# PRACTICE EXAM 18: ASE G1 SIMULATION — 55 QUESTIONS

1. A vehicle has a vibration that occurs between 60–70 mph. The technician balances all four tires — the vibration persists. The technician then rotates the tires front to rear — the vibration remains at 60–70 mph and is still felt in the steering wheel. Which of the following can be concluded from these two tests?

A. The vibration is caused by rear tires since it didn't change during rotation

B. The vibration source is NOT the tires — the tires were balanced (eliminating weight imbalance) and rotated (a tire-caused vibration would move from steering wheel to seat/floor if moved to the rear); the vibration remaining in the steering wheel after rotation points to a front-end component that stayed in place: a bent front wheel, worn front suspension component, or driveshaft issue

C. The balance machine was calibrated incorrectly

D. All four tires have an identical force variation that produces the same vibration regardless of position

2. A vehicle's engine has a no-start condition. The technician checks for spark — no spark. The technician checks for injector pulse — no pulse. The technician then checks the crankshaft position sensor signal on an oscilloscope during cranking — there is no CKP signal. Before replacing the CKP sensor, which of the following should the technician verify?

A. The camshaft position sensor, which may be overriding the CKP signal

B. The fuel pump relay, which powers the CKP sensor on some vehicles

C. The spark plug gap, which may be too wide for the available voltage

D. The CKP sensor wiring, connector, and power/ground supply first — the sensor may be functional but not receiving power, or its signal wire may be open/shorted; additionally, the reluctor ring (tone wheel) should be inspected for damage; replacing a sensor without checking its circuit risks installing a good sensor into a bad circuit

3. A customer brings in a vehicle for an oil change. During the service, the technician discovers that the engine oil is severely overfilled — approximately 3 quarts above the full mark. The customer states another shop performed the last oil change. Which of the following is the MOST important action?

A. Drain the excess oil to the correct level and return the vehicle

B. Top off the oil to the maximum mark since it was recently changed

C. Drain the oil to the correct level AND inspect for damage caused by the overfill condition — check for oil fouling on the spark plugs (oil forced past rings by crankshaft windage), inspect the catalytic converter for contamination, verify the PCV system is not overwhelmed, and check for new oil leaks at seals that may have been stressed by the excessive crankcase pressure

D. Leave the oil level as-is since the other shop is responsible for the fill level

4. A vehicle's scan tool shows the following data during a road test: at 55 mph steady cruise, STFT is +2% and LTFT is +4%. When the driver presses the accelerator for a passing maneuver, STFT immediately spikes to +22% for 3 seconds and then returns to +2%. What does the brief STFT spike during acceleration indicate?

A. A momentary lean condition during the transition from cruise to acceleration — the fuel system briefly cannot deliver enough fuel to match the sudden increase in airflow; possible causes include a weak fuel pump losing pressure under high demand, a partially clogged fuel filter restricting flow during peak demand, or a MAF sensor that underreads during rapid airflow changes

B. Normal fuel system behavior during throttle transitions

C. An oxygen sensor that is slow to respond to the mixture change

D. The PCM's acceleration enrichment strategy adding extra fuel for performance

5. A vehicle's brakes produce a grinding noise from one front wheel. The technician inspects and finds the pad friction material is completely worn, and the steel backing plate has grooved deeply into the rotor. The rotor is below discard thickness. The caliper piston boot is torn and the piston is seized in the extended position. Which of the following represents the complete repair scope?

A. Replace the pads and rotor on the affected side only

B. Replace the pads and rotors on BOTH front wheels, rebuild or replace the seized caliper, replace the caliper piston boot and seals, replace the brake hose on the affected side (heat damage from the seized caliper), bleed the brake system, and inspect the brake fluid for contamination from overheating — the opposite-side caliper should also be inspected since both calipers are the same age and the other may be developing the same seizure

C. Replace only the worn pads and machine the rotor to restore the friction surface

D. Replace the caliper only since the pads and rotor are not the root cause

6. A vehicle's engine has a P0300 (Random Misfire) code. The technician checks fuel pressure — within spec. Checks all coils — within spec. Checks all spark plugs — within spec. Performs a compression test — all cylinders within 10% of each other. What should the technician investigate NEXT?

A. Replace the spark plugs anyway since they may have intermittent faults not detected by testing

B. Replace the fuel pump since the pressure test may not capture brief dropouts

C. Perform a combustion leak test to check for head gasket integrity

D. Investigate causes that affect ALL cylinders equally but were not yet tested: vacuum leaks (smoke test), exhaust restrictions (backpressure test), EGR valve stuck partially open, contaminated fuel (water or excessive alcohol), or a MAF/MAP sensor that reads correctly at steady state but responds inaccurately during transient conditions

7. A vehicle's engine starts and runs for 3 seconds, then stalls. It restarts and stalls again — always after exactly 3 seconds. There are no DTCs stored. The security/theft indicator light is NOT flashing. Which of the following is the MOST likely cause?

A. A faulty crankshaft position sensor that loses signal after initial rotation

B. A fuel pump that can only build pressure during initial prime but cannot sustain it

C. A faulty fuel pump relay or oil pressure switch that provides power only during the initial 2–3 second prime cycle but does not continue powering the pump during running — many vehicles use a PCM-controlled relay that primes the pump for 2–3 seconds at key-on, then relies on a confirmed CKP signal

or oil pressure switch to maintain pump operation; if the transfer fails, the pump shuts off after the prime cycle ends

D. A stuck-closed throttle body that only allows enough air for 3 seconds of operation

8. A customer complains that the vehicle's heater works on the driver's side but blows cold air on the passenger side. The vehicle has dual-zone climate control. Engine temperature is normal. Which of the following is the MOST likely cause?

A. The passenger-side blend door actuator has failed — dual-zone systems use independent blend doors for each side, controlled by separate actuators; if the passenger actuator fails in the cold position, the driver's side operates normally while the passenger receives only cooled or ambient air regardless of the temperature setting

B. The heater core has a blockage that only affects half of its internal passages

C. The coolant is flowing through only one half of the heater core due to a partial thermostat opening

D. The blower motor speed is too low to push heated air to the passenger vents

9. A vehicle's transmission has a check engine light with P0700 (Transmission Control System Malfunction). The scan tool also shows P0730 (Incorrect Gear Ratio) stored in the transmission module. The vehicle drives normally with no noticeable shift problems. Which of the following is the correct action?

A. Clear the codes and return the vehicle since no symptoms are present

B. Replace the transmission fluid and filter to address potential internal contamination

C. Ignore the codes since the vehicle drives normally

D. Diagnose the P0730 code despite the absence of symptoms — a gear ratio code means the PCM detected a discrepancy between expected and actual gear ratios, which could indicate a slipping clutch pack, a failing speed sensor, or early-stage internal wear that hasn't progressed to noticeable symptoms; early detection and repair can prevent a minor issue from becoming a major failure

10. A vehicle's engine has a ticking noise that the customer describes as sounding like "a sewing machine." The noise tracks with engine RPM and is consistent whether the engine is hot or cold. Using a stethoscope, the technician isolates the noise to the fuel injector rail area. Which of the following is the correct conclusion?

A. The fuel injectors are clogged and making excessive noise trying to deliver fuel

B. The noise is the normal operational sound of the fuel injectors — solenoid-type injectors produce a clicking/ticking sound as the pintle opens and closes at each firing event; this "sewing machine" clicking at the injector rail is characteristic of normal injector operation and is not a fault

C. The fuel rail has a loose mounting bolt that vibrates at engine speed

D. The fuel pressure regulator has a ruptured diaphragm that allows fuel pulses to be heard

11. A vehicle's front end makes a creaking noise when going over speed bumps at very low speed. The noise occurs on both sides. All ball joints, tie rod ends, and sway bar links pass inspection with no detectable play. Which of the following is the MOST likely cause?

A. Dry or deteriorated control arm bushings, strut mount bushings, or sway bar bushings — rubber bushings can deteriorate and lose lubrication without developing measurable play; they produce a creaking or groaning noise under slow, heavy compression loading (like a speed bump) but may feel tight during a static hands-on inspection because the rubber has not yet torn or separated from its shell

B. A cracked subframe that flexes over bumps

C. Worn front wheel bearings that creak under vertical loading

D. Loose body mount bolts that allow the body to flex on the frame

12. A vehicle's automatic transmission shifts normally through all gears during the first 30 minutes of driving. After 30 minutes, the transmission begins slipping in 2nd and 4th gears. Parking the vehicle and letting it cool for 1 hour restores normal operation. Which of the following is the MOST likely cause?

A. A faulty shift solenoid that overheats and loses magnetic force after extended operation

B. The torque converter lockup clutch is engaging prematurely when hot

C. An overheating condition caused by a restricted transmission cooler that reduces fluid cooling capacity

D. Internal clutch pack seals that harden with age and lose their sealing ability when hot — when cool, the seals are pliable enough to hold pressure; as the transmission reaches full operating temperature after 30 minutes, the hardened seals shrink or lose flexibility, allowing hydraulic pressure to bypass and the specific clutch packs for 2nd and 4th gears to slip

13. A vehicle has an engine oil leak at the valve cover gasket that was replaced 6 months ago. The technician removes the valve cover and finds the gasket is in good condition with no visible compression set or damage. The mating surfaces are clean and flat. Which of the following is the MOST likely cause of the recurring leak?

A. Excessive crankcase pressure from a restricted PCV system is overwhelming the gasket seal — the gasket is physically intact but the internal pressure exceeds the gasket's designed sealing capacity; fixing the PCV restriction eliminates the pressure that is forcing oil past the undamaged gasket

B. The valve cover bolts were not torqued to specification

C. The gasket material is incompatible with the engine oil type

D. The engine oil is overfilled, creating excess pressure at the valve cover

14. A vehicle's cooling fan does not activate. The technician jumps the fan relay and the fan runs. The technician then checks the ECT sensor reading on the scan tool — it shows 230°F (the engine is clearly overheating). The fan activation threshold is 220°F. Which of the following should the technician investigate?

A. The ECT sensor, which may be reading higher than actual temperature

B. The PCM's fan control output — the scan tool confirms the ECT exceeds the fan activation threshold, and the relay test confirms the fan and relay are functional; the missing link is the PCM's command to the relay; the PCM may have a failed driver output, an open wire between the PCM and the relay control coil, or a faulty relay ground circuit that prevents the PCM from energizing the relay

C. The radiator cap for excessive pressure preventing coolant circulation

D. The water pump for insufficient flow causing localized overheating at the sensor

15. A vehicle's tires show a wear pattern with smooth, bald patches alternating with unworn areas around the circumference — a pattern called "cupping" or "scalloping." The tires are properly inflated and alignment is within specification. Which of the following is the MOST likely cause?

A. Aggressive driving habits causing excessive tire spin

B. Tire manufacturing defect creating inconsistent tread rubber hardness

C. Worn shock absorbers or struts that cannot control the wheel's vertical oscillation — the wheel bounces on its suspension, and each bounce lifts the tire momentarily off the road; when it contacts the road again, the tire scrubs a flat spot; this bounce-scrub cycle repeats around the tire's circumference, creating the characteristic alternating cupped pattern

D. Incorrect wheel bearing preload allowing the wheel to wobble during rotation

16. A vehicle equipped with a turbocharger has a blue smoke from the exhaust under boost. No smoke is present at idle or during deceleration. Oil consumption is elevated. Which of the following is the MOST likely cause?

A. The turbocharger's compressor-side oil seal has failed, allowing engine oil (which lubricates the turbo bearing) to be pushed into the compressor housing under boost pressure — the oil is then drawn into the intake and burned during combustion; the smoke appears only under boost because the positive pressure on the compressor side forces oil past the compromised seal

B. Worn piston rings that leak oil under the high cylinder pressures of boosted operation

C. A PCV valve stuck open that is drawing excess oil mist into the intake during boost

D. A leaking intercooler that has accumulated oil from normal turbo operation

17. A vehicle's engine starts but dies immediately when the brake pedal is pressed. The engine restarts and runs normally as long as the brake pedal is not pressed. Which of the following is the MOST likely cause?

A. A faulty brake booster that is not providing adequate assist when the pedal is pressed

B. The brake light switch is shorted and sending a kill signal to the PCM

C. A sticking brake caliper that creates excessive engine load when the brakes are applied

D. A massive vacuum leak in the brake booster — pressing the pedal opens the booster's internal valve, and if the booster diaphragm is ruptured or the rear shell is cracked, pressing the pedal suddenly introduces a massive unmetered air leak into the intake manifold through the vacuum hose; the sudden lean condition overwhelms the PCM's ability to compensate and the engine stalls instantly

18. A vehicle's rear shock absorbers have been replaced. After replacement, the customer complains that the rear of the vehicle bounces more than before. The new shocks are the correct part number. Which of the following is the MOST likely cause?

A. The new shocks need a 500-mile break-in period before they dampen properly

B. The new shocks were shipped with internal air instead of being fully charged with gas/oil — some replacement shock absorbers must be primed (cycled through their full stroke several times with the shock held upright) before installation to purge trapped air from the internal chambers; an unprimed shock provides little to no damping until the air is expelled

C. The rear springs are worn and the new shocks have revealed a pre-existing spring weakness

D. The new shocks have a different valving than the originals and should be replaced with a softer rating

19. A vehicle's power steering pump makes a loud whining noise immediately after the engine is started. The noise diminishes after 30 seconds. The fluid level is correct. Which of the following is the MOST likely cause?

A. The power steering pump bearings are worn and need replacement

B. The serpentine belt is slipping on the power steering pump pulley during cold startup

C. Air trapped in the system from sitting overnight is being pumped through the system — the pump cavitates as it tries to compress the air/fluid mixture until the circulating fluid re-absorbs the air and flow normalizes; this 30-second noise is common and typically benign unless it persists beyond warm-up

D. The power steering fluid is the wrong type and creates excessive foam when cold

20. A vehicle's engine has an intermittent check engine light that illuminates for several drive cycles and then turns off for several drive cycles. The DTC is P0420 (Catalyst Efficiency Below Threshold). The light cycling on and off suggests which of the following?

A. The catalytic converter is operating at the borderline of the OBD II efficiency threshold — its oxygen storage capacity fluctuates based on driving conditions (speed, load, temperature); under some conditions it passes the monitor, and under others it marginally fails; this borderline behavior produces the intermittent MIL pattern and indicates the converter is deteriorating but has not yet completely failed

B. The upstream O2 sensor is failing intermittently

C. The exhaust system has an intermittent leak that only occurs at certain temperatures

D. The PCM's catalyst monitor is malfunctioning and running inconsistently

21. A customer asks why the vehicle's automatic transmission has a "learning" or "adaptive" process. Which of the following is the correct explanation?

A. The transmission learns the driver's personality and adjusts shift aggressiveness to match

B. The adaptive process calibrates the speedometer to the transmission's gear ratios

C. Adaptive learning allows the transmission to function without electronic control during an ECU failure

D. As transmission clutch packs wear over time, the hydraulic apply timing must be adjusted to maintain consistent shift quality — the TCM monitors the time between commanded shift and actual gear engagement; as clutch material wears and engagement time increases, the TCM adapts by commanding the shift solenoids slightly earlier or with more pressure to compensate for the wear; this continuous adjustment maintains smooth shifts throughout the transmission's life

22. A vehicle's engine runs rough and has a P0301 (Cylinder 1 Misfire). The technician performs a swap test: moves the coil from cylinder 1 to cylinder 3, and moves the plug from cylinder 1 to cylinder 4. After clearing codes and running the engine, the misfire stays on cylinder 1. What does this eliminate and what remains?

A. This eliminates the coil, plug, and PCM driver — the fuel injector, compression, or a cylinder-specific vacuum leak is the remaining suspect

B. This eliminates the coil and plug — the fuel injector, compression, PCM driver circuit, and cylinder-specific issues remain as suspects since the swap test only tracked the coil and plug, not the injector or the wiring

C. This eliminates only the spark plug

D. This eliminates only the ignition coil

23. A vehicle has a clunking noise from the front when the brakes are applied gently at low speed. The noise occurs once per stop — a single clunk at the moment braking begins. Suspension and steering components are tight. Which of the following is the MOST likely cause?

A. A warped brake rotor that grabs once per revolution

B. A worn wheel bearing that shifts under braking load

C. A loose brake caliper bracket bolt or worn caliper bracket bushing that allows the caliper assembly to shift when the pads contact the rotor — the caliper "rocks" into its loaded position as braking force is applied, producing a single clunk at the moment of pad-to-rotor contact

D. An ABS module that is prematurely activating during initial braking

24. A vehicle's engine has a hesitation on acceleration that occurs only when the A/C is turned on AND the engine is under load (climbing a hill). Without A/C, there is no hesitation. At idle with A/C on, the engine runs normally. Which of the following is the MOST likely cause?

A. The engine is marginally lean under load, and the additional parasitic drag of the A/C compressor pushes the already-stressed engine past its compensation limit — the PCM cannot simultaneously

deliver enough fuel for the high-load demand AND compensate for the compressor's mechanical load; possible underlying causes include a marginally weak fuel pump, a partially restricted fuel filter, or a MAF sensor that slightly underreads at high airflow

B. The A/C compressor clutch is slipping and creating a vibration the driver interprets as hesitation

C. The A/C high-pressure switch is intermittently disengaging the compressor during load

D. The evaporator is icing over and restricting airflow to the engine during hill climbing

25. Technician A says that when replacing an oxygen sensor, anti-seize compound should be applied to the threads. Technician B says that most replacement oxygen sensors come with anti-seize already applied to the threads and adding more can contaminate the sensor element. Who is correct?

A. Technician A only

B. Technician B only — most quality replacement O2 sensors have anti-seize pre-applied to their threads at the factory; adding additional compound risks getting it on the sensor's tip, where it can contaminate the sensing element and cause inaccurate readings or premature sensor failure; if the sensor does not come pre-treated, only a small amount of the correct anti-seize should be applied to the threads, avoiding contact with the sensor tip

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

26. A vehicle's engine runs normally but the oil pressure gauge reads much higher than normal at all RPM. Oil level is correct. The oil was changed recently with the correct specification oil. Which of the following should the technician investigate?

A. The oil pump, which may be producing excessive pressure

B. The oil filter, which may be restricting flow and creating backpressure

C. The crankshaft bearings, which may have been replaced with undersized bearings during a previous rebuild

D. The oil pressure sending unit or gauge — before investigating expensive internal engine components, the technician should verify the gauge reading with a mechanical gauge installed directly in the oil gallery; a faulty sending unit, corroded connector, or gauge fault can produce a falsely high reading; mechanical verification determines whether the pressure is actually high or the gauge is lying

27. A vehicle has a fuel odor inside the cabin. The technician inspects the fuel system and finds no visible leaks from any fuel line, connection, or component. The EVAP system has no codes. Which of the following should the technician check NEXT?

A. The charcoal canister for saturation from liquid fuel overfilling

B. The fuel injector O-rings for slow seepage onto hot engine surfaces

C. The fuel tank top — specifically the fuel pump module O-ring, the fuel level sender gasket, and the EVAP line connections at the top of the tank; fuel vapor from even a minor seal seepage at the tank top can migrate along the underside of the vehicle and enter the cabin through the HVAC fresh air intake, trunk seal gaps, or rear seat pass-through without producing visible liquid fuel on the ground

D. The exhaust system for a rich exhaust condition that smells like fuel

28. A vehicle's engine stalls when the headlights are turned on while the engine is idling. Turning the headlights off allows the engine to restart and idle normally. Which of the following is the MOST likely cause?

A. The headlight circuit has a grounding fault that is sharing a ground path with the engine control module or a critical sensor — when the headlights draw current through the faulty ground, the resulting voltage drop disrupts the ground reference for the PCM or a sensor (such as the CKP or MAP), causing the PCM to lose its operating reference and the engine to stall

B. The alternator is overloading the engine with the additional headlight electrical demand

C. The battery is severely weak and cannot supply power to both the headlights and the ignition system simultaneously

D. The headlight switch has an internal short that sends voltage into the engine management circuit

29. A vehicle's cooling system has been flushed and refilled. The technician verifies the level is correct and the system has been bled of air. Two days later, the customer returns with an overheating complaint. The coolant level is now 1 quart low. There are no visible external leaks. Which of the following is the MOST likely explanation?

A. Residual trapped air that was not fully purged during the initial bleed has worked its way out over 2 days of driving — the air pocket displaced coolant volume that was previously counted as "full"; as the air migrated to the radiator cap and was vented, the actual coolant volume dropped below the minimum needed for proper cooling; the system needs to be topped off and re-bled, and monitored for further loss

B. The new coolant has a different specific gravity than the old coolant and occupies less volume

C. The radiator cap is releasing pressure too easily and venting coolant to the overflow

D. The head gasket is leaking and coolant is entering the combustion chamber

30. A vehicle's engine produces a whining noise that increases with engine RPM. The noise is present with the serpentine belt installed and disappears when the belt is removed. The technician spins each pulley by hand with the belt removed. The alternator pulley feels smooth, but the technician notices the alternator pulley spins freely in one direction and locks in the other. Which of the following is the correct interpretation?

A. The alternator has a failed bearing and must be replaced

B. The alternator pulley is defective and must be replaced immediately

C. The alternator's internal diodes have failed and are creating a mechanical braking effect

D. The alternator has an overrunning alternator decoupler (OAD) pulley — the one-way clutch design is NORMAL; it spins freely in one direction and locks in the other; the whining noise is NOT from the OAD mechanism but from the alternator's internal bearings, which produce the noise only when the belt drives the alternator; the alternator (not just the pulley) needs replacement for the bearing noise

31. A vehicle's engine has been diagnosed with a head gasket leak between the cylinder and the coolant jacket on cylinder 3. The MLR technician has confirmed the diagnosis through a combustion gas test and leak-down test. Which of the following is the correct action for the MLR technician?

A. Proceed with the head gasket replacement since the diagnosis is complete

B. Apply a chemical head gasket sealer as a permanent repair

C. Document the diagnostic findings thoroughly, explain the confirmed diagnosis to the customer, and refer the internal engine repair (head gasket replacement) to an A1 (Engine Repair) certified technician — the diagnosis is within MLR scope but the repair requires head removal and internal engine work that is outside G1 scope

D. Remove the cylinder head for visual inspection before referring the repair

32. A vehicle's brake pedal feels firm at the top but has a soft, spongy zone in the middle of its travel before becoming firm again near the bottom. Brake fluid is at the correct level and there are no external leaks. Which of the following is the MOST likely cause?

A. Air trapped in one section of the brake hydraulic system — the firm-spongy-firm pedal feel indicates a pocket of air in one specific circuit (typically the circuit with the longest line run or the ABS modulator); the first firm zone compresses the air-free portion of the system; the spongy zone is the air pocket compressing; the second firm zone is the compressed air finally transmitting force to the remaining fluid

B. A faulty master cylinder with a partial internal bypass

C. A weak brake booster that provides inconsistent assist through the pedal stroke

D. Worn brake pads that have uneven thickness across their surface

33. A vehicle's engine has a P0101 (MAF Circuit Range/Performance) code. The technician checks the air intake system and finds that an aftermarket cold air intake was installed with a section of flexible accordion-style tubing. The tubing has a small tear on one of the accordion folds. Which of the following BEST explains how this tear causes the P0101?

A. The torn tubing allows hot engine compartment air to enter the intake, raising the IAT reading

B. The tear creates turbulent airflow that damages the MAF sensing element

C. The flexible tubing is the wrong diameter and restricts airflow to the MAF sensor

D. The tear in the tubing AFTER the MAF sensor allows unmetered air to enter the intake — the MAF measures airflow passing through its sensing element, but the torn tubing provides an alternate path for air that bypasses the sensor; the PCM detects a discrepancy between the MAF reading and other inputs (RPM, MAP, throttle position) and sets the range/performance code

34. A vehicle's A/C system blows cold air from the vents, but there is a constant dripping sound from behind the dashboard on the passenger side. The carpet is damp. The coolant level is stable and there is no sweet smell. Which of the following is the MOST likely cause?

A. A leaking heater core that is dripping water only, not coolant

B. A clogged evaporator condensate drain tube — the A/C system is working (cold air confirms the evaporator is cold and condensing moisture from the air as designed); the condensation that should drain externally through the drain tube is instead backing up inside the HVAC case and overflowing onto the passenger floor; the dripping sound is water inside the case

C. The evaporator core is leaking refrigerant that liquefies and drips inside the case

D. The windshield seal is leaking and water is running down behind the dashboard

35. A vehicle has a P0456 (EVAP Very Small Leak) that was diagnosed with a smoke test showing smoke escaping from the gas cap area. The technician replaced the gas cap with a new OEM cap. The code returned after one drive cycle. Which of the following should the technician investigate NEXT?

A. The EVAP canister for internal cracks

B. The purge solenoid for a stuck-open condition

C. The filler neck itself — the sealing surface where the gas cap seats may be corroded, pitted, or damaged; a new cap cannot seal against a deteriorated filler neck surface; the technician should inspect the filler neck's sealing rim for corrosion, scratches, dents, or warping that prevents the new cap from making a complete seal

D. The fuel tank pressure sensor for a calibration error

36. A vehicle's engine has a steady check engine light with a P0340 (CMP Sensor Circuit). The engine starts and runs but has rough idle and reduced power. The technician replaces the CMP sensor. The code clears and does not return for 3 weeks, then comes back. Which of the following is the MOST likely cause of the delayed code return?

A. The new sensor has an intermittent internal fault that takes time to manifest

B. The CMP sensor reluctor ring (tone wheel) has a crack that widens with heat cycling over weeks of driving until it produces a signal dropout large enough for the PCM to detect — the new sensor reads the same cracked reluctor; the gradual crack progression explains the delayed code return

C. The PCM requires a relearn after CMP sensor replacement that was not performed

D. The replacement sensor is a different brand with slightly different signal characteristics

37. A vehicle's front brakes have been serviced with new pads and rotors. During the post-repair road test, the technician notices the steering pulls slightly to the right during braking. All brake components are confirmed correctly installed. Which of the following should the technician check?

A. The replacement rotors for a manufacturing defect causing unequal friction surfaces

B. The new brake pads for mixed friction compounds between the left and right sides

C. The wheel alignment, which may have a pre-existing caster or camber imbalance exposed by the new brake components

D. The brake hoses on BOTH front wheels — a partially restricted left front brake hose that limits flow to the left caliper during braking, or a partially restricted right front hose that prevents the right caliper from releasing fully (acting as a check valve), creates unequal braking force that manifests as a pull; the new pads and rotors did not cause the pull — they simply changed the brake system's behavior enough to make a pre-existing hose restriction noticeable

---

38. A vehicle's engine has a tapping noise from the upper engine that disappears when the engine oil is cold and gets progressively louder as the engine warms to operating temperature. This is the OPPOSITE of the typical cold-start lifter tick. Which of the following is the MOST likely cause?

A. A collapsed hydraulic lifter that pumps up with cold, thick oil but bleeds down with hot, thin oil

B. A worn cam lobe or lifter that maintains adequate clearance when cold (thermal contraction keeps components tight) but develops excessive lash as the components expand unevenly with heat — the expanding camshaft, lifter, or rocker arm creates a gap that produces the tapping noise when hot

C. A cracked exhaust manifold that opens as the manifold expands with heat

D. A loose timing chain guide that vibrates more as the oil thins and loses its dampening effect

39. A vehicle's scan tool shows an EVAP system "Large Leak" code. The technician performs a smoke test and immediately sees heavy smoke pouring from under the vehicle near the charcoal canister. Closer inspection reveals the canister has a large crack in its housing. Which of the following should the technician consider about the canister failure?

A. The canister cracked from normal age-related material degradation

B. The canister was damaged by road debris impact

C. The canister may have cracked due to liquid fuel flooding caused by fuel overfilling or a purge valve stuck open — before simply replacing the cracked canister, the technician should investigate WHY it cracked; if the canister was saturated with liquid fuel (from overfilling the tank to the cap or from a purge valve flooding liquid fuel into the canister), the replacement canister will suffer the same fate unless the root cause is corrected

D. The EVAP vent solenoid created excessive pressure that burst the canister housing

40. A vehicle has four DTCs stored: P0300 (Random Misfire), P0171 (System Too Lean — Bank 1), P0174 (System Too Lean — Bank 2), and P0101 (MAF Circuit Range/Performance). Which of the following is the MOST efficient diagnostic approach?

A. Diagnose the P0101 (MAF) code FIRST — a MAF sensor that is underreporting airflow causes the PCM to deliver less fuel than the engine needs, creating lean conditions on BOTH banks (explaining P0171 and P0174); the lean mixture causes incomplete combustion across all cylinders (explaining P0300); fixing the MAF issue may resolve all four codes simultaneously because it is the likely root cause of the entire symptom chain

B. Diagnose each code independently starting with P0300

C. Replace the O2 sensors on both banks since lean codes usually indicate O2 sensor failure

D. Perform a fuel system cleaning since multiple lean codes suggest dirty injectors

41. A vehicle's automatic locking retractor (ALR) seat belt does not lock when pulled sharply. The belt extends and retracts smoothly but does not lock during sudden deceleration or quick pull. Which of the following is the correct action?

A. The seat belt functions normally — it does not need to lock during a manual pull test

B. Recommend replacing the seat belt only if the customer requests it

C. Report the finding but take no action since the belt still restrains the occupant

D. The seat belt retractor has a failed inertia locking mechanism and must be replaced — the ALR/ELR mechanism is designed to lock during sudden deceleration (collision or emergency braking) or when pulled sharply; failure to lock means the belt will not restrain the occupant in a crash; this is a critical safety defect that requires immediate replacement

42. A vehicle's engine has been running progressively rougher over 2,000 miles. The scan tool shows gradually increasing positive fuel trim on both banks (now at +12% LTFT). No single event triggered the roughness — it has been a slow decline. Which of the following is the MOST likely cause of this gradual deterioration?

A. A sudden vacuum leak that worsened over 2,000 miles

B. A gradually deteriorating component — the most common cause of slow, progressive lean drift on both banks is a MAF sensor element that is progressively accumulating contamination (oil mist from the PCV system, dust past a poorly sealed air filter, or environmental buildup); as the contamination layer

thickens over thousands of miles, the sensor underreads airflow by an increasing amount, causing the PCM to progressively lean out the mixture

C. A fuel pump that is gradually losing pressure over 2,000 miles

D. Both oxygen sensors aging at exactly the same rate

43. A vehicle's engine temperature gauge shows a rapid rise to hot within 5 minutes of driving but the engine does not actually overheat — the upper radiator hose is warm, the heater blows warm air, and there is no boiling or steam. Which of the following is the MOST likely cause?

A. A faulty water pump impeller that is not circulating coolant adequately

B. An internal head gasket leak pressurizing the cooling system

C. A faulty engine coolant temperature sensor for the dashboard gauge (or a wiring fault in its circuit) that is reading higher than actual temperature — the engine is at normal temperature (confirmed by warm hose and adequate heater output), but the gauge sensor or its circuit is producing an exaggerated reading; the PCM's separate ECT sensor may be reading correctly, which is why no DTCs or overheating symptoms are present

D. A thermostat stuck partially closed, restricting flow but not completely blocking it

44. A vehicle's power windows all operate normally, but the auto-down feature on the driver's window no longer works — the window goes down only while the switch is held, and does not continue automatically when the switch is tapped. The auto-up feature still works normally. Which of the following is the MOST likely cause?

A. The window auto-down feature requires a relearn procedure — many vehicles need the auto-up/down feature to be recalibrated after a battery disconnect, window motor replacement, or window regulator service; the relearn typically involves holding the switch in the full-down position for several seconds after the window reaches the bottom, then holding it in the full-up position for several seconds after reaching the top

B. The driver's door window switch has a faulty auto-down contact

C. The window motor has lost its position sensor calibration

D. The BCM has disabled the auto-down feature due to an obstacle detection fault

45. A vehicle has a check engine light with P0430 (Catalyst Efficiency Below Threshold — Bank 2). The technician uses a two-channel oscilloscope to simultaneously display the upstream and downstream O2 sensors on Bank 2. The upstream switches normally. The downstream shows switching that closely follows the upstream pattern. The technician then checks Bank 1 — the upstream switches normally and the downstream shows a nearly flat line. Which of the following is confirmed?

A. Both catalytic converters have failed

B. Both O2 sensors on Bank 2 are faulty

C. The Bank 1 downstream sensor is stuck and needs replacement

D. The Bank 2 catalytic converter has failed (downstream mirrors upstream = no oxygen buffering), while the Bank 1 converter is operating normally (downstream is flat = good oxygen storage) — the side-by-side comparison between the good bank and the bad bank provides definitive diagnostic evidence by showing what a healthy converter pattern looks like on the same vehicle

46. A vehicle's engine has a P0016 (CKP-CMP Correlation, Bank 1). The technician checks the engine oil level and finds it is 2 quarts low. Which of the following explains why low oil could cause this code on a VVT-equipped engine?

A. Low oil level causes the oil pump to cavitate, reducing flow to the main bearings

B. Low oil is unlikely to cause a CKP-CMP correlation code

C. Low oil affects only the lifter operation, not the camshaft phaser position

D. The VVT camshaft phasers are hydraulically actuated by oil pressure — with the oil level 2 quarts low, the oil pump may intermittently lose prime or fail to maintain adequate pressure to the phasers, especially during hard cornering, acceleration, or deceleration when oil shifts in the pan; the phaser cannot maintain its commanded position, and the CMP signal drifts out of correlation with the CKP signal

47. A customer complains that the vehicle "doesn't feel right" after a recent tire replacement. All four tires are new, correct size, correct pressure, and properly balanced. The vehicle tracks straight and has no vibration. The customer cannot describe the problem more specifically than "it feels different." Which of the following is the MOST likely explanation?

A. The wheel alignment was disturbed during the tire installation

B. The new tires are defective and should be returned

C. New tires have significantly different ride, handling, and noise characteristics compared to the worn tires they replaced — full tread depth changes the tire's contact patch shape, sidewall stiffness, road noise frequency, and steering response; the customer has adapted to the worn tires' characteristics over thousands of miles and the new tires simply feel different; this is normal and the customer will re-adapt within a few hundred miles

D. The tire mounting machine damaged the wheel rims during installation

48. A vehicle's brake master cylinder has been replaced. The technician bench-bled the master cylinder before installation, bled all four wheels using the correct sequence, and achieved a firm pedal. During the road test, the ABS light illuminates. Which of the following is the MOST likely cause?

A. Air remains trapped in the ABS hydraulic modulator — standard four-wheel bleeding does not cycle fluid through the internal solenoid valves and passages of the ABS modulator; some ABS systems require a scan tool to command the ABS solenoids open during the bleed procedure to purge trapped air from inside the modulator; the ABS light illuminates because the module detects abnormal pedal response or pressure characteristics from the trapped air

B. The replacement master cylinder is incompatible with the ABS system

C. The master cylinder pushrod length is incorrect for the brake booster

D. The brake fluid level sensor in the new master cylinder cap is defective

49. A vehicle has a clunking noise from the rear when accelerating from a stop. The noise also occurs during the transition from acceleration to deceleration. The technician suspects the rear differential. Which of the following tests would BEST confirm the rear differential as the noise source?

A. Raise the rear of the vehicle, remove both rear wheels, and rotate the driveshaft by hand while listening at the differential — if the clunk is reproduced during direction changes of the driveshaft, the noise is confirmed inside the differential (excessive ring and pinion backlash, worn side gears, or worn spider gears)

B. Check the differential fluid level and condition — if the fluid is low, the gears are making noise due to inadequate lubrication and a simple refill will resolve the clunk

C. Inspect the rear shock absorbers for worn bushings that clunk during weight transfer

D. Check the rear sway bar end links for play

50. A vehicle's engine has been diagnosed with worn valve stem seals on multiple cylinders. The customer asks whether the seals can be replaced without removing the cylinder head. Which of the following is correct?

A. Valve stem seals always require head removal for replacement

B. On many engines, valve stem seals CAN be replaced without removing the cylinder head — a special tool introduces compressed air into the cylinder through the spark plug hole to hold the valve closed while the valve spring is compressed and the seal is replaced; this technique saves significant labor compared to head removal but requires the technician to have the proper pneumatic valve spring compressor and airline adapter

C. Valve stem seals are permanently molded onto the valve guide and cannot be individually replaced

D. Valve stem seals are only replaceable on overhead-valve engines, not overhead-cam engines

51. A vehicle's engine oil appears milky on the dipstick. The customer states the vehicle is only driven 3 miles to work and 3 miles home, five days a week, for the past 6 months. There is no coolant loss and the cooling system pressure test holds. Which of the following is the MOST likely cause?

A. A head gasket leak that is just beginning and has not yet progressed to measurable coolant loss

B. A cracked engine block that allows a micro-leak of coolant into the oil

C. Moisture condensation from chronic short-trip driving — the engine never reaches full operating temperature during the 3-mile commute, so the combustion-produced water vapor that condenses inside

the engine cannot be evaporated and driven out through the PCV system; over 6 months, this accumulated moisture emulsifies with the oil and creates the milky appearance without any coolant leak

D. The oil was contaminated with coolant during the last oil change

---

52. A vehicle's engine has a P0401 (EGR Flow Insufficient) code. The technician replaces the EGR valve. The code returns within one drive cycle. The technician then cleans the EGR passages in the intake manifold. The code still returns. Which of the following should the technician investigate NEXT?

A. The EGR system's MONITORING sensor and its circuit — the EGR valve works and the passages are clean, but the sensor that TELLS the PCM whether adequate flow is occurring (DPFE sensor, EGR temperature sensor, or position feedback sensor) may be faulty or its sensing passages may still be restricted; the PCM sets P0401 because its MONITORING system reports insufficient flow, even if actual flow is adequate

B. The exhaust manifold for a restriction that prevents exhaust gas from reaching the EGR valve

C. The catalytic converter for excessive backpressure that interferes with EGR operation

D. The intake manifold gasket for a leak near the EGR port

53. A vehicle has been brought in for a second opinion on a transmission replacement recommendation from another shop. The customer states the transmission "sometimes slips in 3rd gear when it's hot." The technician's initial scan reveals no stored DTCs. Which of the following is the correct diagnostic approach BEFORE agreeing with the first shop's recommendation?

A. Agree with the previous shop since they already diagnosed the vehicle

B. Tell the customer the transmission is fine since there are no codes

C. Recommend a transmission fluid flush as a first step without diagnosis

D. Perform an independent, thorough diagnosis: verify the fluid level, condition, and specification; road test the vehicle until it reaches full operating temperature and attempt to reproduce the slip in 3rd gear;

monitor transmission PIDs (line pressure, gear ratio, slip percentage, fluid temperature) during the slip event; check for TSBs that may address the complaint with a software update or minor repair — a complete diagnosis may reveal a $200 solenoid replacement or software update rather than a $4,000 transmission rebuild

54. A vehicle's engine has a steady ticking noise from the top of the engine. The technician removes the oil filler cap and the ticking gets noticeably louder. Which of the following does this confirm about the noise source?

A. Removing the cap does not help diagnose internal engine noises

B. The noise is coming from INSIDE the valve cover area — removing the cap removes the acoustic barrier between the technician's ear and the valve train; the noise getting louder confirms it originates from the valve train (camshaft, lifters, rocker arms, valve springs) rather than from external sources like the exhaust manifold, timing cover, or accessories

C. The PCV system is creating the noise by drawing excessive vacuum on the valve cover

D. The oil filler cap gasket was dampening a vibration, and removing it revealed a loose valve cover bolt

55. A technician has completed all authorized repairs on a vehicle. During the final inspection before returning the vehicle to the customer, the technician notices a safety concern that was NOT part of the original service request — a severely cracked brake hose on the right rear with visible bulging. Which of the following is the correct action?

A. Return the vehicle to the customer and mention the brake hose during the delivery conversation

B. Replace the brake hose without customer authorization since it is a critical safety defect

C. Document the safety concern on the repair order with a clear description and photographs, notify the service advisor immediately, and contact the customer to explain the safety risk and obtain authorization for the repair — if the customer declines the repair, document the refusal, have the customer sign acknowledging the known safety defect, and clearly note that the shop recommends against driving the vehicle until the hose is replaced

D. Ignore the brake hose since it was not part of the original work order

# Practice Exam 18: Answer Key and Full Explanations

1. B — Two diagnostic tests were performed, and both yielded critical information. Balancing eliminated weight imbalance. Rotating front-to-rear should have moved the vibration from the steering wheel to the seat/floor if tires were the source — but the vibration remained in the steering wheel at the same speed. This means the vibration source STAYED at the front of the vehicle when the tires moved to the rear. The cause is a front-end component that was not moved during the rotation: a bent front wheel, a worn front suspension component, or a driveshaft/differential issue.

2. D — "No CKP signal" does not automatically mean "bad CKP sensor." The sensor requires power, ground, and a clear signal path back to the PCM. An open wire, corroded connector, blown sensor fuse, or lost ground can produce the same no-signal result as a failed sensor. Additionally, the reluctor ring (tone wheel) that the sensor reads may have a damaged or missing section. Replacing the sensor without verifying its supporting circuit risks installing a functional sensor into a broken circuit — and the no-start condition persists.

3. C — Draining to the correct level addresses the immediate overfill, but the damage assessment is equally critical. Three quarts overfull means the crankshaft counterweights were churning through the oil, aerating it into foam that reduces lubrication and oil pressure. The pressurized aerated oil may have been forced past valve seals and piston rings into the combustion chambers, fouling spark plugs and contaminating the catalytic converter. Existing gaskets and seals may have been stressed by the excessive crankcase pressure. A thorough inspection ensures no secondary damage goes undetected.

4. A — The steady-state fuel trims (+2% STFT, +4% LTFT) are within normal range, confirming the fuel system is adequate during cruise. The brief +22% STFT spike during acceleration reveals a transient lean condition — the fuel system momentarily cannot match the sudden increase in air demand. This points to a fuel DELIVERY limitation under peak demand: a pump losing pressure at high flow, a filter restricting volume during maximum injector demand, or a MAF sensor that underreads during rapid airflow changes before stabilizing.

5. B — Extended metal-to-metal grinding creates cascading damage throughout the brake system on the affected corner. The rotor is destroyed. The caliper piston seized in the extended position (confirming it was the ROOT CAUSE — the seized piston held the pad against the rotor continuously). The extreme heat from the seizure likely damaged the brake hose's internal liner, the caliper seals, and possibly the wheel bearing grease. Brake fluid may have boiled. The opposite caliper should be inspected because it is the same age and may be developing the same seal deterioration that caused the first to seize.

6. D — The technician has systematically tested and cleared the four most common causes of random misfires: fuel pressure (normal), ignition coils (normal), spark plugs (normal), and compression (even across cylinders). With these eliminated, the investigation must expand to systemic causes that affect all cylinders but were not yet tested: vacuum leaks (a smoke test is the definitive check), exhaust restrictions (a backpressure test), EGR valve stuck partially open (introducing exhaust gas at idle), contaminated fuel, or an airflow sensor that reads correctly at steady state but responds poorly to transient conditions.

7. C — The consistent 3-second run time is the diagnostic key. Many fuel systems use a two-stage power strategy: the PCM energizes the fuel pump relay for a 2–3 second prime cycle when the key is turned on, then transfers fuel pump power to a run circuit that requires confirmation of engine running (CKP signal or oil pressure switch). If the run-circuit transfer fails (bad relay, open run-circuit wire, faulty oil pressure switch, or no CKP signal reaching the PCM), the pump runs only during the prime cycle and shuts off — the engine runs on the primed fuel for exactly 2–3 seconds and then dies.

8. A — Dual-zone climate control systems use independent blend door actuators for each side of the vehicle. Each actuator positions its blend door to mix heated and cooled air according to that zone's temperature setting. If the passenger-side actuator fails in the cold (or default) position, the blend door stays in the path that directs air through the evaporator (or bypasses the heater core), delivering only unheated air to the passenger vents. The driver's side operates independently with its own functioning actuator, producing the correct temperature — proving the heater core, coolant flow, and blower are all working.

9. D — A stored transmission code without current symptoms does NOT mean the problem doesn't exist — it means the problem hasn't progressed to the point of being noticeable during normal driving. P0730 (Incorrect Gear Ratio) means the PCM detected a mathematical discrepancy between the input speed sensor and output speed sensor readings for a specific gear. This indicates a clutch pack is beginning to slip, a speed sensor is developing an intermittent fault, or internal wear is altering the expected gear ratio. Early diagnosis can identify a minor repair (solenoid, sensor) before internal damage requires a major overhaul.

10. B — Fuel injectors are solenoid-operated valves that open and close rapidly (pulsing) during each injection event. The clicking sound is the mechanical action of the electromagnetic solenoid snapping the pintle off its seat (opening) and the return spring snapping it back (closing). This rhythmic, consistent clicking at engine speed is the NORMAL operating sound of properly functioning injectors. Every sequential fuel injection system produces this "sewing machine" noise at the fuel rail — it is a sign of correct operation, not a fault.

11. A — Rubber suspension bushings can deteriorate internally (losing their lubricating properties and becoming sticky or dry) without developing measurable play. During static inspection, the bushing may feel tight because the rubber hasn't separated from its shell. But under slow, heavy compression loading (like traversing a speed bump at walking speed), the dry rubber-to-metal interface resists the twisting motion and produces a creaking or groaning noise. The noise occurs on both sides because all bushings are the same age and experience similar deterioration.

12. D — Temperature-dependent clutch pack slipping that resolves when cool is the signature of aged, hardened internal seals. Transmission clutch piston seals are made of rubber compounds that progressively harden from decades of heat cycling and chemical exposure. When the fluid is cool, these hardened seals retain just enough pliability to maintain hydraulic pressure. At full operating temperature, the seals reach their maximum hardened state and shrink minutely — enough to allow pressurized fluid to bypass the piston seal, reducing clamping force on the clutch pack. The specific gears affected depend on which clutch circuit uses the most compromised seals.

13. A — The gasket is intact, properly installed, and the mating surfaces are clean and flat — the gasket itself is NOT the problem. When every physical aspect of the gasket installation is correct but the leak persists, the cause is excessive internal pressure EXCEEDING the gasket's sealing capacity. A restricted PCV system (clogged valve, plugged hose, blocked intake passage) traps crankcase blowby gases, building internal pressure that overwhelms any gasket. The gasket is designed to seal against normal crankcase pressure, not elevated pressure from a failed ventilation system.

14. B — The relay test confirmed the fan and relay work. The scan tool confirmed the ECT exceeds the fan activation threshold (230°F > 220°F trigger). The missing piece is the PCM's COMMAND to the relay. The PCM knows the engine is hot (it sees 230°F from its sensor), but it is not sending the control signal to the relay. This means either the PCM's fan output driver has failed internally, the wire between the PCM output and the relay coil is open, or the relay coil ground circuit is open — the command path between the PCM's decision and the relay's execution is broken.

15. C — Cupped or scalloped tire wear is caused by the wheel bouncing vertically on its suspension — the tire intermittently loses contact with the road surface. Each bounce creates a flat spot where the tire impacts the pavement. This bounce-scrub pattern repeats around the circumference, producing the characteristic alternating bald-and-unworn patches. The component responsible for controlling vertical wheel oscillation is the shock absorber or strut — when it can no longer dampen the spring's energy, the wheel bounces freely. Replacing the worn shocks and the damaged tires resolves both the cause and the result.

16. A — Under boost, the compressor side of the turbocharger is pressurized above atmospheric. The turbo bearing housing is supplied with engine oil for lubrication and cooling. The oil seals between the bearing housing and the compressor housing prevent this oil from entering the intake airstream. When the compressor-side seal fails, the positive boost pressure pushes oil INTO the compressor housing where it mixes with the intake air and is drawn into the engine and burned. The blue smoke appears only under boost because positive pressure is required to force oil past the compromised seal.

17. D — The brake booster multiplies pedal force using engine vacuum supplied through a vacuum hose from the intake manifold. Inside the booster, a large diaphragm separates the vacuum side from the atmospheric side. When the pedal is pressed, an internal valve opens to allow atmospheric air to one side of the diaphragm, creating the pressure differential that amplifies force. If the booster's diaphragm is ruptured or the rear shell is cracked, pressing the pedal opens a direct path from the atmosphere into the intake manifold — creating a massive, instantaneous vacuum leak that overwhelms the PCM's ability to compensate and kills the engine.

18. B — Some replacement shock absorbers are shipped with the internal piston rod in a random position and may have air trapped in the working chambers. The shocks must be primed before installation: held upright (mounting end up) and cycled through their full stroke 3–5 times to purge the trapped air and draw hydraulic fluid into all internal chambers. An unprimed shock has air pockets that compress freely instead of providing resistance, resulting in minimal damping — the shock is essentially a hollow tube until the air is purged.

19. C — Power steering fluid absorbs small amounts of air through normal operation, and overnight sitting allows some of this entrained air to partially separate. On first startup, the cold, thick fluid mixed with micro-bubbles passes through the pump, which attempts to compress the air-fluid mixture. Since air compresses (and fluid does not), the pump cavitates — creating the characteristic whining or groaning noise. Within 30 seconds, the fluid warms enough to flow freely, the circulating fluid re-absorbs the air bubbles, and the noise disappears.

20. A — An intermittent P0420 that cycles the MIL on and off indicates the catalytic converter is operating at the exact boundary of the OBD II efficiency threshold. Under some driving conditions (steady highway cruise, moderate load), the converter's remaining catalyst activity is sufficient to pass the monitor — the MIL turns off. Under others (city driving, frequent cold starts, heavy load), the converter fails the monitor — the MIL turns on. This borderline pattern confirms the converter is deteriorating progressively and will eventually fail consistently.

21. D — Automatic transmission adaptive learning is the TCM's continuous self-correction for internal wear. As clutch pack friction material wears, the time between the shift solenoid command and actual

gear engagement increases (the clutch plates must travel further to contact). The TCM monitors this delay and gradually adjusts its shift timing and pressure commands to compensate — commanding shifts slightly earlier or with more apply pressure to maintain consistent shift feel. Without adaptive learning, shifts would become progressively harsher or softer as the clutch packs wore.

22. B — The swap test moved TWO components: the coil went to cylinder 3, the plug went to cylinder 4. The misfire STAYED on cylinder 1. Since the misfire did not follow either moved component, both the coil AND the plug are eliminated as causes. The remaining cylinder-1-specific components are: the fuel injector (stuck, clogged, or electrically dead), compression (leaking valve or head gasket at that cylinder), the PCM's injector or coil driver circuit for cylinder 1, or a vacuum leak at the cylinder 1 intake runner.

23. C — A single clunk at the moment braking begins (not rhythmic, not repetitive) indicates a component that shifts ONCE when brake application force loads the caliper against the rotor. A loose caliper bracket bolt or worn bracket bushing allows the caliper assembly to rock or shift when the pads first contact the rotor and the braking torque is transmitted through the bracket. The caliper settles into its loaded position with a clunk and holds steady for the remainder of the stop.

24. A — The engine has a marginal fuel delivery capacity that is adequate for EITHER high mechanical load OR A/C compressor drag — but not both simultaneously. At idle with A/C on (moderate load, low fuel demand), the system copes. Under hill-climbing load without A/C (high load, high fuel demand), the system copes. But the combination of hill-climbing load PLUS compressor parasitic drag pushes the total demand beyond what the marginal fuel system can deliver. A weak pump, a partially restricted filter, or a MAF sensor that slightly underreads at high airflow are the most common underlying causes.

25. B — Technician B is correct. Most quality replacement O2 sensors come with anti-seize compound pre-applied to the threads at the factory — the gray or silver coating visible on new sensor threads IS the anti-seize. Adding additional compound creates excess material that can migrate to the sensor's tip during installation or through vibration. If anti-seize contacts the sensor's ceramic element, zirconia surface, or the protective thimble, it can contaminate the sensing material and produce inaccurate readings. If the sensor does not come pre-treated, only a small amount should be applied to the threads, keeping it well away from the sensor tip.

26. D — Before investigating expensive internal engine possibilities for a high oil pressure reading, the technician must verify the reading is REAL. Oil pressure gauges and sending units fail far more often than oil pumps produce excessive pressure. A faulty sending unit can read incorrectly due to internal resistance changes, corrosion, or calibration drift. A corroded connector can alter the signal. The gauge mechanism itself can stick or drift. Installing a mechanical pressure gauge directly into the oil gallery

provides an independent, verified reading. If mechanical pressure matches the high gauge reading, then internal causes warrant investigation.

27. C — A fuel odor with no visible leaks and no EVAP codes points to a vapor source rather than a liquid fuel leak. The fuel tank top — accessible only by dropping the tank — houses multiple potential vapor leak points: the fuel pump module O-ring, the fuel level sender gasket, EVAP line quick-connect fittings, and the rollover valve. Even a minor seal seepage at any of these points releases fuel vapor that migrates along the underside of the vehicle. The vapor enters the cabin through the HVAC cowl intake, trunk seal gaps, rear seat pass-throughs, or body seam openings.

28. A — The engine stalling ONLY when headlights are activated points to a shared ground circuit fault. The headlight circuit draws significant current (10–15 amps). If the headlight ground shares a path with a critical engine management component (PCM ground, CKP sensor ground, or MAP sensor ground), the headlight current flowing through the high-resistance shared ground connection creates a voltage drop that shifts the ground reference for the engine component. A CKP sensor that loses its ground reference produces no signal — the PCM sees no crankshaft rotation and cuts ignition/fuel.

29. A — Cooling systems have complex internal passages with multiple high points where air pockets can hide during initial filling. Even a careful bleed may not purge 100% of the trapped air on the first attempt. Over 2 days of driving, heat cycling causes these hidden air pockets to gradually migrate toward the radiator cap and vent out of the system. As the air escapes, the coolant level drops — the volume that was previously occupied by trapped air is now empty. The system needs to be topped off, re-bled, and monitored for a few more days to ensure all residual air has been purged.

30. D — The one-way clutch behavior (free-spin in one direction, lock in the other) is the DESIGNED function of an overrunning alternator decoupler (OAD) pulley — it is NOT a defect. The OAD allows the alternator to freewheel momentarily during rapid engine deceleration, reducing belt stress. The whining noise that disappears when the belt is removed originates from the alternator's internal BEARINGS, which are separate from the pulley. The noise is driven by the belt's rotation of the alternator shaft, and it indicates bearing wear inside the alternator housing. The alternator needs replacement for the bearings; the OAD pulley function is normal.

31. C — The MLR technician performed diagnostic work that is fully within G1 scope: combustion gas testing, leak-down testing, and confirming the head gasket as the failure point. The REPAIR — removing the cylinder head, inspecting and resurfacing the head, replacing the head gasket, and reassembling with correct torque and sequence — is internal engine work that falls under ASE A1 (Engine Repair) certification. The technician should document their diagnostic findings thoroughly,

explain the confirmed diagnosis to the customer, and refer the repair to an appropriately certified technician or facility.

32. A — The firm-spongy-firm pedal pattern indicates a localized air pocket in one section of the brake hydraulic system. The first firm zone represents the air-free portion of the hydraulic circuit applying force normally. The spongy zone is the trapped air pocket compressing — air is compressible, so the pedal sinks through this zone without building proportional pressure. The final firm zone occurs after the air pocket has fully compressed and the remaining fluid column transmits force to the calipers/cylinders. Targeted bleeding of the specific circuit containing the air pocket resolves the spongy zone.

33. D — The aftermarket cold air intake uses flexible accordion tubing that has a tear DOWNSTREAM of (after) the MAF sensor. Air entering through the tear bypasses the MAF sensing element — the MAF measures only the air that passes through it, not the total air entering the engine. The PCM receives an underreported airflow reading, calculates less fuel than needed, and the engine runs lean. The PCM also compares the MAF reading to expected values based on RPM, MAP, and throttle position — the discrepancy triggers the P0101 range/performance code.

34. B — The A/C is working (cold air confirms the evaporator is functioning), and the coolant level is stable with no sweet smell (ruling out a heater core leak). The dripping sound and wet carpet on the passenger side point to water — specifically, evaporator condensation that is not draining properly. The HVAC condensate drain tube exits through the firewall and should drip water harmlessly under the vehicle. When the drain tube clogs, water accumulates inside the HVAC case and overflows onto the passenger floor. The dripping sound is water pooling inside the case before it spills.

35. C — The smoke test showed the leak at the gas cap area, and a new OEM cap was installed — but the code returned. The cap is new and sealing correctly against whatever surface it meets. If the leak STILL appears at the cap area, the SURFACE the cap seals against is the problem. The filler neck's sealing rim may have corrosion pitting, scratches from fuel nozzles, dents from cross-threaded caps, or warpage from heat — any of which prevents even a perfect new cap from creating an airtight seal.

36. B — A CMP sensor code that clears with a new sensor but returns after weeks of driving indicates a PROGRESSIVE fault in the signal source — the reluctor ring. A hairline crack in the reluctor ring gradually widens through thermal cycling (expansion when hot, contraction when cool). Initially, the crack is small enough that the signal passes the PCM's threshold. Over weeks of heat cycles, the crack propagates until the signal dropout at the crack point exceeds the PCM's tolerance — and the code returns. The new sensor reads the same cracking reluctor; the sensor is not the fault.

37. D — The brake pull appeared AFTER a brake service that confirmed correct component installation. New pads and rotors did not cause the pull — they changed the system's behavior enough to reveal a PRE-EXISTING fault. A partially restricted brake hose (typically from internal delamination) on either front wheel creates unequal braking force. A left hose restriction reduces left braking force (pull right). A right hose acting as a check valve prevents full release after braking (drag = effective pull right). The hoses were present before the service but the old pads/rotors masked the effect.

38. B — The typical cold-start lifter tick (noisy cold, quiet hot) occurs because cold, thick oil takes time to fill the lifter. This question presents the OPPOSITE: quiet cold, noisy hot. This reverse pattern indicates a component that maintains adequate clearance when cold (all parts are thermally contracted and tight) but develops EXCESS clearance when hot (one component expands more than its mating part). A cam lobe, lifter, or rocker arm that expands unevenly with heat creates a gap that produces the tapping noise only at operating temperature.

39. C — Before replacing the cracked canister and closing the repair, the technician must investigate WHY the canister cracked. Charcoal canisters are designed to adsorb VAPOR — not liquid fuel. If the fuel tank was habitually overfilled (topping off past the first click), liquid fuel can be pushed into the canister through the vapor lines, saturating the charcoal and stressing the plastic housing with liquid weight it was never designed to hold. A purge solenoid stuck open can also flood liquid fuel from the tank into the canister. Replacing the canister without fixing the flooding source guarantees a repeat failure.

40. A — Four codes, one root cause. The P0101 (MAF Range/Performance) is the originating fault — the MAF is underreporting airflow. Because the PCM uses MAF data to calculate fuel delivery, underreported airflow causes the PCM to deliver LESS fuel than the engine actually needs. This creates lean conditions on BOTH banks simultaneously (P0171 + P0174), and the lean mixture causes incomplete combustion across all cylinders (P0300 random misfire). Diagnosing and fixing the MAF code first — by cleaning or replacing the sensor — may clear all four codes because the MAF fault cascaded into the other three.

41. D — The automatic locking retractor (ALR/ELR) seat belt is designed to lock instantly during sudden deceleration (the inertia-triggered locking mechanism) or when pulled sharply (the webbing-sensitive locking mechanism). Failure to lock during a sharp pull test means the locking mechanism has failed — the belt will extend freely during a collision instead of locking the occupant in place. This is a critical life-safety failure. The seat belt retractor assembly must be replaced immediately, and the vehicle should not be returned to service until the restraint system is fully functional.

42. B — Gradual, progressive fuel trim drift on BOTH banks over thousands of miles points to a component that is slowly deteriorating — not one that has suddenly failed. The MAF sensor's hot wire or hot film element accumulates contamination (oil mist from the PCV system, fine dust past the air filter, environmental residue) over time. This thin contamination layer insulates the element, reducing its sensitivity. The element underreads airflow by an increasing amount as the layer thickens, causing the PCM to progressively lean out the fuel mixture across all cylinders equally on both banks.

43. C — The engine is NOT actually overheating — the upper radiator hose is warm (not dangerously hot or rock-hard) and the heater blows warm air (confirming coolant circulation at an adequate temperature). The gauge is lying. On vehicles with separate gauge senders and PCM sensors, the gauge sender can fail in the high-reading position while the PCM's ECT sensor reads correctly — which is why there are no DTCs, no drivability complaints, and no actual overheating symptoms. Verifying actual coolant temperature with an infrared thermometer or scan tool ECT PID confirms the gauge fault.

44. A — The auto-up/down feature on power windows stores the window's travel endpoints in module memory. This memory is volatile on many vehicles — battery disconnects, window motor replacements, regulator changes, or even certain module resets can erase the stored endpoints. Without these reference points, the module does not know where the top and bottom of travel are, and it disables the one-touch auto feature as a safety precaution (to prevent the window from driving past its endpoint and damaging the regulator). The relearn procedure re-teaches the module the exact travel limits.

45. D — The two-channel oscilloscope comparison is the most powerful catalytic converter diagnostic technique in the series. The Bank 2 downstream sensor mimicking the upstream confirms the Bank 2 converter has lost its oxygen storage capacity — exhaust composition passes through unchanged. The Bank 1 downstream showing a flat line confirms the Bank 1 converter IS buffering oxygen effectively. The side-by-side comparison on the SAME vehicle eliminates variables like engine condition, fuel quality, and driving conditions — the only difference between the two banks is the converter performance.

46. D — VVT camshaft phasers are hydraulically positioned by oil pressure flowing through the VVT solenoid into the phaser. With the oil 2 quarts low, the oil pump's pickup tube may intermittently lose submersion — especially during cornering, hard braking, or hard acceleration when the oil shifts in the pan. When the pump briefly sucks air instead of oil, oil pressure drops momentarily, and the VVT phaser loses its hydraulic positioning. The camshaft drifts from its commanded position, creating a timing correlation mismatch that the PCM detects as P0016.

47. C — New tires with full tread depth are a fundamentally different product than worn tires — they have deeper grooves (more road noise), more tread squirm (different steering feel), higher sidewall

stiffness (firmer ride from new rubber), different contact patch shape (wider and shorter when new vs. narrow and long when worn), and different rolling characteristics. The customer drove tens of thousands of miles on gradually wearing tires and unconsciously adapted to their progressively changing behavior. The sudden change to new tires creates a perceptible difference that cannot be described as a specific "problem" — it simply feels unfamiliar.

48. A — Standard four-wheel bleeding pushes fluid through the external brake lines and calipers/wheel cylinders, but the ABS hydraulic modulator contains internal solenoid valves and passages that can trap air pockets. These internal passages are CLOSED during normal bleeding because the solenoids are in their default de-energized position. Without using a scan tool to command the ABS solenoids open during the bleed procedure, trapped air inside the modulator remains — creating an air pocket that affects ABS operation and triggers the ABS warning light.

49. A — Raising the rear of the vehicle and manually rotating the driveshaft while listening at the differential is the most direct isolation test. The driveshaft connects to the pinion gear, which meshes with the ring gear inside the differential. Rotating the driveshaft by hand allows the technician to feel and hear any play or clunking in the gear mesh. A clunk at the moment of direction change during manual rotation confirms excessive ring-and-pinion backlash or worn differential side/spider gears. This hand test is definitive because it isolates the differential from all other vehicle systems.

50. B — On many engines, valve stem seals CAN be replaced without removing the cylinder head using a technique called "through-the-plug-hole" seal replacement. A special adapter threads into the spark plug hole and connects to an airline, which pressurizes the cylinder with compressed air. The air pressure holds the valve closed against its seat while the technician uses a specialized valve spring compressor to remove the spring, retainer, and keepers, then slides off the old seal and installs the new one. This technique saves 6–10 hours of labor compared to head removal and is commonly performed by experienced technicians.

51. C — The vehicle's driving pattern is the diagnostic key. A 3-mile commute does not allow the engine to reach full operating temperature. Normal combustion produces water vapor, which condenses inside the crankcase on the cooler internal surfaces. Normally, extended driving raises the engine temperature enough to evaporate this moisture and vent it through the PCV system. With only 3-mile trips, the engine never gets hot enough to burn off the moisture. Over 6 months, the accumulated condensation emulsifies with the oil, creating the milky appearance — WITHOUT any coolant leak. An extended highway drive would evaporate the moisture and clear the oil.

52. A — The EGR valve was replaced (works correctly) and the passages were cleaned (flow path is clear) — but P0401 persists. The valve provides the flow; the PCM uses a MONITORING sensor to

verify the flow occurred. If the monitoring sensor is faulty or its sensing passages are still restricted, the PCM receives a "no flow" or "insufficient flow" report even though the actual flow is adequate. The DPFE (delta pressure feedback) sensor's hoses can clog with carbon, the EGR temperature sensor can fail, or the EGR position feedback sensor can lose calibration — all producing a false "insufficient flow" reading.

53. D — A second opinion requires an INDEPENDENT, thorough diagnostic process — not agreement with the first shop based on trust, and not dismissal based on the absence of current codes. The technician should verify fluid level, condition, and specification; road test until the transmission reaches operating temperature (the slip occurs "when hot"); attempt to reproduce the specific symptom; monitor transmission PIDs during the slip event; and check for TSBs. A complete diagnosis may reveal a $200 solenoid replacement, a $50 software update, or a $30 fluid change — any of which would save the customer $6,000+ compared to a full transmission replacement.

54. B — Removing the oil filler cap eliminates the acoustic barrier between the technician's ear and the valve train inside the valve cover. If the ticking gets louder when the cap is removed, the noise is originating from INSIDE the valve cover area — the camshaft, lifters, rocker arms, valve springs, or their interfaces. If the noise stayed the same or got quieter, the source would be external (exhaust manifold, timing cover, accessories). This simple cap-removal test takes 3 seconds and immediately narrows the noise source to internal valve train or external components.

55. C — Discovering a safety defect during an unrelated service creates both a professional obligation and a legal responsibility. The technician cannot ignore a severely cracked, bulging brake hose — it is an imminent safety hazard that could rupture during driving. However, performing unauthorized work also violates customer consent laws. The correct procedure balances both: document the finding with clear description and photographs, notify management, and contact the customer to explain the risk and request authorization. If the customer declines, document the refusal with the customer's signature and clearly state the shop's recommendation against driving until repaired.