PRACTICE EXAM 10: ASE G1 SIMULATION — 55 QUESTIONS

1. A technician is using a coolant refractometer to test the freeze protection of a vehicle's coolant after a flush. The refractometer indicates protection to -10°F. The vehicle operates in a climate where winter temperatures reach -25°F. Which of the following is the correct action?

A. The protection level is adequate since the engine's operating temperature prevents the coolant from freezing

B. The coolant mixture must be adjusted to provide freeze protection below the coldest expected temperature — typically -34°F or lower for most climates; the current 50/50 ratio needs to be increased toward 60/40 or 70/30 coolant-to-water

C. Add pure water to lower the freeze point further

D. Install an engine block heater instead of adjusting the coolant mixture

2. A vehicle's SRS (supplemental restraint system) airbag deployed in a minor collision. The customer asks whether the airbag can simply be reset and reused. Which of the following is the correct response?

A. The airbag module can be reset with a scan tool and the deployed bag refolded into the housing

B. Only the airbag module needs replacement; the deployed bag can be reused if undamaged

C. The airbag system is designed to deploy only once per vehicle lifetime and the vehicle must be totaled

D. Deployed airbags, the clockspring (if damaged), SRS module, associated sensors, and any damaged trim must all be replaced — deployed airbags cannot be reset, refolded, or reused

3. A technician finds a bolt marked with six radial lines on the head during a suspension repair. Which of the following does this marking indicate?

A. The bolt is a Grade 8 (SAE) fastener — the strongest commonly used automotive grade, designed for high-stress applications like suspension and drivetrain components

B. The bolt is a Grade 5 fastener suitable for general-purpose use

C. The bolt is a metric Class 10.9 fastener identified by line count

D. The radial lines are manufacturer-specific decorative markings with no strength significance

4. A vehicle's scan tool live data shows the following at idle: MAP sensor 35 kPa, IAT sensor 85°F, ECT sensor 198°F, STFT +2%, LTFT +3%, RPM 750. All of the following values are within normal range EXCEPT:

A. The MAP sensor reading of 35 kPa

B. The IAT reading of 85°F on a warm day

C. None — all values listed are within normal operating parameters for a properly running engine at idle

D. The LTFT of +3% indicating a lean condition requiring diagnosis

5. A customer brings in a vehicle with a complaint of poor A/C cooling. The technician connects the gauge set and reads: low-side 55 psi, high-side 150 psi. Normal specifications are low-side 25–35 psi and high-side 200–250 psi. Both readings are abnormal. Which condition do these readings MOST likely indicate?

A. An undercharged system that needs additional refrigerant

B. A restricted orifice tube or expansion valve starving the evaporator

C. A faulty condenser cooling fan

D. A compressor that is not pumping efficiently — the compressor cannot adequately compress the refrigerant from the low side to the high side, resulting in elevated low-side pressure and reduced high-side pressure

6. A technician needs to safely raise and support a vehicle to perform undercar work. The vehicle is positioned on a flat, level shop floor. Which of the following describes the CORRECT procedure?

A. Raise the vehicle with a floor jack at the manufacturer-specified lift point, then immediately place jack stands at the designated support points and lower the vehicle onto the stands before working under it — never work under a vehicle supported only by a floor jack

B. Use the floor jack as the primary support and place jack stands nearby as a precaution only

C. Raise the vehicle with the floor jack and begin work immediately since hydraulic jacks are self-locking

D. Place the jack stands first, then use the floor jack to raise the vehicle off the stands for additional clearance

7. A vehicle with a conventional ignition system has a no-start condition. The technician holds a spark plug wire near a ground and cranks the engine — a strong blue spark is observed. The technician then checks for fuel injector pulse using a noid light — the noid light flashes during cranking. Which system should the technician investigate NEXT?

A. The mechanical engine condition — compression, valve timing, or timing belt/chain integrity — since both spark and fuel delivery are confirmed present but the engine still will not start

B. The ignition system, since the spark test was inconclusive

C. The fuel system pressure, since the noid light only confirms electrical pulse and not actual fuel delivery

D. The charging system, since low voltage may prevent starting

8. A vehicle with a flex-fuel capability (E85/gasoline) has a check engine light with DTC P0178 (Fuel Composition Sensor Circuit Low). The vehicle runs rough and has poor fuel economy. Which of the following BEST explains the relationship between the sensor and the symptoms?

A. The fuel composition sensor has no effect on engine operation and the symptoms are unrelated

B. The fuel composition sensor tells the PCM the ethanol percentage in the fuel so it can adjust fuel injector pulse width, ignition timing, and fuel trim — a failed sensor causes the PCM to miscalculate the required fuel mixture, producing rough running and poor economy

C. The fuel composition sensor only controls the fuel gauge reading and has no effect on engine management

D. The sensor is failing because the customer mixed E85 and gasoline, which is prohibited on flex-fuel vehicles

9. A technician is performing a safety inspection and tests the parking brake. The parking brake pedal (or lever) travels to its full extent without resistance, and the vehicle rolls freely on a slight incline. Which of the following is the MOST likely cause?

A. A weak parking brake pedal return spring

B. Worn rear brake shoes that no longer contact the drum at full cable travel

C. A faulty parking brake warning light switch giving a false indication

D. A broken or disconnected parking brake cable that is not transmitting force from the pedal/lever to the rear brake mechanism

10. Technician A says that a Safety Data Sheet (SDS) must be available in the shop for every hazardous chemical used or stored on the premises. Technician B says that SDS information is only needed for chemicals that are flammable. Who is correct?

A. Technician B only

B. Both Technician A and Technician B

C. Technician A only

D. Neither Technician A nor Technician B

11. A vehicle has a rough idle and a P0305 (Cylinder 5 Misfire). The technician swaps the spark plug from cylinder 5 to cylinder 3. The misfire remains on cylinder 5. The technician then swaps the ignition coil from cylinder 5 to cylinder 3. The misfire still remains on cylinder 5. What should the technician conclude?

A. The misfire is not caused by the spark plug or ignition coil — the remaining possibilities include a faulty fuel injector, low compression, a vacuum leak at the intake runner for cylinder 5, or a wiring issue

B. The spark plug and coil swaps were performed incorrectly

C. The PCM misfire counter is malfunctioning and reporting the wrong cylinder

D. Both the original plug and coil are faulty and both need replacement

12. A vehicle's brake fluid reservoir cap has a built-in rubber diaphragm. The diaphragm appears collapsed and is pushed down against the fluid surface. Which of the following is the correct interpretation?

A. The diaphragm has failed and must be replaced immediately

B. The brake fluid is contaminated and the diaphragm is reacting chemically with the fluid

C. This is normal — the diaphragm drops as brake fluid level decreases (from pad wear) and prevents moisture-laden air from contacting the fluid surface

D. The master cylinder is generating excessive vacuum that is pulling the diaphragm downward

13. A vehicle has a scraping noise from one front wheel that occurs during every wheel rotation, regardless of whether the brakes are applied. The noise changes pitch slightly when the brakes are applied. Which of the following is the MOST likely cause?

A. A worn brake pad that has reached its wear indicator, creating a metal-to-rotor contact noise

B. A brake pad wear indicator (squealer tab) that is in constant contact with the rotor — the tab is designed to scrape the rotor as a warning that the pad has worn to minimum thickness; the noise changes when the brakes are applied because the pad shifts slightly under hydraulic pressure

C. A wheel bearing that is failing and producing a metallic scraping sound

D. A loose caliper bracket bolt allowing the caliper to contact the wheel rim

14. A customer reports that the vehicle's steering feels different after having new tires installed — the steering seems to require more effort. The tires are the correct size and properly inflated. Which of the following is the MOST likely explanation?

A. The new tires have stiffer sidewalls that reduce steering response

B. The wheel alignment was disturbed during the tire mounting process

C. The tire mounting machine damaged the power steering rack

D. The new tires have a wider tread contact patch or higher rolling resistance compound compared to the worn tires they replaced, which naturally increases steering effort — this difference is especially noticeable at low speeds and in parking lots

15. A vehicle has an intermittent check engine light that comes on during humid or rainy weather and turns off when the weather is dry. The DTC is P0304 (Cylinder 4 Misfire). Which of the following is the MOST likely cause?

A. A cracked spark plug boot, damaged ignition coil boot, or deteriorated spark plug wire insulation on cylinder 4 that allows the ignition voltage to arc to ground in high-humidity conditions

B. Water entering the fuel tank through the fuel cap vent during rain

C. A leaking intake manifold gasket that absorbs moisture and swells

D. A faulty ECT sensor that reads incorrectly when wet

16. A customer's vehicle requires a headlight bulb replacement. The technician discovers that the headlight assembly must be partially removed to access the bulb. During removal, the technician accidentally cracks the headlight lens. Which of the following is the correct action?

A. Seal the crack with clear silicone and reinstall the headlight

B. Apply clear packing tape over the crack as a temporary repair and inform the customer

C. Inform the customer immediately, take responsibility for the damage, and arrange for replacement of the headlight assembly — the shop is responsible for damage caused during service

D. Reinstall the cracked headlight and say nothing since the bulb replacement was the only authorized repair

17. Technician A says that a Class B fire extinguisher is appropriate for extinguishing a gasoline fire in the shop. Technician B says that a Class A fire extinguisher should be used for all automotive shop fires. Who is correct?

A. Technician B only

B. Both Technician A and Technician B

C. Neither Technician A nor Technician B

D. Technician A only

18. A vehicle is brought in for a wheel alignment. The technician notices that the front tires are a different size than the rear tires. The vehicle is not a staggered-fitment application — all four positions specify the same size. What should the technician do BEFORE performing the alignment?

A. Perform the alignment using the current tire sizes and note the discrepancy

B. Inform the customer that mismatched tire sizes affect alignment readings, TPMS accuracy, speedometer calibration, and ABS/traction control function — the correct size tires should be installed before performing the alignment

C. Adjust the alignment specifications to compensate for the different tire sizes

D. Perform the alignment on the rear only, since the front tires are incorrect

19. A vehicle's engine has a coolant leak at the intake manifold gasket. The technician notices that the leak only appears when the engine is hot and under load — there is no leak when the engine is cold or at idle. Which of the following BEST explains this behavior?

A. Thermal expansion of the intake manifold and cylinder head opens the gap at the gasket under operating temperature, and the increased cooling system pressure under load forces coolant through the opening that seals when cold

B. The water pump only produces enough pressure to leak at high RPM

C. The radiator cap is releasing pressure under load, forcing coolant out the manifold gasket

D. The coolant is evaporating before it can be seen when the engine is cold

20. A vehicle's A/C system has just been recharged. The technician checks the system and finds that the sight glass (on systems so equipped) shows a steady stream of bubbles. What does this indicate?

A. The system is overcharged and the excess refrigerant is creating turbulence

B. The system is operating normally — bubbles in the sight glass indicate proper refrigerant circulation

C. The system is still undercharged — a steady stream of bubbles indicates the liquid refrigerant line does not have a full column of liquid, meaning more refrigerant is needed until the sight glass is clear

D. The desiccant in the receiver/drier has broken apart and the particles are visible as bubbles

21. A technician is performing a cranking compression test on a 4-cylinder engine. The results are: Cylinder 1: 155 psi, Cylinder 2: 150 psi, Cylinder 3: 90 psi, Cylinder 4: 148 psi. What is the correct interpretation?

A. All cylinders are within acceptable variation and the engine is in good condition

B. Cylinder 3 is high and indicates carbon buildup

C. The compression gauge is defective and reading low on one port

D. Cylinder 3 is significantly lower than the others — a wet test (adding oil to cylinder 3 and retesting) should be performed to determine whether the low compression is caused by ring/bore wear (pressure increases with oil) or valve/head gasket failure (pressure remains low with oil)

22. A vehicle is brought in with a complaint that the door locks activate on their own while driving. The customer also reports that the interior lights flash intermittently. Which of the following is the MOST likely cause?

A. A faulty door lock actuator that is sending false feedback signals to the BCM

B. A wiring harness problem in a door jamb or between the body and a door — intermittent shorts or opens in the wiring bundle as the door flexes activate multiple circuits that share the same harness

C. A faulty ignition switch that is sending erratic power signals to the body electrical system

D. A weak battery causing voltage fluctuations that confuse the body control module

23. A customer asks what the "UTQG" rating on the tire sidewall means. The tire shows: Treadwear 400, Traction A, Temperature A. Which of the following is the correct explanation?

A. UTQG stands for Uniform Tire Quality Grading — the treadwear rating (400) is a comparative index of expected tread life, traction (A) rates the tire's wet stopping ability, and temperature (A) rates the tire's resistance to heat buildup; higher treadwear numbers indicate longer expected life, and A is the highest grade for traction and temperature

B. UTQG is a mandatory speed rating that limits the tire's maximum highway speed

C. UTQG ratings only apply to commercial truck tires and have no relevance to passenger vehicles

D. The numbers represent the tire's maximum load capacity in different conditions

24. A vehicle equipped with direct TPMS (valve-stem sensors) has all four tires rotated. After the rotation, the TPMS display shows the pressures are assigned to the wrong wheel positions — the front-left pressure reading is displayed at the rear-right position, etc. Which of the following is the correct action?

A. Reset the TPMS by driving the vehicle for 20 miles, which will automatically reassign the sensor positions

B. Remove and reinstall all four sensors in their correct positions

C. Perform a TPMS relearn procedure using a TPMS activation tool and/or scan tool to reassign each sensor's ID to its new wheel position

D. Ignore the position assignment since the actual pressures displayed are still accurate

25. A vehicle's engine runs well at all speeds but produces visible blue-gray smoke from the tailpipe only during deceleration — when lifting off the throttle from highway speed. No smoke is present during acceleration or at idle. Which of the following is the MOST likely cause?

A. Worn piston rings that cannot seal under the high vacuum of deceleration

B. A rich fuel mixture that is incompletely combusting during deceleration

C. A clogged catalytic converter that backs up exhaust during deceleration

D. Worn valve stem seals that allow engine oil to be drawn past the seals and into the combustion chambers by the high intake manifold vacuum present during closed-throttle deceleration

26. A technician discovers that a vehicle's engine wiring harness has been repaired by a previous shop using standard household electrical connectors (butt splices with no heat shrink or sealant). The repair is currently functional. What should the technician recommend?

A. Leave the repair as-is since it is currently working and repairing it again is unnecessary

B. Recommend that the splices be redone using automotive-grade crimp connectors with adhesive-lined heat shrink or solder-and-heat-shrink to prevent moisture intrusion, corrosion, and intermittent failures that household connectors will inevitably cause in the harsh underhood environment

C. Replace the entire wiring harness since any previous repair compromises the system

D. Cover the existing splices with additional electrical tape for added protection

27. A vehicle's power steering fluid reservoir has a "cold" fill line and a "hot" fill line. The technician checks the fluid with the engine cold and the level is at the "cold" line. Which of the following is correct?

A. The fluid level is low and must be topped off to the "hot" line regardless of engine temperature

B. The power steering fluid is contaminated and has thickened, causing a false cold reading

C. The fluid level is correct — the "cold" line indicates the proper fill level when the fluid is at ambient temperature; the fluid will expand to the "hot" line when the system reaches operating temperature

D. Both lines indicate minimum acceptable levels and the fluid should always be filled above the "hot" line

28. A vehicle's engine has a persistent P0171 (System Too Lean — Bank 1) code. The technician sprays carburetor cleaner around the intake manifold gaskets while the engine idles. The engine RPM increases momentarily when the cleaner is sprayed at the rear of the intake manifold. What does this confirm?

A. A vacuum leak exists at the location where the RPM increase occurred — the carburetor cleaner was drawn into the engine through the gap in the gasket, temporarily enriching the mixture and causing the RPM rise

B. The carburetor cleaner is contaminating the MAF sensor and causing a temporary rich condition

C. The PCV valve is stuck open and drawing the cleaner into the crankcase

D. The intake manifold gasket is sealing correctly and the RPM change is coincidental

29. A vehicle with a 3.6L V6 engine has a check engine light with DTCs P0300, P0302, P0304, and P0306. What is significant about the specific cylinders (2, 4, 6) that are misfiring?

A. These are the three cylinders with the longest fuel injector lines, causing fuel delivery delay

B. The firing order places cylinders 2, 4, and 6 consecutively, indicating a timing issue

C. These are random misfires that happen to affect even-numbered cylinders by coincidence

D. Cylinders 2, 4, and 6 are typically on the same bank of the V6 engine — a misfire pattern affecting one entire bank suggests a bank-specific cause such as an intake manifold leak, a failed coil pack on a waste-spark system, a cam sensor issue, or a head gasket failure isolated to that bank

30. A technician is inspecting a vehicle and finds that the exhaust system is hanging lower on one side due to a broken exhaust hanger. The system is not leaking and does not contact the ground. Which of the following is the correct action?

A. No action is needed since the exhaust is not leaking or dragging

B. Replace the broken hanger — a sagging exhaust system can develop stress cracks at the joints, contact the undercarriage or driveline components, and eventually break apart or create a leak that allows carbon monoxide to enter the cabin

C. Secure the exhaust with a wire hanger as a permanent repair

D. Replace the entire exhaust system since one broken hanger indicates system-wide deterioration

31. A vehicle has a whirring noise from the engine compartment that increases with engine RPM. The noise is present whether the A/C is on or off, and does not change when the steering wheel is turned. Removing the serpentine belt eliminates the noise. Which of the following is the MOST likely cause?

A. A failing water pump bearing

B. A worn crankshaft harmonic balancer

C. A failing bearing in one of the belt-driven accessories — the idler pulley, tensioner pulley, alternator, A/C compressor, power steering pump, or water pump; spinning each component by hand (with the belt removed) to check for roughness identifies the specific bearing

D. The serpentine belt itself is defective and producing the noise

32. A vehicle's scan tool freeze frame data for a P0420 (Catalyst Efficiency Below Threshold) code shows: ECT 195°F, RPM 2,200, vehicle speed 55 mph, fuel trim +1%, engine load 45%. What does this data tell the technician about the conditions when the code set?

A. The code was set during cold start when the catalytic converter had not yet reached operating temperature

B. The data shows the engine was running rich, which contaminated the converter

C. The engine was misfiring, causing unburned fuel to damage the converter

D. The code was set during steady-state highway cruising with a warmed-up engine running under normal conditions — this indicates the converter's reduced efficiency is not caused by a temporary engine operating condition but reflects genuine converter deterioration

33. Technician A says that a brake lathe should be used to machine brake rotors until they are perfectly smooth, even if this requires going below the minimum thickness specification. Technician B says that rotors must never be machined below the minimum (discard) thickness specification regardless of surface condition. Who is correct?

A. Technician B only — the minimum thickness specification is an absolute safety limit that accounts for the rotor's ability to dissipate heat and maintain structural integrity during braking; a rotor below this thickness can overheat, warp, crack, or fail catastrophically

B. Technician A only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

34. A vehicle's front brake pads were replaced 3,000 miles ago. The customer returns complaining of a pulsation in the brake pedal. The rotors were new when installed. Rotor thickness variation is measured at 0.0015 inches, exceeding the 0.0005-inch specification. What is the MOST likely cause of the thickness variation on new rotors after only 3,000 miles?

A. The rotors were defective from the manufacturer

B. The brake pads were not properly bedded (broken in) after installation — without proper bedding, friction material transfers unevenly to the rotor surface, creating high spots that progressively worsen into measurable thickness variation

C. The caliper pistons are applying uneven force across the pad surface

D. Normal brake dust accumulation between the pad and rotor creating an uneven wear pattern

35. A vehicle has a noise from the rear that sounds like a bearing hum. The noise increases with speed and is present in all gears and in Neutral. The technician lifts the rear of the vehicle and runs it at speed — the noise is still present. Rotating each rear wheel by hand with the axle shafts removed reveals no roughness in either wheel bearing. Which of the following is the MOST likely noise source?

A. The front wheel bearings, which are transmitting noise to the rear through the vehicle structure

B. The rear brake pads dragging against the rotors at high speed

C. Tire noise from the rear tires that is still present because the tires are still mounted during the on-lift test

D. The rear differential ring and pinion gears or carrier bearings — with the axle shafts removed, the wheel bearings are isolated, but the differential is still spinning during the on-lift test and is the remaining rotating component

36. A vehicle's cabin air filter is located behind the glove box. During replacement, the technician notices water stains and debris on the floor of the HVAC case below the filter. Which of the following is the MOST likely cause?

A. A leaking heater core that is dripping coolant into the HVAC case

B. The filter was not installed correctly at the last service, allowing water to bypass around the filter

C. The HVAC case condensate drain tube is clogged, allowing water from A/C evaporator condensation to back up and pool in the case — the drain must be cleared to prevent water damage to the floor and mold/mildew growth

D. The windshield cowl drain is leaking water into the HVAC intake

37. A vehicle with a returnless fuel system is difficult to start after sitting overnight but starts and runs normally once it does start. Fuel pressure bleeds down to zero within 30 minutes of shutdown. Which of the following is the MOST likely cause?

A. A leaking fuel injector, faulty check valve in the fuel pump, or a leaking fuel pressure regulator allowing fuel to drain back to the tank — the component that maintains residual fuel rail pressure when the pump is off has failed

B. A weak battery that loses voltage overnight and cannot prime the fuel pump

C. A clogged fuel filter that only restricts fuel during the low-flow conditions of startup

D. Normal fuel system behavior on returnless systems — fuel pressure is not maintained when the engine is off

38. A vehicle has a clunking noise from the front suspension that occurs when driving over small bumps at low speed. The technician inspects the sway bar end links, ball joints, and tie rod ends — all are tight with no play. The struts show no leaking. Which of the following components is MOST likely to produce this noise and is often overlooked?

A. The wheel lug nuts, which have loosened slightly

B. The strut upper bearing plate or mount — even when the strut is not leaking and the nut is tight, the internal bearing or rubber isolator can deteriorate, allowing movement that produces a clunk over bumps; this component is frequently missed because technicians focus on lower suspension joints

C. The brake caliper, which is shifting on its bracket

D. The steering rack mount bolts, which have loosened

39. A vehicle's A/C system has been recovered, evacuated, and recharged. The system pulls into a deep vacuum (below 500 microns) during evacuation. After closing the vacuum pump valve, the vacuum holds steady for 30 minutes. What does this confirm?

A. The vacuum test only confirms the system can be evacuated but does not confirm leak-free status

B. The vacuum test confirms the system is overcharged

C. The deep vacuum reading indicates the compressor is functional

D. The system is sealed and leak-free — if a leak were present, the vacuum would rise (toward atmospheric pressure) as air enters through the leak; a stable vacuum reading confirms no air is entering the system

40. A vehicle's steering wheel is equipped with audio controls, cruise control buttons, and a driver airbag. The technician needs to replace the clockspring. Which of the following precautions is essential?

A. The steering wheel must be locked in the straight-ahead position before the old clockspring is removed

B. The new clockspring should be wound fully clockwise before installation to ensure maximum travel

C. The SRS system must be disabled (battery disconnected, capacitor discharge waited), the steering wheel centered, and the new clockspring installed with its centering pin or index mark aligned to prevent the ribbon cable from being damaged during steering rotation

D. The clockspring can be installed in any rotational position since it self-centers during the first full steering lock-to-lock cycle

41. A vehicle's owner's manual lists a maintenance schedule with two columns: "Normal" and "Severe." The customer drives primarily in city traffic with frequent stops, short trips under 10 miles, and in hot weather. Which schedule should the technician recommend?

A. The severe service schedule — city driving with frequent stops, short trips, extreme temperatures, dusty conditions, and towing all qualify as severe service conditions that accelerate fluid degradation and component wear, requiring shorter maintenance intervals

B. The normal service schedule since the vehicle is not being used for towing or racing

C. A custom schedule created by the technician based on the vehicle's odometer reading

D. The customer should follow whichever schedule has the longest intervals to reduce maintenance costs

42. A technician replaces the fuel filter on a fuel-injected vehicle. After the repair, the engine cranks but will not start immediately — it takes 10–15 seconds of extended cranking before it fires and runs

normally. All subsequent starts are normal. What is the MOST likely explanation for the initial extended crank?

A. The new fuel filter is restricted and is limiting fuel flow

B. The fuel system lost prime during the filter replacement — the first start required extra cranking time to refill the filter, purge air from the fuel lines, and rebuild fuel rail pressure before the engine could start; all subsequent starts are normal because the system remains primed

C. The fuel pump relay was inadvertently damaged during the filter service

D. The replacement filter is the wrong part number and has a different flow rating

43. A vehicle with a V8 engine has a steady misfire on cylinder 7. The technician performs a compression test and finds cylinder 7 at 60 psi while all other cylinders are at 150 psi. A wet compression test (adding oil) on cylinder 7 raises the reading to only 65 psi. What does the wet test result indicate?

A. Worn piston rings would show a significant pressure increase with oil — a minimal increase suggests a valve sealing problem or head gasket leak

B. The minimal increase means the cylinder walls are severely scored

C. The compression gauge is malfunctioning on cylinder 7

D. Both the rings and valves have failed simultaneously — the wet test confirms worn rings and valves on the same cylinder

44. A customer reports a vibration that occurs ONLY when the vehicle is in Drive at a stoplight with the foot on the brake. The vibration disappears in Park and Neutral, and is not present while driving. Which of the following is the MOST likely cause?

A. A worn harmonic balancer that vibrates only under drivetrain load

B. An out-of-balance torque converter

C. A broken or collapsed engine/transmission mount — the mount cannot absorb the drivetrain torque reaction when the transmission is in gear with the brakes applied, transmitting the engine's vibration directly into the vehicle body; in Park/Neutral there is no drivetrain load, so the broken mount is not stressed

D. A worn flywheel that produces a vibration only when the torque converter locks up at idle

45. A vehicle's rear differential makes a howling noise during acceleration between 40 and 60 mph. The noise disappears during deceleration (coast) and is not present below 40 or above 60 mph. Which of the following is the MOST likely cause?

A. Improper ring and pinion gear backlash or a wear pattern on the drive side of the gear teeth — the specific speed range and the acceleration-only characteristic indicate the gear contact pattern is only problematic under drive-side loading at those speeds

B. Low differential fluid level causing inadequate lubrication

C. A worn pinion bearing that vibrates at specific rotational speeds

D. Worn axle shaft bearings producing a speed-dependent noise

46. A technician notices that a vehicle's tires are wearing faster on the outside edges of the front tires only. All four tires were rotated on schedule and tire pressures have been maintained at the placard specification. Which alignment angle is MOST likely out of specification?

A. Excessive positive caster

B. Excessive positive camber — positive camber tilts the tops of the tires outward, concentrating the vehicle's weight on the outer edges of the tread and causing accelerated wear on the outside shoulders

C. Excessive toe-in

D. Excessive negative caster

47. A vehicle has an electrical concern where the headlights flicker at idle. The problem goes away above 1,500 RPM. The battery is new and tests good. The alternator output is 14.2 volts at 2,000 RPM. Which of the following should the technician check FIRST?

A. The charging system output at idle, which may be different from the reading at 2,000 RPM

B. The alternator output specifically at idle speed — the alternator may produce adequate voltage at 2,000 RPM but drop below specification at the lower idle RPM due to worn brushes, weak magnets, or a developing stator fault; testing was only performed at 2,000 RPM, not at the speed where the symptom occurs

C. The headlight bulbs for the correct wattage

D. The headlight switch for excessive resistance

48. A vehicle's brakes have been serviced and the technician is performing a final test. During the road test, the technician applies the brakes from 40 mph. The vehicle stops in a straight line with a firm pedal, but the stopping distance feels longer than expected. Which of the following is the MOST likely cause?

A. The brake fluid needs to be replaced with a higher-specification fluid

B. The wheel lug nuts were not torqued correctly, allowing the wheels to shift during braking

C. The new brake pads have not been properly bedded — new pads require a break-in procedure of moderate stops from moderate speed to transfer an even layer of friction material to the rotor; until bedded, the pads operate at reduced efficiency and stopping distances are longer

D. The master cylinder has developed an internal leak from the service procedure

49. A technician is inspecting a battery and notices a crack in the battery case near the positive terminal. No acid is actively leaking, but there is residue around the crack. What is the correct action?

A. Replace the battery immediately — a cracked case is a structural failure that will worsen with vibration and temperature cycling, eventually leaking acid that corrodes surrounding components, creates a fire hazard, and can cause a short circuit; the battery cannot be repaired

B. Apply battery terminal sealant to the crack and monitor it at the next service

C. Reposition the battery in the tray so the crack faces away from other components

D. The crack is superficial if there is no active leak and the battery can continue in service

50. A vehicle's cooling system has a slow leak that the technician cannot find with a standard pressure test. The system holds pressure for the full test duration. The coolant level drops approximately one cup per month. Which of the following is a possible explanation?

A. The pressure test is defective and not applying adequate pressure

B. The coolant is evaporating naturally through the overflow bottle vent

C. One cup per month is the normal consumption rate for ethylene glycol coolant

D. The leak occurs only at operating temperature and pressure — a cold pressure test may not reveal leaks that open due to thermal expansion of gaskets or components under heat; a UV dye test during actual driving conditions is the next diagnostic step

51. A vehicle has a rough idle with a P0305 (Cylinder 5 Misfire). Fuel injector resistance on cylinder 5 measures 16 ohms. The specification is 12–14 ohms. What does this resistance reading indicate?

A. The injector resistance is within the normal range

B. The injector has higher-than-specified resistance, which reduces current flow through the coil and may cause the injector to open slowly, deliver less fuel, or not open at all — this could be the cause of the misfire on cylinder 5

C. The injector is shorted and drawing excessive current

D. Resistance measurements cannot diagnose fuel injector problems

52. A vehicle with electronic stability control (ESC) has the ESC light illuminated after a front brake pad replacement. No other warning lights are on. Which of the following is the MOST likely cause?

A. The ESC module was damaged when the caliper was removed

B. The new brake pads are incompatible with the ESC system

C. The wheel speed sensor was disconnected or damaged during the brake service and was not reconnected — the ESC requires input from all four wheel speed sensors and will disable itself and illuminate the warning light if any sensor signal is lost

D. The ESC system needs to be recalibrated after any brake service

53. A customer states that the vehicle's gas mileage dropped suddenly — not gradually — by approximately 20%. There are no DTCs, warning lights, or drivability complaints. Which of the following should the technician investigate FIRST?

A. Whether the customer recently changed driving habits, route, fuel brand, or if the fuel being used has changed to a winter blend (which has lower energy content) — sudden fuel economy changes without mechanical symptoms are frequently caused by external factors rather than vehicle faults

B. The fuel injectors for a simultaneous flow rate change on all cylinders

C. The catalytic converter for a sudden efficiency drop

D. The PCM calibration for an unauthorized software change

54. A technician is diagnosing a vehicle with a P0455 (EVAP Large Leak). The smoke test reveals smoke coming from the charcoal canister vent solenoid. Which of the following is the MOST likely cause?

A. The charcoal canister is saturated and pushing smoke back through the vent

B. The vent solenoid is stuck open when it should be closed during the EVAP leak test — the solenoid's purpose is to seal the vent side of the EVAP system during the leak monitor; if it fails to close, it creates a large leak path directly to the atmosphere

C. The smoke machine is pressurizing the system too aggressively

D. The purge solenoid is stuck open and routing smoke backward through the canister

55. A vehicle is in for a routine oil change. During the multi-point inspection, the technician discovers that the front suspension lower control arm has a hairline crack visible on the arm itself — not the

bushing. The customer has no complaints and the crack is not affecting current handling. Which of the following is the correct action?

A. Note the crack on the inspection report and recommend monitoring at the next service

B. Apply a weld repair to the cracked control arm to restore structural integrity

C. Replace the control arm bushing since the crack originates from the bushing pressing area

D. Immediately inform the customer that the control arm is a critical structural safety component that must be replaced before the vehicle is driven further — a cracked control arm can fail catastrophically during normal driving, cornering, or braking, resulting in loss of vehicle control

Practice Exam 10: Answer Key and Full Explanations

1. B — A refractometer reading of -10°F freeze protection is inadequate for a climate that reaches -25°F. The coolant mixture must protect below the coldest expected temperature with an additional safety margin — most manufacturers specify protection to at least -34°F, achieved with approximately a 50/50 to 60/40 coolant-to-water ratio. Increasing the coolant concentration raises the freeze point protection; however, exceeding 70% coolant actually reduces both freeze protection and heat transfer efficiency, so more is not always better.

2. D — Airbags are single-use pyrotechnic devices that cannot be reset, refolded, or reused after deployment. The deployed bag, its inflator module, any damaged crash sensors, the SRS control module (if it has recorded a deployment event), the clockspring (if steering column components were affected), and all damaged trim panels must be replaced. The SRS system must then be verified functional with a scan tool before the vehicle is returned to service. This is a non-negotiable safety repair.

3. A — SAE bolt grade markings use radial lines on the bolt head: the grade equals the number of lines plus two. Six radial lines = Grade 8 (6 + 2), which is the highest standard automotive grade with a minimum tensile strength of 150,000 psi. Grade 5 has three lines and Grade 2 has none. Using a lower-grade replacement bolt in a Grade 8 application — such as suspension or drivetrain — risks fastener failure under load. Always match or exceed the original bolt grade.

4. C — Every value listed is within normal operating range for a warmed-up engine at idle. MAP at 35 kPa indicates healthy manifold vacuum (atmospheric is ~101 kPa, so 35 kPa = ~66 kPa of vacuum = ~19.5 in. Hg). IAT of 85°F is reasonable on a warm day. ECT at 198°F is normal operating temperature.

STFT +2% and LTFT +3% are well within the ±5% acceptable range. RPM 750 is a standard idle speed. This question tests whether you can recognize NORMAL — a skill as important as identifying faults.

5. D — Elevated low-side pressure combined with reduced high-side pressure is the signature gauge reading of a compressor that cannot efficiently move refrigerant from the suction side to the discharge side. The compressor runs but cannot compress — worn reed valves, damaged pistons, or a broken valve plate allow refrigerant to leak internally from the high side back to the low side. A restriction would show low low-side and high high-side. An undercharge would show both readings low.

6. A — A hydraulic floor jack is a lifting device, NOT a support device. Hydraulic seals can fail, release valves can slip, and jacks can shift on the floor — all of which would drop the vehicle without warning. Jack stands are the ONLY acceptable support for working under a vehicle. The correct sequence is: lift with the jack at the specified point, position jack stands at the designated support locations, lower the vehicle onto the stands, and verify stability before going underneath.

7. A — The diagnostic process has confirmed spark (ignition) and fuel injector pulse (fuel delivery command). With both inputs verified present, the engine still refuses to start — which means combustion is not occurring despite having its two primary ingredients. The remaining possibility is mechanical: the engine must have adequate compression, and the spark and fuel events must occur at the correct time relative to piston position. A jumped timing belt/chain, severely low compression, or a mechanical timing failure would prevent starting even with confirmed spark and fuel.

8. B — The fuel composition sensor is a critical input on flex-fuel vehicles because E85 requires approximately 30% more fuel than gasoline for the same power output due to ethanol's lower energy density. The PCM uses the sensor's ethanol percentage reading to adjust injector pulse width, ignition timing, and fuel trim in real time. If the sensor fails or reports inaccurately, the PCM calculates the wrong fuel quantity — either too lean (rough running, hesitation) or too rich (poor economy, fouled plugs) — regardless of what fuel is actually in the tank.

9. D — A parking brake pedal or lever that travels to its full extent with zero resistance means the mechanical connection between the pedal/lever and the rear brakes has been completely interrupted. The cable has either broken, disconnected from the equalizer, or detached from the rear brake mechanism. A cable with resistance that simply doesn't hold would indicate a different problem (worn shoes, misadjustment). Complete absence of resistance is a disconnected or broken cable.

10. C — Technician A is correct. OSHA's Hazard Communication Standard (HazCom/GHS) requires that Safety Data Sheets be available for EVERY hazardous chemical in the workplace — not just

flammable ones. This includes brake cleaner, coolant, refrigerant, battery acid, solvents, adhesives, paints, and any other chemical that poses health or safety risks. Technician B is incorrect because SDS requirements extend to toxic, corrosive, reactive, and health-hazard chemicals — flammability is only one of many hazard categories.

11. A — The systematic swap test has eliminated both the spark plug and ignition coil as causes — the misfire stayed on cylinder 5 regardless of which plug or coil was installed. This means the fault is specific to cylinder 5's remaining components: the fuel injector (not delivering fuel), the compression (leaking valve, damaged piston ring, or head gasket breach at that cylinder), a vacuum leak at the cylinder 5 intake runner, or a wiring fault in the injector or coil driver circuit specific to that cylinder position.

12. C — The rubber diaphragm in a brake fluid reservoir cap serves two purposes: it drops with the fluid level to maintain contact with the fluid surface (preventing air space above the fluid), and it acts as a barrier that prevents moisture-laden atmospheric air from contacting the hygroscopic brake fluid. As brake pads wear, caliper pistons extend outward, displacing fluid from the reservoir into the calipers — the diaphragm follows the fluid level down. This is completely normal and indicates the system is functioning as designed.

13. B — A brake pad wear indicator (squealer tab) is a small metal tang attached to the brake pad backing plate that is positioned to contact the brake rotor when the pad friction material wears to minimum thickness. The tab drags against the rotor continuously during wheel rotation, producing a metallic scraping or squealing noise that serves as an audible warning. When the brakes are applied, the pad shifts slightly under hydraulic pressure, changing the tab's contact angle and altering the pitch of the noise.

14. D — New tires have full tread depth, sharper tread edges, and typically a different rubber compound than the worn tires they replaced — all of which increase the tire's contact patch area and rolling resistance. The wider, grippier contact patch requires more effort to turn the steering, especially at low speeds and during parking maneuvers where the tires must scrub against the pavement. This increased steering effort is a normal consequence of fresh tires and is not a vehicle deficiency.

15. A — Humidity-dependent misfires are the classic symptom of deteriorated ignition insulation. Spark plug boots, coil boots, and plug wire insulation develop microscopic cracks over time that are invisible to the eye. In dry conditions, air in the cracks acts as an adequate insulator. In high humidity or rain, moisture fills the cracks and creates a conductive path that allows ignition voltage to arc to the nearest ground — bypassing the spark plug gap and causing a misfire. Replacing the degraded boots or wires eliminates the moisture path.

16. C — When a technician causes damage to a customer's vehicle during a repair — regardless of whether the damage is related to the authorized work — the shop is professionally and legally responsible. The correct action is immediate transparency: inform the customer, explain what happened, and arrange for repair or replacement at the shop's expense. Concealing damage is both unethical and creates significant legal liability. Professional integrity and customer trust are the foundation of a successful repair business.

17. D — Technician A is correct. Fire extinguishers are classified by the type of fire they can extinguish: Class A for ordinary combustibles (wood, paper, cloth), Class B for flammable liquids (gasoline, oil, solvents), and Class C for electrical fires. A gasoline fire requires a Class B (or Class BC/ABC) extinguisher. Technician B is incorrect — a Class A extinguisher typically uses water, which spreads a flammable liquid fire and can cause electrocution on electrical fires. Most automotive shops use ABC-rated dry chemical extinguishers that cover all three fire classes.

18. B — Mismatched tire sizes between front and rear affect every system that relies on consistent wheel speed data. Different tire diameters produce different rotational speeds at the same vehicle speed, confusing ABS, traction control, and stability control. The speedometer calibration is based on the OEM tire size and reads incorrectly with different sizes. Alignment readings are also affected because ride height and suspension geometry change with different tire diameters. The correct tires must be installed before any alignment work has value.

19. A — Metals expand when heated. The aluminum intake manifold and cast iron cylinder head expand at different rates as they reach operating temperature. This differential thermal expansion can open a gap at the gasket interface that does not exist when the engine is cold. Additionally, the cooling system pressure increases with temperature, providing the force to push coolant through the newly opened gap. Cold pressure testing may not reveal the leak because the gap has not opened and the test pressure may be lower than actual operating system pressure.

20. C — On A/C systems equipped with a sight glass (typically older R-12 or some R-134a systems), a clear sight glass with no bubbles indicates a full liquid column — the system has adequate liquid refrigerant at that point. A steady stream of bubbles indicates the liquid column is incomplete — gaseous refrigerant is mixing with liquid, which means the system is undercharged. Occasional bubbles during compressor cycling can be normal, but a continuous stream requires additional refrigerant until the glass clears.

21. D — A single cylinder reading 90 psi against three cylinders reading 148–155 psi represents a 40% variation — far beyond the maximum 10–15% variation threshold for acceptable engine condition. The wet test is the next diagnostic step: adding a tablespoon of oil to the low cylinder temporarily seals the

piston rings. If compression rises significantly (to near the other cylinders), worn rings are confirmed. If compression barely changes, the rings are adequate and the problem is in the valve train or head gasket.

22. B — Multiple electrical symptoms affecting different systems (door locks AND interior lights) that occur simultaneously and intermittently point to a shared circuit path. The wiring harness that passes through the door jamb area — where it flexes every time the door opens and closes — is the most common failure point for multi-circuit intermittent problems. Wire conductors fatigue and break internally while the insulation remains intact, creating intermittent opens and shorts that affect every circuit in the bundle.

23. A — The Uniform Tire Quality Grading system is a federally mandated rating that provides consumers with comparative information about three tire performance characteristics. Treadwear is a relative index: a tire rated 400 is expected to last twice as long as a tire rated 200 under controlled test conditions. Traction grades (AA, A, B, C) rate wet stopping ability. Temperature grades (A, B, C) rate heat resistance at sustained speed. These ratings help consumers make informed comparisons between tire models.

24. C — Direct TPMS systems assign each sensor's unique radio frequency ID to a specific wheel position in the TPMS module's memory. When tires are rotated, the sensors physically move to new positions, but the module still has them mapped to their old locations. A TPMS relearn procedure — using a TPMS activation tool to trigger each sensor in sequence while the module listens — updates the module's position map to match the sensors' new locations. Without relearning, the displayed pressures are accurate but assigned to the wrong corners.

25. D — Blue-gray smoke on deceleration only is the textbook symptom of worn valve stem seals. During closed-throttle deceleration, intake manifold vacuum is at its highest (strongest suction). This high vacuum pulls engine oil past deteriorated valve stem seals and down the valve guides into the combustion chambers, where it burns as blue-gray smoke. During acceleration, positive manifold pressure pushes oil away from the seals, and at idle, vacuum is moderate. The deceleration-only pattern is diagnostic for valve stem seals specifically.

26. B — Standard household electrical connectors (uninsulated butt splices, wire nuts, twist-and-tape) are designed for indoor, climate-controlled, vibration-free environments. The automotive underhood environment subjects wiring to extreme temperature cycling (-20°F to 250°F+), constant vibration, road splash, salt, oil contamination, and chemical exposure. Household connectors corrode, loosen, and fail in these conditions — often causing intermittent problems that are extremely difficult to diagnose. Automotive-grade sealed connections prevent these failures.

27. C — Power steering fluid expands as it heats up during system operation. The dual-level markings on the reservoir account for this thermal expansion: the "cold" line is the correct fill level at ambient temperature, and the "hot" line is the correct fill level at operating temperature. If the fluid is at the cold line when the engine is cold, it will rise to the hot line when the system reaches operating temperature — this is exactly correct. Filling to the hot line when cold will result in overfilling when hot.

28. A — The carburetor cleaner spray test is a standard vacuum leak detection method. When the flammable cleaner is sprayed at a gasket interface, it is drawn into the engine through any gap in the seal. The combustible cleaner momentarily enriches the air-fuel mixture in the cylinders nearest the leak, causing a temporary RPM increase. The location where the RPM changes identifies the exact point of the vacuum leak. This confirms an intake manifold gasket leak at the rear of the manifold as the source of the P0171 lean condition.

29. D — On a V6 engine, the cylinders are divided into two banks of three. When misfires occur exclusively on cylinders 2, 4, and 6 — which are typically all on the same bank — the cause is almost certainly bank-specific rather than random. Possible bank-specific causes include an intake manifold gasket leak on that bank, a failed ignition coil pack on a waste-spark system that fires that bank's cylinders, a camshaft position sensor issue on that bank, or a head gasket failure isolated to that side. This pattern recognition skill prevents wasting time investigating individual cylinder faults.

30. B — An exhaust hanger may seem like a minor component, but it plays a critical role in supporting the exhaust system at the correct position relative to the undercarriage. A broken hanger allows the exhaust to sag, creating stress at the pipe joints that leads to fatigue cracking and eventual exhaust leaks. A sagging pipe can also contact the driveshaft, fuel lines, brake lines, or heat-sensitive components, and an exhaust leak near the cabin allows carbon monoxide to enter the passenger compartment through floor seams or HVAC intake.

31. C — Removing the serpentine belt eliminated the noise, confirming the source is one of the belt-driven accessories. The next step is to identify WHICH accessory has the failing bearing by spinning each component's pulley BY HAND with the belt removed. A rough, grinding, or notchy bearing is immediately obvious when spun manually. The idler pulley and tensioner pulley are the most common failures because they have the smallest bearings and spin at the highest speeds. Alternator, water pump, power steering pump, and A/C compressor bearings can also fail.

32. D — Freeze frame data captures the engine's operating conditions at the moment the DTC was stored. ECT 195°F confirms the engine was fully warmed up, RPM 2,200 and vehicle speed 55 mph indicate steady highway cruising, fuel trim at +1% is essentially perfect mixture control, and engine load at 45% is a moderate, stable load. This data proves the converter efficiency code was not triggered by a

cold engine, a misfire, a rich condition, or any other temporary abnormality — the converter is genuinely deteriorated under normal operating conditions.

33. A — Technician B is correct. The minimum thickness (discard) specification is an absolute engineering limit calculated to provide the rotor with sufficient mass for heat dissipation and structural strength during emergency braking. A rotor below this thickness can overheat, warp, develop thermal cracks, or fracture under the extreme forces of panic braking. No surface condition — however rough — justifies machining a rotor below this specification. If machining would take the rotor below the discard limit, the rotor must be replaced.

34. B — Brake pad bedding (break-in) is a deliberate procedure of moderate stops from moderate speed that transfers a thin, uniform layer of pad friction material onto the rotor surface. This transfer layer is essential for consistent braking performance. Without proper bedding, material transfers unevenly — creating high spots that develop into measurable thickness variation over a few thousand miles. The variation produces the pulsation the customer feels. Proper bedding after EVERY pad and rotor installation prevents this common comeback.

35. D — The diagnostic process systematically eliminated each possibility: the noise is present on-lift (ruling out tire noise from road contact), and hand-spinning the wheel bearings with axle shafts removed revealed no bearing roughness. With the tires, wheel bearings, and axle shafts isolated, the remaining rotating component during the on-lift test is the differential — the ring gear, pinion gear, and carrier bearings are still spinning because the driveshaft drives them. A differential gear noise typically presents as a hum or whir that changes character between acceleration, coast, and cruise.

36. C — When the A/C system operates, the cold evaporator core causes moisture in the air to condense — just like a cold glass on a humid day. This condensation is supposed to drain out of the HVAC case through a rubber drain tube that exits under the vehicle. When the drain tube clogs with debris, mold, or insulation material, the water pools inside the case, eventually overflowing onto the cabin floor. The standing water also creates an ideal environment for mold and mildew growth that produces the musty odor commonly associated with A/C operation.

37. A — A returnless fuel system maintains residual pressure in the fuel rail after shutdown through three components: a check valve in the fuel pump prevents fuel from draining back to the tank by gravity, the fuel pressure regulator (or control valve) prevents pressure bleed-off through the return path, and the fuel injector seals prevent fuel from leaking into the cylinders. If any of these three components fails, fuel rail pressure bleeds to zero during shutdown, requiring extended cranking to rebuild pressure before the engine can start.

38. B — The strut upper mount and bearing plate sit at the top of the MacPherson strut assembly, sandwiched between the coil spring and the vehicle body. This component absorbs vertical road impacts AND allows the strut to rotate with the steering. When the internal bearing wears or the rubber isolator deteriorates, the mount develops play that produces a distinct clunk over bumps — even when the strut shaft nut is tight, the strut is not leaking, and all lower suspension joints are good. This component is frequently missed because inspection requires removing the strut assembly.

39. D — The vacuum decay test is the industry-standard method for verifying A/C system integrity before charging. A properly sealed system pulled to a deep vacuum (500 microns or below) will hold that vacuum indefinitely because no air can enter through a sealed system. If a leak exists — even a very small one — atmospheric pressure will slowly push air into the evacuated system, causing the vacuum reading to rise toward atmospheric pressure over time. A stable vacuum for 30 minutes confirms the system is sealed and ready for refrigerant charging.

40. C — The clockspring maintains electrical connections between the rotating steering wheel (airbag, horn, audio controls, cruise control) and the stationary vehicle wiring. It uses a coiled ribbon cable that winds and unwinds as the steering wheel rotates. If the clockspring is not centered (aligned to the steering wheel's straight-ahead position) during installation, the ribbon cable can reach its maximum travel during a full steering lock turn and tear — destroying the clockspring and disabling the airbag, horn, and steering wheel controls. The centering pin or index mark must be aligned precisely.

41. A — Most drivers assume their normal daily driving qualifies as "normal" service conditions, but manufacturer definitions of "severe" service include conditions that the majority of drivers actually experience: frequent short trips under 10 miles (engine never fully warms up), stop-and-go city driving, extreme heat or cold, dusty conditions, and trailer towing. These conditions accelerate oil degradation, filter clogging, brake wear, and fluid contamination. The severe schedule — with shorter intervals — is the correct recommendation for this customer's actual driving pattern.

42. B — Replacing the fuel filter requires disconnecting the fuel lines, which allows air to enter the system and fuel to drain from the filter and surrounding lines. On the first start after reassembly, the fuel pump must fill the empty filter, push air out of the lines, and rebuild rail pressure from zero — all of which takes longer than a normal start where the system is already primed. Once the system is filled and pressurized, subsequent starts are normal because the fuel system retains its prime. This is expected post-service behavior, not a fault.

43. D — The wet compression test differentiates between ring/bore wear and valve/gasket problems. Oil added to the cylinder temporarily seals the piston rings, so if worn rings are the cause of low compression, the reading should increase substantially (30+ psi) with oil. In this case, adding oil raised

compression from 60 to only 65 psi — a minimal increase that indicates the rings are NOT the primary problem. The low compression is instead caused by a valve that is not sealing (burned, bent, or improperly seated) or a head gasket leak on that cylinder.

44. C — A vibration that appears ONLY in Drive/Reverse at idle with the brakes applied — and disappears in Park/Neutral — is the textbook symptom of a broken or collapsed engine/transmission mount. In Park/Neutral, the drivetrain is unloaded and the engine vibrates at its normal idle amplitude. In Drive with the brakes holding the vehicle stationary, the torque converter creates a reaction torque that twists the engine against its mounts. A healthy mount absorbs this torque silently; a failed mount allows the engine to shift and transmit its vibration directly into the body.

45. A — Differential gear noise that occurs only during acceleration within a specific speed range indicates a gear tooth contact pattern issue on the DRIVE side of the ring gear teeth. Ring and pinion gears mesh differently under drive torque versus coast torque, and at different speeds the gear mesh frequency excites different resonances. The noise disappearing during coast (deceleration) confirms the problem is on the drive-side contact pattern specifically. Incorrect backlash, a worn drive-side tooth face, or an improper gear set installation are the most common causes.

46. B — Wear concentrated on the outside edges of both front tires — with even pressure and regular rotation — indicates the tires are making excessive contact on their outer shoulders. Excessive positive camber tilts the tops of the tires outward, shifting the vehicle's weight toward the outer edges of the tread. Over time, this unequal loading wears the outside edges while the inner tread remains relatively unworn. Negative camber would produce inner-edge wear. Toe issues produce feathered wear across the entire tread.

47. B — The critical diagnostic gap in this scenario is that the alternator was tested at 2,000 RPM but the symptom occurs at idle. Alternator output is proportional to rotor speed — at idle, the alternator spins at its slowest and produces its lowest output. Worn brushes, a developing stator fault, or weak rotor magnetism can produce adequate voltage at 2,000+ RPM but drop below the minimum voltage needed to maintain system loads at the slower idle speed. The technician must test the alternator AT IDLE — where the symptom occurs — to reveal the fault.

48. C — New brake pads require a bedding (break-in) procedure to achieve their full braking effectiveness. During bedding, a series of moderate stops from moderate speed gradually transfers a thin, uniform layer of pad material onto the rotor surface. Until this transfer layer is established, the pad-to-rotor friction is lower than its designed capability, resulting in longer stopping distances. Most brake pad manufacturers include bedding instructions with their pads, and technicians should perform or instruct the customer on the procedure after every pad installation.

49. A — A cracked battery case is a structural failure that will progressively worsen due to vibration, thermal cycling, and internal pressure from hydrogen gas generation during charging. Sulfuric acid leaking from the crack corrodes the battery tray, nearby wiring, and underhood components. Acid on metal surfaces creates a fire hazard, and a cracked case can lead to a short circuit if the crack allows the electrolyte level to drop and expose the plates unevenly. The battery must be replaced immediately — no sealant or repair is appropriate for a cracked case.

50. D — A cooling system that holds pressure during a standard cold test but still loses coolant slowly may have a leak that only manifests at full operating temperature and pressure. Gasket materials, O-rings, and metal interfaces expand with heat, and some leaks only open when the components reach operating temperature and the system reaches full operating pressure (which may exceed the test gauge pressure). Adding UV dye to the coolant and driving the vehicle under normal conditions, then inspecting with a UV light, reveals the leak path that the cold pressure test cannot reproduce.

51. B — The fuel injector's resistance specification is 12–14 ohms. A reading of 16 ohms exceeds this range, indicating increased resistance in the injector coil winding — likely from a partial winding break, corrosion at the internal connections, or heat damage to the coil wire. Higher resistance reduces the current flowing through the coil when the PCM commands the injector to open, weakening the magnetic field that lifts the pintle off its seat. The result is an injector that opens late, stays open for less time, or doesn't open fully — delivering less fuel and causing the misfire.

52. C — The ESC system depends on all four wheel speed sensors to calculate each wheel's rotational speed and detect traction loss. During front brake pad replacement, the caliper must be removed, and on many vehicles, the wheel speed sensor wiring harness clips to the caliper bracket or is routed nearby. If the sensor connector was inadvertently left disconnected, the sensor wire was stretched or cut, or the sensor was bumped out of alignment during the service, the ESC module loses that wheel's speed input and disables the system.

53. A — A sudden 20% fuel economy decrease with no DTCs, no warning lights, and no drivability symptoms almost always has a non-mechanical explanation. Common external causes include a seasonal gasoline blend change (winter fuel has lower energy content and can reduce economy by 5–15%), a change in driving route (more hills, more city driving, more idling), a change in driving style (heavier foot, higher speeds), increased use of accessories (A/C, heated seats), or even a different fuel station with different actual octane or ethanol content. Investigating these factors before tearing into the vehicle prevents unnecessary repairs.

54. B — During the EVAP system self-test, the PCM commands the vent solenoid CLOSED to seal the system so it can monitor for pressure changes that indicate a leak. If the vent solenoid is stuck open

(failed electrically or mechanically), the EVAP system has a direct path to atmosphere through the open vent, which the PCM detects as a large leak. Smoke escaping from the vent solenoid during a smoke test visually confirms the solenoid is not closing. Replacing the vent solenoid and retesting resolves the P0455.

55. D — A cracked lower control arm is a critical structural safety failure that requires immediate action. The control arm is a primary load-bearing suspension component that connects the wheel assembly to the vehicle frame and endures cornering forces, braking forces, and road impacts with every mile driven. A crack will propagate under these cyclic loads until the arm fails completely — potentially causing the wheel to separate from the vehicle or the suspension to collapse during cornering or braking. The vehicle should not be driven until the arm is replaced.