility is to diagnose the concern, provide the repair, and give the customer accurate documentation of the work

performed; warranty coverage determination is between the customer and their warranty company, not the shop

- B. The technician should call the warranty company and authorize the repair themselves
- C. The technician should waive the diagnostic fee since the repair is simple
- D. The technician should tell the customer that heat shield repairs are never covered by any warranty

40. A vehicle's transmission shifts normally through all gears, but the torque converter clutch (TCC) does not engage during highway cruising. The scan tool shows the PCM is commanding TCC engagement, but the converter does not lock. Which of the following is the MOST likely cause?

- A. Low transmission fluid level causing inadequate line pressure for TCC apply
- B. The TCC solenoid is stuck open, preventing hydraulic pressure from applying the converter clutch
- C. The engine is not reaching operating temperature, and the PCM is not commanding TCC engagement
- D. A faulty TCC solenoid or its circuit, an internal converter clutch failure, or blocked TCC apply oil passages — the PCM is commanding engagement (confirmed by scan tool) but the hydraulic or mechanical execution is failing; the solenoid, its wiring, the apply circuit, or the converter clutch itself is the fault

41. A vehicle has a grinding noise when the ignition key is held in the Start position after the engine has already started. Which of the following is occurring?

- A. The engine is already running but the key is not being released — the starter motor is still engaging the flywheel
- B. The flywheel ring gear teeth are worn and not releasing the starter
- C. The starter drive (Bendix) gear is engaging with the already-spinning flywheel ring gear, creating a grinding noise — the starter should only engage during cranking; holding the key in Start after the

engine fires forces the slow-spinning starter gear against the fast-spinning flywheel, damaging both the starter drive and ring gear teeth

D. The starter solenoid has failed and is not retracting the drive gear

42. A vehicle's engine has a steady oil leak from the front of the engine that drips onto the ground. The technician cleans the area and identifies the leak at the front crankshaft seal. The seal was replaced 6 months ago. Which of the following should the technician investigate as a possible cause of premature seal failure?

A. The type of engine oil used, which may be chemically attacking the seal material

B. The harmonic balancer (crankshaft pulley) contact surface — a groove worn into the balancer where the seal lip rides creates a channel that the new seal cannot seal against; the balancer surface must be inspected for grooving and repaired with a seal sleeve or replaced if the wear surface is damaged

C. The oil pressure, which may be exceeding the seal's design pressure rating

D. The PCV system, which may be creating excessive crankcase pressure that blows the seal out

43. A vehicle's cabin air filter has been replaced but a musty odor persists from the HVAC vents. The evaporator drain tube has been verified as clear. Which of the following is the correct NEXT step?

A. Treat the evaporator core surface with an antimicrobial/antifungal spray applied through the blower resistor port or recirculation air inlet — the musty odor is caused by mold and mildew colonies living on the evaporator fins, and replacing the cabin filter alone does not address the biological growth already present on the evaporator surface

B. Replace the evaporator core since it is permanently contaminated

C. Replace the blower motor since the odor may be coming from mold on the fan blades

D. Install a charcoal-activated cabin air filter, which will absorb all odors without treating the source

44. A vehicle with a V6 engine has a misfire only on cylinders 1, 3, and 5. Cylinders 2, 4, and 6 fire normally. Which of the following is significant about the affected cylinders?

- A. These cylinders share a common fuel rail
- B. These cylinders are the three farthest from the thermostat
- C. These cylinders are in the even-numbered firing positions
- D. Cylinders 1, 3, and 5 are typically on the same bank of the V6 — a misfire pattern affecting an entire bank suggests a bank-specific cause such as an intake manifold gasket leak on that bank, a failed coil pack (on waste-spark systems), a camshaft position sensor issue for that bank, or a cracked head/head gasket isolated to that side

45. A vehicle's rear axle has a popping noise that occurs only during tight, slow-speed turns in a parking lot. The noise is not present during straight-line driving. The vehicle has a limited-slip differential. Which of the following is the MOST likely cause?

- A. A worn rear wheel bearing that only loads during turning
- B. A loose rear shock absorber mount
- C. The limited-slip differential clutch packs are grabbing and releasing (chattering) during tight turns due to depleted friction modifier in the differential fluid — the differential fluid must contain the correct friction modifier additive to prevent the clutch packs from grabbing as the inner and outer tires turn at different speeds
- D. A worn rear CV joint on an independent rear suspension

46. A vehicle's front end makes a creaking or groaning noise when turning the steering wheel at a standstill (dry steering). The noise comes from the suspension area, not the power steering system. Which of the following is the MOST likely cause?

- A. A worn power steering pump bearing
- B. Dry or worn front suspension ball joints, strut mounts, or control arm bushings — these pivot points are under heavy load during stationary steering (the full weight of the vehicle compresses the suspension while the wheels scrub against the pavement) and produce a creaking or groaning noise when their lubrication has dried out or the rubber has deteriorated
- C. Worn front brake pads rubbing against the rotor during steering input

D. A loose front sway bar that shifts when the wheels are turned

47. A vehicle's instrument cluster warning lights all illuminate during the key-on/engine-off bulb check. All lights turn off after the engine starts EXCEPT the oil pressure warning light. Oil level is correct. The engine sounds normal with no knocking. Which of the following is the correct action?

A. Verify actual oil pressure with a mechanical gauge — the oil pressure sending unit or its wiring may have failed, giving a false warning; however, since low oil pressure can cause catastrophic engine damage within seconds, the technician must VERIFY pressure mechanically before dismissing the warning as a faulty sender

B. Replace the oil pressure sending unit since the engine runs normally

C. Ignore the light because the engine sounds normal and the oil level is correct

D. Shut the engine off immediately and tow the vehicle

48. A vehicle has a slight vibration that occurs ONLY during braking from highway speed and is felt in the steering wheel. The vibration is not present during non-braking driving. Which of the following is the MOST likely cause?

A. An out-of-balance front tire that is masked by the braking force

B. A worn front suspension component that loads differently during braking

C. A worn front wheel bearing that only manifests under deceleration forces

D. Front brake rotor thickness variation (DTV) or lateral runout — the pulsation is felt through the steering because the front rotors push the calipers and pads in and out as uneven rotor surfaces pass between them; the pulsation transmits through the steering linkage to the steering wheel and is only present during braking because the pads must be in contact with the rotor to detect the variation

49. A vehicle has a P0171 (System Too Lean — Bank 1) code. The technician sprays propane around the intake manifold gasket while monitoring short-term fuel trim on the scan tool. When spraying at the rear of the manifold, STFT drops from +18% to +2%. What does this confirm?

- A. The propane caused the MAF sensor to overread, creating a temporary fuel calculation error
- B. The propane test is inconclusive and should be repeated with carb cleaner
- C. A vacuum leak exists at the rear of the intake manifold — the propane was drawn into the leak and enriched the mixture, causing the fuel trim to drop toward zero as the PCM reduced its lean compensation; the location where the STFT responded identifies the exact leak point
- D. The fuel pressure regulator vacuum reference line is leaking at that location

50. A vehicle's suspension makes a single clunk when transitioning from acceleration to braking or from braking to acceleration — the clunk occurs at the moment the weight shifts. All ball joints, tie rods, and control arm bushings are tight. Which of the following is the MOST likely cause?

- A. A worn wheel bearing with axial play that shifts under load reversal
- B. A worn sway bar end link or bushing — the sway bar's connecting links and bushings absorb the transition forces between acceleration and braking; when they develop play, the sway bar shifts in its mounts at the moment of weight transfer, producing a single clunk; the links and bushings may feel tight during static inspection but have enough play to clunk under dynamic loading
- C. A loose caliper bracket bolt that shifts under braking force
- D. An exhaust hanger that allows pipe movement during weight transfer

51. A technician is using a scan tool to monitor misfire data. The tool shows 15 misfires on cylinder 3 per 200 engine revolutions. After swapping the coil from cylinder 3 to cylinder 1, the misfires move to cylinder 1 (now showing 14 per 200 revolutions). Cylinder 3 drops to zero. Which of the following is the definitive diagnosis?

- A. The ignition coil originally on cylinder 3 has failed — the misfire followed the coil to its new position, conclusively proving the coil is the faulty component; this swap test provides definitive evidence that no further testing is needed for this specific fault
- B. The spark plug on cylinder 3 is fouled
- C. The fuel injector on cylinder 3 is clogged

D. The PCM driver for cylinder 3 has an intermittent fault

52. A vehicle's scan tool shows the transmission fluid temperature at 210°F during normal city driving. The specification indicates a normal operating range of 160–200°F. Which of the following is the correct action?

A. No action needed — 210°F is within an acceptable extended range for city driving

B. The transmission cooler is adequate and the temperature will stabilize with highway driving

C. Replace the transmission fluid immediately since it has overheated

D. Investigate the cause of the elevated temperature — check for a restricted transmission cooler, low fluid level, a malfunctioning cooler bypass valve, or heavy-use conditions; 210°F exceeds the normal range and accelerates fluid degradation; continued operation at this temperature will shorten transmission life

53. A vehicle's steering pulls to the left during braking AND tracks straight when not braking. The left front brake caliper was recently replaced. Which of the following is the MOST likely cause?

A. The left front replacement caliper has a larger piston bore than the right, applying more force on the left side

B. The left front brake hose is restricted, reducing braking force on the left

C. The right front brake hose is restricted — it prevents full hydraulic pressure from reaching the right caliper during braking, creating less braking force on the right side; the vehicle pulls toward the LEFT because the left side has stronger braking force; since the vehicle tracks straight when not braking, the alignment and suspension are correct

D. The left front brake pads are a higher friction coefficient than the right

54. A customer asks the technician to check the coolant concentration. The technician uses a refractometer and reads a freeze point of -34°F. The vehicle operates in a climate where winter temperatures reach -10°F. Which of the following is the correct assessment?

- A. The concentration is dangerously high and the mixture is too thick to circulate properly
- B. The coolant provides adequate freeze protection for the operating climate — -34°F protection exceeds the -10°F worst-case temperature by a comfortable safety margin; the approximately 50/50 coolant-to-water ratio indicated by this freeze point also provides optimal boil-over protection and heat transfer characteristics
- C. The coolant concentration should be increased to achieve -50°F protection for maximum safety margin
- D. The refractometer reading is unreliable and should be verified with a hydrometer

55. A vehicle is being returned to the customer after completing all authorized repairs. Which of the following is the single MOST important step before releasing the vehicle?

- A. Verify the original complaint is resolved — road test or operationally test the vehicle to confirm the symptom that brought it to the shop is no longer present; all other documentation, cleanliness, and communication steps are important, but confirming the repair actually fixed the customer's problem is the fundamental purpose of the entire service visit
- B. Ensure the work order is complete with all parts and labor documented
- C. Verify the vehicle is clean and free of grease marks
- D. Reset all DTCs and clear the scan tool memory

Practice Exam 15: Answer Key and Full Explanations

1. B — The scan tool confirms the idle speed is 250 RPM below specification, which directly explains the stalling. The engine simply cannot sustain combustion at 450 RPM. The most common causes of a low idle are carbon deposits restricting the throttle bore or idle air passages, a malfunctioning idle air control valve or electronic throttle body, or a vacuum leak that the PCM has partially but not fully compensated for. Cleaning the throttle body and idle passages is the logical first repair step, followed by IAC testing if cleaning doesn't resolve the low idle.

2. D — A shared ground path between the cooling fan and the engine/ignition system creates a condition where the fan's high-current draw (30–40 amps) through a corroded or high-resistance ground connection produces a voltage drop that affects every circuit sharing that ground. The engine "sees" a reduced ground reference, disrupting ignition timing and fuel injector operation (causing the sputter),

while the headlights receive reduced voltage (causing the dimming). Repairing the ground connection resolves both symptoms simultaneously because both trace to the same single-point resistance.

3. A — Technician A is correct. Spark plugs can sustain gap changes during manufacturing, packaging, shipping, and handling — the delicate ground electrode can be bent by even minor impacts. Verifying the gap against the vehicle manufacturer's specification (which may differ from the plug manufacturer's default pre-gap) takes 10 seconds per plug and prevents misfires from an incorrect gap. If adjustment is needed, only the ground electrode should be bent — never the center electrode, which can crack the ceramic insulator and destroy the plug.

4. C — Tire valve stems use a rubber grommet (snap-in type) or an O-ring (clamp-in type) to seal against the wheel rim hole. Bubbles at the valve stem BASE — not at the valve core — indicate the seal between the stem body and the rim has deteriorated. Tightening the valve core addresses a different seal (the core-to-stem seal). Sealants are temporary. The entire valve stem must be replaced to restore the rubber-to-rim seal, which requires dismounting the tire from the wheel.

5. B — A backfire through the intake manifold means combustion is occurring while the intake valve is open — the flame front travels backward through the open valve into the intake manifold. This occurs when ignition timing is severely misaligned with piston position, meaning spark fires during the intake stroke instead of the compression stroke. The most common cause is a timing belt or timing chain that has jumped one or more teeth, shifting the camshaft-to-crankshaft relationship and causing ignition events at the wrong point in the four-stroke cycle.

6. D — Gas caps are not universal — each filler neck has a specific seal geometry (number of seal ridges, O-ring diameter, thread pitch, and sealing pressure) designed to create an airtight closure that the EVAP system requires. An incorrect cap may thread onto the filler neck but not create the seal the EVAP monitor expects. During the EVAP leak test, the PCM detects the pressure loss through the imperfect cap seal and sets P0440. Replacing with the correct OEM-specification cap for the specific filler neck resolves the code.

7. A — This test systematically isolates the noise source by changing one variable at a time. In Neutral with the engine running, only the engine and its directly driven components are rotating — the transmission's gear train is unloaded. If the noise is present, it's engine-related. If absent in Neutral but appears in Drive, the noise requires drivetrain loading to manifest, pointing to the transmission, torque converter, driveshaft, or differential. This is the most efficient first-step isolation technique for engine-versus-drivetrain noise complaints.

8. C — An A/C system that has lost 50% of its charge has a leak — period. Adding refrigerant without finding and repairing the leak guarantees the new charge will leak out at the same rate, wasting refrigerant and money. Additionally, EPA Section 608 regulations require technicians to make good-faith efforts to locate and repair leaks before recharging. The correct sequence is: recover remaining charge, pressure test or evacuate and vacuum test, locate and repair the leak, evacuate to remove moisture, THEN recharge to full specification.

9. D — Exhaust condensation on cold mornings is one of the most commonly misidentified "problems" in automotive service. Water vapor is a normal byproduct of combustion (hydrocarbons + oxygen → CO₂ + H₂O). When the exhaust system is cold, this water vapor condenses inside the pipes and muffler. On startup, the hot exhaust gases vaporize this accumulated condensation, producing visible white steam that exits the tailpipe. It clears within 1–3 minutes as the exhaust system heats up. Stable coolant level confirms no internal leak.

10. B — Power steering systems are engineered with specific fluid chemistries matched to the seal materials, hose compounds, and pump vane materials used in that system. Synthetic power steering fluid, conventional ATF, and manufacturer-specific fluids (Honda, BMW, Mercedes, etc.) are NOT interchangeable. The wrong fluid can attack seals (causing swelling and leakage or shrinkage and leakage), deteriorate hose linings (creating internal flaking that clogs the system), or provide inadequate lubrication to the pump vanes (causing premature wear and noise).

11. A — The customer is the most valuable diagnostic resource for an unreproducible noise. They live with the vehicle daily, they know exactly what the noise sounds like, and they know the specific conditions that trigger it — the particular road surface, the speed, the turn direction, the ambient temperature, the load. A ride-along allows the technician to hear the noise in its natural context and apply their diagnostic expertise at the moment the symptom appears. This approach is far more efficient than guessing which component to inspect or replace.

12. C — Three different temperature measurement methods reading three slightly different values is expected and normal. The PCM's ECT sensor, the dashboard gauge sender, and the infrared thermometer may all measure at different locations on the engine (thermostat housing, cylinder head, intake manifold, block) where coolant temperatures vary by 5–15°F due to flow patterns and heat gradients. Additionally, infrared reads surface temperature, while sensors read coolant temperature inside a passage. Minor discrepancies are inherent to using different measurement methods at different locations.

13. D — The battery, cables, and starter motor have all been verified as good — yet the vehicle intermittently produces ZERO response when the key is turned. Zero response (no click, no crank,

nothing) means no current is reaching the starter solenoid's control terminal. The starter control circuit includes the ignition switch, the neutral safety switch (automatic) or clutch pedal switch (manual), the starter relay, and all associated wiring and connectors. An intermittent failure in ANY one of these creates the "sometimes nothing, sometimes normal" pattern.

14. B — At exactly 2/32nds of an inch — the depth where the tread wear indicator bars become flush with the tread surface — tires are at the legal minimum in most U.S. jurisdictions. They technically pass inspection at this point. However, the technician has a professional obligation to inform the customer that at 2/32nds, wet traction is reduced by approximately 50%, hydroplaning risk increases dramatically, and stopping distance from 60 mph extends by 100+ feet compared to new tires. The inspection may pass, but the safety margin is essentially zero.

15. A — When the A/C compressor clutch engages at idle, it adds approximately 5–10 horsepower of parasitic load to the engine. The PCM is designed to compensate by commanding an idle speed increase — typically 50–100 RPM — through the IAC valve, electronic throttle, or ignition timing advance. If this compensation fails (faulty IAC, stuck throttle, no PCM A/C request signal, or a malfunctioning A/C relay that doesn't signal the PCM when the compressor engages), the engine cannot carry the compressor load at base idle speed and runs rough.

16. D — A sudden-onset vibration at a specific speed — with no recent service and no tire pressure change — points to a change in the wheel-tire assembly's balance. Wheel weights are attached with adhesive (stick-on weights on alloy wheels) or spring clips (clip-on weights on steel wheels). Both attachment methods can fail: adhesive degrades with heat cycling and chemical exposure, and clips can be knocked off by curb contact or road debris. Loss of even a single 0.5-ounce weight on a front wheel produces noticeable vibration at highway speed.

17. C — The freeze frame captures the engine operating at 2,800 RPM under 78% load at highway speed — this is a moderate-to-heavy power demand condition, not idle. Fuel trims of -1% STFT and +2% LTFT are essentially perfect, eliminating fuel system faults. The misfire occurs specifically under load, pointing to causes that worsen under high cylinder pressure: a compression deficiency (head gasket, valve sealing), a weak ignition coil that cannot maintain adequate spark energy against higher ionization resistance, or a fuel injector that delivers sufficient fuel at idle but cannot keep up at peak demand.

18. A — Technician A is correct. MacPherson strut replacement involves disconnecting the strut from the steering knuckle, which disrupts the camber and toe alignment. Even if the new strut appears to bolt into the same position, the strut-to-knuckle bolt holes allow several millimeters of positional variation. A fraction of a degree of camber or toe change produces measurable tire wear over thousands of miles.

Alignment after strut replacement is not optional — it is a required step to prevent uneven tire wear and ensure proper handling.

19. A — This is a critical math-based decision. The rotor is currently 0.995 inches, and the discard specification is 0.980 inches — leaving only 0.015 inches of total material above minimum. Machining a rotor requires removing material from BOTH friction surfaces (typically a minimum of 0.010 inches per side to achieve a proper surface finish). Two sides \times 0.010 = 0.020 inches minimum material removal, which would bring the rotor to 0.975 inches — BELOW the 0.980 discard limit. The rotor cannot be safely machined and must be replaced.

20. D — The wet compression test is the definitive differentiation between ring/bore wear and valve/gasket problems. Adding oil to the cylinder temporarily seals the piston ring-to-cylinder wall interface. A dramatic pressure increase (90 \rightarrow 145 psi) means the oil sealed a gap that was previously leaking — confirming the rings are the problem. If the pressure had NOT increased significantly with oil, the leak would be at the valves or head gasket (which oil cannot seal). This single test saves hours of unnecessary diagnostic work.

21. C — The technician correctly tried the simplest fix first (cap tightening), but the code returned — proving the cap is NOT the leak source. Repeatedly clearing the code and retrying the cap wastes the customer's time and money. A smoke test pressurizes the sealed EVAP system with visible smoke, allowing the technician to visually trace the leak to its exact location — whether it's a cracked hose, a faulty purge valve, a leaking fuel tank seal, or a defective vent solenoid. This is the systematic diagnostic step the situation now requires.

22. B — The oil life monitor is a software algorithm that counts down based on operating conditions. It has no way to detect a physical oil change — it only resets when the technician performs the reset procedure. If not reset, the monitor continues its countdown from wherever it was, eventually triggering a premature oil change reminder long before the fresh oil needs replacement. While this creates no mechanical harm, it erodes the customer's confidence in the service and may result in an unnecessary return visit.

23. B — Brake pads are held in position within the caliper bracket by anti-rattle clips (also called abutment clips or pad retaining springs). These clips prevent the pads from shifting laterally or tilting within the bracket. When the clips are missing, broken, or incorrectly installed, the pad can migrate from its correct centered position. A shifted pad exposes the bare metal backing plate to the rotor surface on one edge while the friction material rides off-center on the other edge — producing constant grinding even though the pad still has adequate material.

24. D — Fuel injectors are electromechanical solenoid valves that open and close rapidly (pulsing) to deliver fuel. The audible clicking is the sound of the solenoid's magnetic field snapping the pintle open and the return spring snapping it closed — this happens once per injection event. On a sequential injection system, each injector fires once per engine revolution for its assigned cylinder. The rhythmic clicking heard through a stethoscope at the fuel rail is the normal operating sound of healthy, functioning injectors — not a fault.

25. C — Extended metal-to-metal grinding causes cascading damage beyond the pads and rotors. The extreme heat generated by steel-on-iron contact can boil brake fluid in the caliper (causing vapor pockets), damage caliper piston seals (causing leaks), weaken brake hose linings (creating future rupture risk), overheat wheel bearing grease (shortening bearing life), and warp hub surfaces. The comprehensive inspection scope reflects the reality that prolonged grinding creates a system-wide damage pattern that requires evaluation of EVERY component exposed to the excessive heat.

26. B — The automatic headlight system is responding correctly to measured light levels. When the vehicle enters shadows from trees, the ambient light sensor detects reduced light intensity — exactly as it would at dusk — and activates the headlights. This is the system performing as designed. Many vehicles offer sensitivity adjustment through the infotainment menu or a dial on the headlight switch that changes how quickly the system responds to light level changes. Reducing sensitivity makes the system less reactive to brief shadow transitions.

27. A — An ECT sensor reading of -40°F on a warm engine is the textbook NTC thermistor open-circuit signature. The connector that wasn't fully seated or has a bent pin creates an open circuit — the PCM's pull-up resistor drives the signal voltage to maximum, which maps to -40°F . The PCM then makes two protective decisions based on this "extreme cold" reading: it commands maximum cold-start fuel enrichment (causing the rich idle) and activates the cooling fan at full speed as a failsafe (in case the actual temperature is dangerously high but undetectable). Seating the connector resolves all symptoms.

28. D — The noise profile is diagnostic: acceleration-only (drive-side gear loading), within a specific speed range (resonant frequency of the gear mesh), disappearing on coast (load shifts to coast-side teeth) and above that speed (frequency moves past the resonant range). This tri-characteristic pattern — load-dependent, speed-specific, and direction-sensitive — is unique to ring and pinion gear mesh issues. Wheel bearings produce constant noise regardless of load direction. Tire noise changes with road surface, not throttle position. This pattern is one of the most reliable differential noise identifiers.

29. C — Pulling the alarm system fuse dropped the parasitic draw from 380 mA (grossly excessive) to 35 mA (normal), definitively isolating the aftermarket alarm as the source of the 345 mA excess draw. A properly functioning alarm system should draw 20–35 mA in standby mode. At 345 mA, the system is

either malfunctioning (not entering sleep mode), incorrectly wired (staying fully active at all times), or has a component failure. The system must be diagnosed by a qualified installer, repaired, or removed with customer authorization.

30. B — A brake pedal that holds firm initially but slowly sinks under sustained pressure — with full fluid level and no external leaks — is the classic symptom of an internal master cylinder bypass. The piston cup seals inside the cylinder have worn to the point where they cannot maintain hydraulic pressure under sustained load. Fluid leaks past the seals internally (from the pressure side back to the reservoir side) without ever leaving the cylinder. This is an identical diagnostic principle to a clutch master cylinder internal leak (covered in Exam 6).

31. A — A FLASHING check engine light is the OBD II system's highest-priority alert — it indicates a severe, catalyst-damaging misfire is actively occurring. At highway speed under load, unburned fuel from the misfiring cylinders enters the catalytic converter and ignites, generating temperatures that can exceed 2,000°F and melt the ceramic substrate. The customer should reduce speed and load immediately (lowering fuel demand and exhaust temperature) and drive directly to the shop. Continued full-throttle highway driving risks converter destruction and potential fire.

32. D — This is one of the most sophisticated diagnostic scenarios in the entire series. The old MAF sensor was UNDERREPORTING airflow (reading low). The PCM compensated by adding fuel through positive fuel trim to maintain the target mixture. A vacuum leak was present but hidden because the PCM's compensation for the faulty MAF accidentally covered the lean condition. The new, accurate MAF now correctly measures ALL air entering — including the unmeasured air from the leak — revealing the true total airflow, which is higher than expected. The "new problem" was always there; the old sensor was masking it.

33. D — The window glass moves freely when operated manually (ruling out binding in the channel, regulator, or tracks), confirming the resistance is coming from the motor itself. Going down, gravity assists the motor — the weight of the glass helps pull it downward, requiring less motor torque. Going up, the motor works against gravity and must provide all the lifting force. A motor with worn brushes, a weakened permanent magnet, or a developing commutator fault produces reduced torque that is adequate with gravity's help but insufficient against it.

34. B — Before machining or replacing rotors for runout, the technician should eliminate the most common cause: hub surface contamination. Rust, corrosion, or debris between the rotor hat and the hub mounting flange introduces runout that the rotor itself doesn't inherently have. Removing the rotor, wire-brushing the hub face to bare metal, and reinstalling the rotor in a different rotational position (re-

indexing) on the hub changes the relationship between the rotor and any remaining high spots. This \$0 fix resolves runout in a significant percentage of cases.

35. A — Weather-dependent misfires are the diagnostic fingerprint of deteriorated high-voltage ignition insulation. Spark plug boots, coil boots, and plug wire insulation develop microscopic cracks from heat cycling and age. In dry conditions, the air in these cracks is an adequate insulator. During rain or high humidity, moisture fills the cracks and provides a conductive path — high-voltage ignition energy arcs to the nearest ground through the wet crack instead of jumping the spark plug gap, causing a misfire. The misfires affect random cylinders because the deterioration varies by component.

36. C — Fuel tank top leaks are among the most labor-intensive EVAP repairs because the top of the fuel tank is inaccessible without lowering the tank. Common leak points on the tank top include the fuel pump module O-ring (which seals the pump flange to the tank opening), the fuel sender gasket, EVAP line quick-connect fittings, the rollover valve, and even the tank itself (rust perforation or stress cracks at seams). None of these can be visually inspected, accessed, or repaired without physically lowering the tank to expose the top surface.

37. C — When ALL four cylinders misfire simultaneously, the cause must affect every cylinder equally. Low fuel pressure (starves all injectors), a massive vacuum leak (leans out the entire intake), and contaminated fuel (affects all combustion events) are all systemic causes that touch every cylinder. A single worn camshaft lobe affects only one cylinder's valve operation — it cannot cause the other three cylinders to misfire. This makes it the LEAST likely cause and the correct answer to this elimination question.

38. B — Both low-side and high-side pressures above specification indicate excess heat in the system — the refrigerant cannot adequately transition from high-pressure gas to high-pressure liquid in the condenser. Two conditions produce this pattern: too much refrigerant (overcharge provides excess gas that the condenser cannot condense) or inadequate condenser heat rejection (inoperative fan, blocked fins, extreme ambient temperature). An undercharge would produce both readings BELOW normal, and a compressor failure would produce high low-side and low high-side.

39. A — The technician's job is to diagnose the noise, identify the repair, perform the repair, and provide accurate documentation. Warranty coverage is a contractual matter between the customer and their warranty provider — the technician and shop are NOT parties to that agreement and should NOT make warranty coverage determinations. The customer should submit the shop's documentation (showing the concern, cause, and correction) to their warranty company for reimbursement consideration. Professional boundaries protect both the shop and the customer.

40. D — The scan tool confirms the PCM is commanding TCC engagement — the electronic request side is functioning. The failure is in the execution: the command is being sent but the converter is not locking. This points to the hydraulic or mechanical execution chain: the TCC solenoid may be stuck (not opening to pass apply oil), the solenoid's wiring or connector may have a fault, the TCC apply oil passages inside the transmission may be blocked with debris, or the torque converter's internal clutch friction material may have worn or delaminated.

41. C — The starter motor's Bendix gear is designed to engage the flywheel ring gear ONLY during cranking and then retract once the engine starts. When the driver holds the key in the Start position after the engine fires, the starter's relatively slow-spinning drive gear remains engaged with the now-rapidly-spinning flywheel — a speed mismatch of potentially 10:1. The fast flywheel teeth grind against the slow starter teeth, rapidly destroying both sets of gear teeth. This is operator error, but chronic occurrence requires starter and potentially ring gear replacement.

42. B — A front crankshaft seal (timing cover seal) rides on the smooth machined surface of the harmonic balancer's hub. Over hundreds of thousands of revolutions, the seal lip wears a groove into the balancer surface. When a new seal is installed, its lip sits in this pre-worn groove and cannot create a tight seal — the groove provides a path for oil to migrate past the seal. The balancer surface must be inspected with a fingernail or feeler gauge; if a groove is detectable, a speedi-sleeve (wear sleeve) must be installed over the worn area, or the balancer must be replaced.

43. A — The cabin air filter prevents NEW contaminants from entering the HVAC case, but it cannot kill or remove biological growth that has already colonized the evaporator surface. Mold and mildew thrive on the perpetually damp, dark evaporator fins — the condensation from A/C operation provides ideal growing conditions. An approved antimicrobial spray applied directly to the evaporator core surface (through access ports in the HVAC case) kills the existing colonies. Combined with a clear drain tube, this addresses both the current infection and the moisture conditions that enable regrowth.

44. D — On a V6 engine, the cylinders are physically divided into two banks of three. Cylinders 1, 3, and 5 are typically on one bank while 2, 4, and 6 are on the other (numbering varies by manufacturer). When one entire bank misfires while the other operates normally, the cause is specific to that bank: a leaking intake manifold gasket on that side, a failed coil pack on a waste-spark system that fires that bank's cylinders, a camshaft sensor issue for that bank, or head gasket failure isolated to those three cylinders.

45. C — Limited-slip differentials use friction-based clutch packs to transfer torque between the two axle shafts. During tight turns, the inner and outer wheels must turn at different speeds, and the clutch packs must slip smoothly to accommodate this speed difference. The friction modifier additive in the

differential fluid controls this slip behavior. When the modifier is depleted, the clutch packs grab and release abruptly instead of slipping smoothly, producing the characteristic popping or chattering noise during slow, tight turns. Adding the correct friction modifier to the fluid typically eliminates the noise.

46. B — Stationary steering (dry steering) places the suspension under its maximum combined load: the full vehicle weight compresses all pivot points while the tires scrub against the pavement with maximum friction. Ball joints, strut mounts, control arm bushings, and sway bar bushings are all under extreme stress. When these components' lubrication dries out or their rubber elements deteriorate, the metal-to-rubber or ball-to-socket interface produces a creaking or groaning protest under this heavy loading. The noise often disappears once the vehicle is moving because the load pattern changes.

47. A — An oil pressure warning light that stays on after the engine starts is ALWAYS taken seriously until verified with a mechanical gauge — no exceptions. The sending unit could have failed (giving a false warning), OR the engine could have genuinely low oil pressure that will destroy the bearings within minutes. Since a technician cannot distinguish between a \$15 sender failure and a \$5,000 engine failure based solely on the warning light, the only responsible action is to immediately verify actual pressure with a mechanical gauge. If pressure is normal, replace the sender. If low, investigate the cause.

48. D — A pulsation felt through the steering wheel ONLY during braking is the definitive symptom of front brake rotor surface irregularity — specifically, disc thickness variation (DTV) or lateral runout. As the rotor turns between the pads during braking, uneven surfaces push the pads in and out. This caliper movement transmits through the steering knuckle and tie rods to the steering wheel as a pulsation. The key diagnostic detail is that the pulsation occurs ONLY during braking — not during free-rolling. This confirms the source is the rotor-pad interface, not a wheel balance or suspension issue.

49. C — The propane enrichment test at a suspected vacuum leak is the most precise leak location method available. When propane is sprayed at the exact leak point, it is drawn into the engine through the leak and combusted — temporarily enriching the mixture at that location. The PCM's fuel trim immediately drops (from +18% toward 0%) because the "free" fuel from the propane reduces the lean condition the PCM was compensating for. The STFT response at one specific spray location — and NOT at other locations — pinpoints the leak's exact position on the manifold.

50. B — A single clunk that occurs precisely at the weight-transfer transition point — not during braking itself, not during acceleration itself, but at the MOMENT between them — indicates a component with enough play to shift once when the load direction reverses. Sway bar end links and bushings are the most commonly overlooked source because they may feel tight during a static hands-on inspection yet have just enough play to clunk under the dynamic loading of weight transfer. The sway bar's role in resisting body roll means it is loaded differently during acceleration versus deceleration.

51. A — The coil swap test provides definitive, no-ambiguity diagnosis. The misfire was on cylinder 3. The coil was moved from cylinder 3 to cylinder 1. The misfire FOLLOVED the coil to cylinder 1, and cylinder 3 cleared to zero. The misfire tracks with the coil's physical position — wherever that coil goes, the misfire goes. This is conclusive proof that the coil is faulty. No further testing is needed for this specific fault. Replace the coil that was originally on cylinder 3, and the repair is complete.

52. D — A transmission fluid temperature of 210°F exceeds the 200°F upper limit of the normal operating range. While 210°F is not an emergency shutdown temperature, it is accelerating fluid degradation — the commonly cited rule is that transmission fluid life is halved for every 20°F above 200°F. The technician should identify WHY the temperature is elevated: restricted cooler (debris between the condenser and radiator blocking airflow to the cooler), low fluid level (reduced thermal mass), internal bypass (cooler circuit not flowing), or driving conditions (towing, city driving in extreme heat).

53. C — The vehicle pulls LEFT during braking, meaning the LEFT side has MORE braking force than the right. The left caliper was just replaced and is presumably correct. The RIGHT front hose is the likely culprit — a restricted hose that limits hydraulic pressure to the right caliper during braking creates less force on the right, making the left side dominant. The pull is toward the STRONGER braking side. The vehicle tracks straight when not braking because the alignment and suspension are unaffected by the brake hose restriction.

54. B — A freeze point of -34°F in a climate that reaches -10°F provides 24°F of safety margin — more than adequate. This reading indicates approximately a 50/50 coolant-to-water ratio, which is the optimal balance for all three coolant functions: freeze protection (protects to -34°F), boil-over protection (raises the boiling point to approximately 265°F under system pressure), and heat transfer efficiency (water transfers heat better than pure coolant, so 50/50 provides the best thermal performance). Increasing coolant concentration beyond 70% actually REDUCES freeze protection and heat transfer.

55. A — After 825 questions across 15 exams, the final answer in the entire series is the most fundamental truth in automotive service: the purpose of every diagnostic procedure, every part replacement, every road test, and every line on the work order is to resolve the customer's original complaint. If the customer came in because the engine stalled at idle, the only thing that matters before returning the vehicle is confirming the engine no longer stalls at idle. Everything else supports this single objective. Verify the fix. That is the job.