PRACTICE EXAM 13: ASE G1 SIMULATION — 55 QUESTIONS

1. A vehicle's engine oil filler cap has a label that reads "API SN Plus / ILSAC GF-5, SAE 0W-20." A customer asks if they can use an oil labeled "API SP / ILSAC GF-6A, SAE 0W-20" instead. Which of the following is the correct response?

A. Yes — API SP and ILSAC GF-6A are newer specifications that are backward-compatible with SN Plus and GF-5, meaning they meet or exceed all the requirements of the older standards while adding additional protection

B. No — different API service categories are never interchangeable and using a newer specification will damage the engine

C. Only if the engine has fewer than 75,000 miles

D. Only if the oil is full synthetic rather than conventional

2. A vehicle's backup camera displays a black screen when the transmission is shifted into Reverse, but the camera guidelines (trajectory lines) are visible on the display. Which of the following is the MOST likely cause?

A. The display unit has failed and must be replaced

B. The transmission range sensor is not correctly identifying the Reverse position

C. The backup camera lens is completely obstructed (covered with mud, ice, or grime) or the camera has failed — the display is receiving the video signal framework (guidelines) from the head unit software but the camera is not transmitting an image

D. The camera wiring harness has a short to power that is overloading the display

3. A vehicle with an all-wheel-drive (AWD) system requires tire replacement. Only one tire is damaged and the other three tires have 7/32nds of tread remaining. The customer wants to replace only the damaged tire. Which of the following is the correct recommendation?

A. Replace the one damaged tire with any tire of the same size

B. Replace the damaged tire with the same brand, model, and size, AND have the replacement tire shaved (trued) to match the tread depth of the remaining three — AWD systems require all four tires to have nearly identical rolling circumference to prevent damage to the center differential or transfer case

C. Replace all four tires even though three are nearly new

D. Replace the damaged tire and its partner on the same axle, leaving the other axle's tires unchanged

4. A vehicle's CAN (Controller Area Network) bus communication system has a total communication failure — the scan tool cannot communicate with ANY module. The technician measures the resistance between CAN-High and CAN-Low at the DLC with the ignition off. The reading is 65 ohms. The specification is 60 ohms (two 120-ohm terminating resistors in parallel). Which of the following is the correct interpretation?

A. The 65-ohm reading is within acceptable tolerance and the CAN bus hardware is not the cause of the communication failure

B. One of the 120-ohm terminating resistors has failed open, and the remaining single resistor is reading 120 ohms

C. The CAN bus wires are shorted together, producing the low reading

D. The 65-ohm reading is close to specification and suggests the bus termination is likely intact — the communication failure may be caused by a module that is pulling the bus voltage to an incorrect level, a damaged CAN wire between modules, or a shorted module dragging the bus down; further testing with an oscilloscope to view the CAN waveform is needed

5. A technician is testing a rear window defroster grid for an open (break) in one of the grid lines. Using a voltmeter with the defroster turned on, the technician places the positive probe at the powered (bus bar) end of the suspected grid line and the negative probe at the grounded end. The reading is 12 volts. What does this confirm?

A. The grid line is open and no current is flowing — the 12-volt reading is simply the potential difference between the energized supply and the grounded return with no load (current) between them

B. The grid line is functioning normally and carrying full current

C. The grid line is complete and current is flowing — the 12-volt reading across the full length of an intact grid line is expected because the resistive grid drops the full source voltage across its length from the power bus bar to the ground bus bar

D. The voltmeter is connected incorrectly and should be reversed

6. A vehicle equipped with front and rear parking sensors has a steady warning tone from the rear sensors even when no objects are behind the vehicle. All rear sensors appear visually clean. Which of the following is the MOST likely cause?

A. One or more rear parking sensors have failed internally and are sending a false proximity signal, OR a sensor has become misaligned and is detecting the vehicle's own bumper or trailer hitch as an obstacle

B. The front sensors are cross-signaling and activating the rear warning tone

C. The parking sensor control module requires a software update

D. The rear camera is malfunctioning and sending a false image to the sensor module

7. A technician is diagnosing a vehicle with a P0325 (Knock Sensor 1 Circuit). The engine has a noticeable pinging (detonation) sound under acceleration that was not present before the code appeared. Which of the following BEST explains the relationship between the code and the symptom?

A. The knock sensor failure is caused by the detonation — the constant pinging has overloaded and damaged the sensor

B. The P0325 code and the pinging are separate, unrelated issues

C. The detonation is caused by low fuel octane, which will damage the knock sensor over time

D. The knock sensor has failed, so the PCM cannot detect detonation and is unable to retard ignition timing to prevent it — the pinging occurs because the PCM's knock-protection strategy is disabled without sensor input

8. A vehicle's rain-sensing automatic wiper system activates the wipers even when the windshield is dry. The wipers operate normally in all manual modes. Which of the following is the MOST likely cause?

A. The wiper motor is internally shorted and running intermittently

B. The rain sensor (typically mounted on the inside of the windshield near the rearview mirror) is contaminated, improperly mounted, or has lost its optical gel coupling to the glass — the sensor misreads the glass condition and commands wipers when no rain is present

C. The multifunction switch has a faulty auto-wipe contact

D. The BCM is receiving false speed signals that trigger the automatic wiper mode

9. A customer brings in a vehicle with an engine oil specification that requires "dexos1 Gen 3" approved oil. The technician has a conventional 5W-30 oil on the shelf that meets API SP but is NOT dexos-approved. Which of the following is correct?

A. The dexos specification includes requirements beyond the API standard — such as specific LSPI (low-speed pre-ignition) protection, turbocharger deposit control, and timing chain wear protection — and a non-dexos oil should not be used even if it meets the API service category; using unapproved oil may void the powertrain warranty

B. Any API SP oil automatically meets dexos1 Gen 3 requirements

C. Dexos is a marketing label only and has no engineering significance beyond the API specification

D. Conventional oil can never meet the dexos specification regardless of its additive package

10. A vehicle has a whining noise from the transmission area that changes pitch with vehicle speed. The noise is present in all forward gears but disappears when the transmission is in Neutral at the same engine RPM. Which of the following does this confirm?

A. The noise source is the engine, since it changes with RPM

B. The torque converter is the source because it is always engaged in forward gears

C. The serpentine belt is slipping under the load of forward gear engagement

D. The noise source is AFTER the torque converter — within the transmission's gear train, output shaft, or related bearings — because the noise requires gear engagement (load through the planetary gearsets) and disappears in Neutral when the gear train is unloaded

11. Technician A says that a direct fuel injection (GDI) system operates at fuel pressures between 500 and 3,000+ psi. Technician B says that a port fuel injection system operates at fuel pressures between 30 and 60 psi. Who is correct?

A. Technician A only

B. Technician B only

C. Both Technician A and Technician B — GDI systems use a mechanical high-pressure pump driven by the camshaft to achieve the extreme pressures needed to inject fuel directly into the combustion chamber against compression pressure, while port injection systems operate at much lower pressures because they inject into the intake port where cylinder pressure is not a factor

D. Neither Technician A nor Technician B

12. A vehicle's heated steering wheel does not produce heat. The steering wheel control button illuminates when pressed. The vehicle's other heated features (seats, mirrors) work normally. Which of the following is the MOST likely cause?

A. The vehicle's battery voltage is too low to power all heated accessories simultaneously

B. The heating element inside the steering wheel rim or the wiring in the clockspring that carries current to the heating element has failed — the button illuminating confirms the switch and its circuit are functional, but the heating element itself is not receiving current or has opened internally

C. The BCM has disabled the heated steering wheel due to a software fault

D. The heated steering wheel requires a separate fuse that powers all steering column accessories

13. A vehicle is brought in for a routine oil change. During the inspection, the technician notices that both front seat belt pretensioner covers (at the base of the B-pillar) appear to have deployed — the plastic covers are cracked open. The customer states the vehicle has never been in an accident. Which of the following is the MOST important action?

A. Replace the pretensioner covers with new ones and return the vehicle to service

B. Inform the customer that deployed pretensioners indicate the SRS system has activated — the vehicle may have been in a previous collision that was repaired without replacing the pretensioners; the SRS system must be fully inspected, and the pretensioners must be replaced before the seat belts can be relied upon for crash protection

C. The cracked covers are a cosmetic issue caused by UV deterioration and have no safety significance

D. Reset the SRS module with a scan tool to restore pretensioner function

14. A vehicle equipped with automatic high-beam headlights has a customer complaint that the system does not switch to low beams when oncoming traffic approaches. Manual high/low beam switching works normally. Which of the following is the MOST likely cause?

A. The automatic high-beam control module has a faulty sensitivity setting

B. The headlight switch is overriding the automatic function

C. The high-beam headlight relay is stuck in the energized position

D. The forward-facing camera or light sensor that detects oncoming headlights is obstructed, dirty, misaligned, or has failed — the system cannot detect approaching vehicle lights and does not command the switch to low beams

15. A vehicle's engine coolant is described as "HOAT" (Hybrid Organic Acid Technology) and is gold/yellow in color. The customer wants to top off the coolant with green "IAT" (Inorganic Acid Technology) coolant that they have at home. Which of the following is the correct advice?

A. Do not mix IAT and HOAT coolants — the different additive chemistries can react and form gels that clog passages and neutralize the corrosion protection of both formulations; only the manufacturer-specified HOAT coolant should be used

B. Any coolant is acceptable as long as it is mixed with the correct ratio of distilled water

C. Green coolant can be mixed with any other coolant type in small amounts without consequence

D. Color alone determines compatibility — as long as the colors are close, the coolants can be mixed

16. A vehicle has an intermittent "Service Tire Monitor" message on the driver information display. The message appears randomly and then clears on its own. All tire pressures are correct and stable. The TPMS sensors were replaced 6 months ago. Which of the following is the MOST likely cause?

A. The new sensors are defective and all four must be replaced again

B. The tire pressures are fluctuating with temperature and triggering the message

C. One of the replacement TPMS sensors has a weak signal due to a failing battery, intermittent antenna connection, or RF interference from an aftermarket device — the intermittent nature points to a signal that is borderline: sometimes strong enough to be received and sometimes not

D. The TPMS module is overdue for a software update

17. A technician is diagnosing a vehicle that stalls intermittently at idle. During the stalling event, the scan tool shows the engine RPM drops from 700 to 0 instantly — not a gradual decline. Which of the following does the INSTANT RPM drop indicate?

A. A vacuum leak that is too large for the idle control system to compensate

B. A fuel delivery problem that gradually starves the engine

C. A failing IAC valve that slowly restricts airflow

D. An electrical interruption — such as a failing crankshaft position sensor, a loose ignition switch connection, or a wiring fault — that instantly kills the ignition or fuel system; a mechanical or fuel-related stall produces a gradual RPM decline as the engine struggles before stopping

18. A vehicle's power liftgate opens partway and then reverses direction and closes. There are no obstructions in the liftgate's path. Which of the following is the MOST likely cause?

A. The liftgate struts (gas springs) are weak and cannot support the weight of the liftgate — the liftgate motor encounters excessive resistance from the weight, the system interprets this as an obstruction (anti-pinch protection), and reverses direction as a safety measure

B. The liftgate latch sensor is misadjusted and signals a closed position prematurely

C. The liftgate motor relay is cycling due to a voltage drop

D. The BCM is receiving a false door-ajar signal that interrupts the liftgate cycle

19. A vehicle's engine has a ticking noise at idle that goes away when the oil filler cap is placed loosely on the valve cover opening (not sealed). What does this test indicate?

A. The PCV valve is stuck closed, creating excessive crankcase pressure

B. The oil level is low, causing the ticking from inadequate lubrication

C. The noise is caused by a slight vacuum leak at the valve cover gasket — placing the cap over the opening restricts the air leak path and changes the pressure dynamics enough to quiet the noise; the valve cover gasket needs replacement

D. The noise is a normal lifter tick that is dampened by the backpressure of the sealed cap

20. A vehicle's front brake caliper has a single piston. After a brake pad replacement, the technician notices that the caliper is not centered over the rotor — it is shifted to one side, and the outer pad is not contacting the rotor evenly. Which of the following is the MOST likely cause?

A. The brake rotor is warped and pushing the caliper off-center

B. The caliper bracket is not fully seated against the steering knuckle — a bolt may not be tightened, a locating pin is missing, or debris between the bracket and knuckle is preventing proper alignment

C. The replacement brake pads are the wrong thickness

D. The caliper piston has seized in a partially extended position

21. A vehicle has a check engine light with DTC P0420. The customer had the catalytic converter replaced 5,000 miles ago at another shop. Which of the following should the technician investigate FIRST?

A. Whether the replacement converter has already failed due to an underlying engine problem

B. Whether the original P0420 was caused by an exhaust leak that was not repaired during the converter replacement

C. Whether the new converter is a genuine OEM unit or a universal fit

D. All of the above — the code returning after converter replacement suggests either the new converter was inadequate for the application (many aftermarket universal converters do not meet OBD II catalyst efficiency requirements), or an underlying engine condition (misfires, rich running, oil consumption) is damaging the new converter, or the original root cause (exhaust leak, O2 sensor fault) was never addressed

22. A technician is testing a vehicle's CAN bus with a DMM. With the ignition on and the engine off, the voltage between CAN-High and chassis ground reads 2.6 volts, and CAN-Low reads 2.4 volts. Which of the following is the correct interpretation?

A. These readings are within normal range — CAN-High sits at approximately 2.5V + 1V = 3.5V during a dominant bit and 2.5V during a recessive bit, while CAN-Low sits at approximately 2.5V - 1V = 1.5V during dominant and 2.5V during recessive; the DMM averages these rapid oscillations, and readings near 2.5V on both lines with a slight differential indicate a functioning bus

B. CAN-High should read 5.0 volts and the reading indicates a failed bus

C. CAN-Low should read 0 volts and the reading indicates a short to power

D. Both readings should be exactly 2.5 volts, and any deviation indicates a fault

23. A vehicle with electronic stability control (ESC) has a yaw rate sensor DTC stored after the vehicle hit a large pothole. The ESC light is illuminated. Which of the following is the correct action?

A. Replace the yaw rate sensor immediately since pothole impacts always destroy the sensor

B. Reprogram the ESC module to recalibrate the yaw rate sensor baseline

C. Clear the code, road test the vehicle, and monitor for code return — the pothole impact may have caused a momentary signal spike that set the code but did not permanently damage the sensor; if the code returns, the sensor must be inspected for damage and tested per the manufacturer's procedure

D. Perform a four-wheel alignment, which will automatically recalibrate the yaw rate sensor

24. A vehicle's engine oil consumption has been measured at 1 quart per 800 miles. The manufacturer's stated acceptable consumption rate is 1 quart per 2,000 miles. There are no external leaks and minimal visible exhaust smoke. Which of the following is the correct approach?

A. This consumption rate is within the acceptable range for modern engines

B. Document the oil consumption rate, compare it to the manufacturer's specification, and inform the customer that the consumption exceeds the manufacturer's threshold — further diagnosis (leak-down test, PCV system inspection, valve seal evaluation) is warranted to determine the internal cause

C. Add a thicker oil to reduce consumption

D. Switch to a high-mileage oil additive to swell the valve seals

25. A vehicle's side curtain airbags are marked with an expiration date printed on a label attached to the airbag module. The date has passed. Which of the following is the correct action?

A. Side curtain airbag expiration dates are advisory only and do not affect deployment reliability

B. The expired airbag modules still function normally and no action is required

C. Inflate the airbags manually to test them before determining if replacement is needed

D. Consult the manufacturer's service information — some manufacturers specify that airbag components (particularly pyrotechnic inflators) must be replaced after a certain number of years because the propellant and initiator compounds degrade over time and may not deploy with the required force in a collision

26. A vehicle has a parasitic draw of 200 milliamps that has been traced to the radio/entertainment system fuse. With the fuse pulled, the draw drops to 40 milliamps. The customer states that a phone USB charger is always left plugged into the center console USB port. Which of the following should the technician check FIRST?

A. Whether the USB charger or a device plugged into it is keeping the entertainment system module from entering sleep mode — many aftermarket chargers and devices draw current continuously and prevent the connected module from completing its power-down sequence, creating a parasitic draw

B. The radio amplifier for a shorted output transistor

C. The navigation system antenna for moisture intrusion

D. The rear-seat entertainment screen for a stuck-on backlight

27. A vehicle's engine has a rough idle and a slight vacuum leak has been detected with a smoke test at the intake manifold gasket. The technician measures engine vacuum at 16 inches of mercury (in. Hg). After temporarily sealing the leak with tape, the vacuum rises to 19 in. Hg and the idle smooths out. What does this test confirm?

A. The vacuum leak is only a minor contributor to the rough idle and other causes should be investigated

B. The intake manifold gasket requires replacement but the rough idle may have a separate cause

C. The vacuum leak is the confirmed cause of the rough idle — the measurable vacuum increase and idle quality improvement when the leak is sealed prove that the leak was the primary cause of the symptom; repairing the intake manifold gasket should resolve the complaint

D. Engine vacuum at 16 in. Hg is within normal range and the rough idle is not related to the leak

28. A vehicle equipped with a variable intake manifold runner control (IMRC) system has a P2004 DTC (Intake Manifold Runner Control Stuck Open — Bank 1). The engine has reduced low-end torque but normal high-RPM power. Which of the following explains this DTC and symptom?

A. The IMRC flaps control A/C airflow and have no effect on engine performance

B. The IMRC system uses movable flaps in the intake manifold that close at low RPM to increase air velocity and improve low-end torque, then open at high RPM for maximum airflow — when a flap is stuck open, the low-speed air velocity benefit is lost, reducing low-end torque while high-RPM performance remains unaffected

C. The IMRC system only affects emissions and has no drivability impact

D. The IMRC flaps control exhaust gas recirculation flow and a stuck flap causes excessive EGR at low RPM

29. A vehicle's key fob remote works from a much shorter distance than normal — the customer must be within 5 feet of the vehicle instead of the usual 30–50 feet. All functions (lock, unlock, trunk, panic) work when the customer is close enough. Which of the following is the MOST likely cause?

A. The key fob battery is weak and producing a reduced-strength radio signal — the fob still functions at close range where the attenuated signal is strong enough for the vehicle's receiver to detect, but cannot reach the vehicle from the normal operating distance

B. The vehicle's receiver antenna has been damaged in a collision

C. RF interference from a nearby cell tower is blocking the fob signal

D. The key fob needs to be reprogrammed to restore full range

30. A technician is performing a tire rotation on a vehicle with directional tires AND a staggered fitment (different size front and rear tires). Which of the following is the correct rotation procedure?

A. Cross-rotate the tires in an X-pattern

B. Rotate front to rear and rear to front on the same side

C. Rotate only the front pair side to side and the rear pair side to side

D. These tires cannot be conventionally rotated — directional tires with staggered fitment can only be swapped side-to-side on the same axle, which requires dismounting and remounting the tires reversed on the rims to maintain the correct rotational direction; many owners choose to simply replace tires in pairs rather than incur this labor cost

31. A vehicle with a dual-overhead-cam (DOHC) engine has a P0016 (Crankshaft Position — Camshaft Position Correlation, Bank 1 Sensor A). The engine starts and runs but lacks power. Which of the following should the technician check FIRST?

A. The exhaust system for restrictions that are creating backpressure and altering valve timing sensor readings

B. The fuel injectors for incorrect spray pattern

C. The engine oil level and condition — variable valve timing systems use oil pressure to actuate the cam phasers, and low oil level, incorrect viscosity, or degraded oil can cause the phasers to respond sluggishly or not at all, creating a correlation error between the camshaft and crankshaft positions

D. The mass airflow sensor for contamination

32. A customer reports that the vehicle's automatic climate control blows only hot air and cannot be adjusted to cold regardless of the temperature setting. The A/C compressor appears to engage and the system has adequate refrigerant. Which of the following is the MOST likely cause?

A. The blend door actuator has failed in the full-heat position — the A/C system is cooling properly, but the blend door that mixes heated and cooled air is stuck in the maximum heat position, directing all airflow through the heater core regardless of the temperature dial setting

B. The evaporator core is completely blocked with debris

C. The heater control valve is stuck open, flooding the heater core with hot coolant

D. The engine thermostat is stuck closed, causing the coolant to overheat and overwhelm the A/C system

33. A vehicle's trailer wiring connector has been tested and found to have no power to the tail light circuit. The vehicle's own tail lights work normally. Which of the following is the MOST likely cause?

A. The trailer connector is the wrong type for the vehicle

B. A blown fuse, failed relay, or wiring fault in the dedicated trailer light circuit — most modern vehicles use a separate trailer light control module or converter that splits the vehicle's lighting signals into independent trailer circuits; a fault in this module or its wiring does not affect the vehicle's own lights

C. The vehicle's tail light bulbs are the wrong wattage and cannot power both circuits

D. The trailer connector ground pin is providing power instead of ground

34. A vehicle's engine idles at 1,100 RPM — approximately 400 RPM above the normal 700 RPM target. There are no DTCs. The technician unplugs the IAC (idle air control) valve connector. The idle speed drops to 500 RPM. Which of the following is the correct interpretation?

A. The IAC valve is stuck open, passing too much air — when unplugged, it defaults to its physical resting position (partially closed), reducing airflow and dropping the idle speed

B. Unplugging the IAC proves the valve is the fault — the IAC valve is commanding too much air either because it is stuck open mechanically, or because the PCM is commanding it to open excessively to compensate for another condition such as a large vacuum leak, a dragging accessory, or a charging system overload

C. The IAC valve is functioning normally and the high idle is caused by the throttle plate

D. The PCM has a software error that is commanding an elevated idle target

35. A vehicle's engine has a rhythmic chirping noise that occurs at half engine speed. The noise is loudest at the front of the engine. The serpentine belt has been removed and the noise persists. Which of the following is the MOST likely cause?

A. A worn alternator bearing that is resonating at its natural frequency

B. A cracked exhaust manifold bolt allowing a rhythmic exhaust leak

C. A worn timing chain guide or tensioner shoe producing a chirping contact noise as the chain slides across the worn plastic surface — the timing system operates at half engine speed on a 4-stroke engine, and a chirp at that frequency with the serpentine belt removed confirms an internally driven component

D. A loose crankshaft pulley wobbling at idle speed

36. A vehicle has a check engine light with P0455 (EVAP System — Large Leak Detected). The technician performs a smoke test and finds no smoke escaping from any EVAP component, hose, or connection. The fuel cap seals correctly. Which of the following should the technician check NEXT?

A. The EVAP vent solenoid and purge solenoid for correct operation — if the vent solenoid does not close when commanded during the EVAP test, the system has a direct path to atmosphere through the vent that mimics a large leak; similarly, if the purge solenoid does not close when it should, the system cannot be sealed for testing

B. The exhaust system for leaks that might affect EVAP test readings

C. The fuel injectors for leaking that could pressurize the fuel tank

D. The catalytic converter for excessive backpressure affecting the EVAP canister

37. A vehicle's engine has an oil leak at the valve cover gasket. The technician replaces the gasket, and the leak returns within 1,000 miles. On re-inspection, the technician finds that the valve cover bolts were tightened to the correct torque specification. Which of the following is the MOST likely cause of the repeat leak?

A. The replacement gasket was defective

B. The oil level is overfilled, creating excessive crankcase pressure

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

D. The PCV system is clogged or restricted, causing excessive crankcase pressure that blows oil past the new gasket — without a functioning PCV system to evacuate crankcase pressure, the pressure builds until it overwhelms the gasket seal

38. A customer's vehicle has a dead battery after being parked at the airport for two weeks. The battery is 1 year old. After jump-starting and driving home, the battery functions normally. A parasitic draw test shows 35 milliamps (within specification). Which of the following is the MOST likely explanation?

A. The battery has a weak cell that discharges under extended sitting

B. A 35 mA parasitic draw, while within specification for daily driving, can still discharge a battery over a 14-day period — 35 mA × 336 hours = approximately 11.8 amp-hours consumed, which can drop a 60 Ah battery below starting voltage; the draw is normal but the extended sitting period simply exceeded the battery's reserve capacity

C. The alternator was not fully charging the battery before the vehicle was parked

D. Airport parking garages have RF signals that interfere with the vehicle's sleep mode

39. A technician is testing an engine's PCV system by placing a piece of paper over the oil filler opening with the engine running. The paper should be lightly held against the opening by vacuum. Instead, the paper is blown off by pressure from inside the crankcase. Which of the following does this indicate?

A. The PCV valve is stuck open, creating excessive vacuum in the crankcase

B. The test is invalid because the paper cannot measure crankcase pressure accurately

C. Excessive crankcase pressure is present — either the PCV valve or its hose is clogged (preventing the system from evacuating normal blowby), or the engine has excessive blowby from worn rings or a damaged gasket that overwhelms the PCV system's capacity

D. This is normal operation for engines with a turbocharger

40. A vehicle has an illuminated ABS warning light. The scan tool shows DTC C0050 (Right Rear Wheel Speed Sensor Circuit). The technician measures the sensor's resistance and it reads within specification. The air gap is correct. The tone ring is intact. Which of the following should the technician check NEXT?

A. The wiring harness between the sensor and the ABS module — specifically at the routing points where the harness is exposed to road debris, suspension movement, and moisture; a wire that has proper sensor-end resistance can still have a break, short, or corrosion at a point between the sensor and the module that only manifests under vibration or temperature change

B. The ABS hydraulic pump motor

C. The brake fluid for contamination affecting the ABS module

D. The brake master cylinder for internal leakage

41. A vehicle has a fuel odor in the cabin that is strongest when the vehicle is stopped at idle with the windows closed and the HVAC in recirculation mode. The fuel system shows no external leaks. Which of the following is the MOST likely cause?

A. A fuel tank vapor leak at the fuel pump module seal or fuel tank seam that emits vapors drawn into the HVAC system through the cowl air intake

B. An exhaust manifold crack that is allowing fuel vapors to escape near the HVAC air inlet

C. An injector leak that only occurs at idle when fuel pressure is at its lowest

D. A small EVAP system leak near the charcoal canister (often mounted near the rear of the vehicle) that releases fuel vapor; at idle with windows closed and recirculation on, the HVAC system draws this vapor into the cabin through the fresh air intake, which is located at the base of the windshield near the cowl

42. A vehicle's power mirror on the driver's side moves up and down but does not move left or right. The passenger mirror moves in all directions. Which of the following is the MOST likely cause?

A. A faulty mirror control switch that has lost its left-right function for both mirrors

B. The left-right adjustment motor inside the driver's mirror assembly has failed — since the up-down motor works, the mirror receives power and ground; the passenger mirror working in all directions confirms the switch sends all signals correctly; the fault is isolated to the one directional motor within the driver's mirror

C. A wiring fault in the mirror harness at the door hinge flex point

D. The mirror glass is binding against the housing and preventing lateral movement

43. A vehicle with an automatic transmission has harsh 2-3 upshifts that were not present before a recent transmission fluid change. The fluid level is correct. The customer states the previous shop used "universal" ATF. Which of the following is the MOST likely cause?

A. The new fluid level is slightly overfilled, causing clutch pack aeration

B. The transmission filter was not replaced during the fluid change

C. The "universal" ATF does not have the correct friction modifier properties for this specific transmission — different manufacturers require different fluid specifications, and using a fluid with incorrect friction characteristics directly changes shift quality; draining and refilling with the manufacturer-specified fluid should resolve the harsh shifts

D. The 2-3 shift solenoid was damaged during the fluid change procedure

44. A customer asks what the lateral accelerometer in the vehicle does. Which of the following is the correct explanation?

A. The lateral accelerometer measures the vehicle's side-to-side (lateral) acceleration force during cornering and sends this data to the electronic stability control (ESC) system — the ESC module compares the actual lateral acceleration to the driver's intended direction (steering angle and yaw rate) to determine if the vehicle is oversteering or understeering, and applies individual brakes to correct the vehicle's path

B. The lateral accelerometer measures the vehicle's braking deceleration rate

C. The lateral accelerometer is part of the adaptive cruise control system and measures the distance to vehicles in adjacent lanes

D. The lateral accelerometer controls the vehicle's active suspension height adjustment

45. A vehicle's engine has a loud ticking noise that occurs at exactly engine speed (not half speed). The noise is present at all temperatures and does not change with oil pressure. Using a stethoscope, the noise is loudest at the exhaust manifold on the passenger side. Which of the following is the MOST likely cause?

A. A worn camshaft bearing

B. A collapsed hydraulic lifter

C. A worn timing chain tensioner

D. An exhaust manifold leak — a cracked manifold, a blown gasket, or a loose/broken manifold bolt allows exhaust pulses to escape once per cylinder firing event at that manifold, producing a ticking noise at engine speed frequency that is loudest directly at the leak source

46. A technician is replacing a wheel stud on a front-wheel-drive vehicle. The new stud must be drawn into the hub using a lug nut and flat washer. Which of the following precautions is MOST important during this procedure?

A. Using an impact wrench to quickly drive the stud into place

B. Using the lug nut to draw the stud into the hub until the stud shoulder is fully seated against the hub, then REMOVING the installation nut and washer before installing the wheel — the installation nut has been stressed during the press-in process and must not be reused as the wheel-mounting lug nut

C. Applying thread-locking compound to the stud before pressing it in

D. Heating the hub with a torch to expand the stud hole for easier installation

47. A vehicle has a P0101 (MAF Sensor Circuit Range/Performance). The technician measures the MAF sensor's voltage output at idle: 0.8 volts. The specification is 0.6–1.0 volts at idle. The MAF voltage at 2,500 RPM reads 1.5 volts. The specification is 1.5–2.5 volts at 2,500 RPM. Which of the following is the correct interpretation?

A. Both readings are above specification and the MAF sensor must be replaced

B. Both readings are within specification and the MAF sensor is functioning correctly

C. The readings are at the LOW end of specification at both test points — while technically within range, a MAF sensor that consistently reads at the minimum threshold may have a contaminated sensing element that underreports airflow; cleaning the MAF sensor and retesting may bring the values to mid-range and resolve the P0101

D. The MAF sensor is overreporting airflow and causing a rich condition

48. A vehicle equipped with a power running board (automatic step) on the passenger side does not deploy when the door is opened. The driver's side running board deploys normally. Which of the following is the MOST likely cause?

A. The passenger side running board motor, linkage, or its dedicated control wiring has failed — the driver's side operating normally confirms the control module and door-ajar signal processing are functional; the fault is isolated to the passenger side's physical deployment mechanism or its individual wiring

B. The running board control module has lost its passenger-side programming

C. The body control module is not registering the passenger door as open

D. The running board system requires a manual reset after any single-side failure

49. A vehicle's engine has a P0172 (System Too Rich — Bank 1) with STFT at -18% and LTFT at -12%. The technician clamps the fuel return line (on a return-style fuel system) and fuel pressure increases significantly above specification. What does this test indicate?

A. The fuel pump is producing excessive pressure at all times

B. The fuel injectors are leaking and flooding the engine

C. The fuel filter is restricted, causing a pressure drop in the supply line

D. The fuel pressure regulator is failing to limit rail pressure — under normal operation, clamping the return line should not significantly change rail pressure because the regulator controls the bypass flow; a large pressure increase with the return clamped indicates the regulator is stuck open and allowing excessive fuel to remain in the rail, causing the rich condition

50. A vehicle has a vibration at idle that is felt in the steering wheel and seat. The vibration disappears above 1,000 RPM. There are no misfires. The engine mounts have been inspected and are intact. Which of the following is the MOST likely cause?

A. A failing harmonic balancer that is no longer dampening normal engine vibration at idle frequency

B. Normal idle vibration that all vehicles produce

C. A slightly low idle RPM that is below the engine's smooth operating range

D. An out-of-balance torque converter that vibrates at idle speed — the harmonic balancer (crankshaft vibration damper) is designed to absorb and cancel the torsional vibrations produced by the crankshaft's uneven firing pulses; when the rubber bonding between the outer ring and inner hub deteriorates or separates, the damper can no longer cancel these vibrations, and they transmit through the engine into the vehicle at idle frequency

51. A technician is performing a state emissions inspection. The vehicle passes all tailpipe readings but has the check engine light illuminated with a confirmed DTC stored. Which of the following is the correct action?

A. Pass the vehicle since the tailpipe readings are within specification

B. Clear the DTC and pass the vehicle since the emissions are clean

C. Fail the vehicle — OBD II emissions inspections require that the MIL be OFF and no confirmed emissions-related DTCs be stored; even if the tailpipe readings pass, an illuminated check engine light is an automatic failure in OBD II inspection programs

D. Pass the vehicle if the DTC is for a non-emissions component

52. A customer brings a vehicle with a complaint that the engine makes a loud knocking noise for 2–3 seconds immediately after startup and then quiets to normal. The noise is more pronounced after the vehicle has sat overnight. Oil level and pressure are normal once running. Which of the following is the MOST likely cause?

A. Piston slap from cold cylinder-to-piston clearance — some engines (particularly those with aluminum blocks and/or hypereutectic pistons) have pistons that are slightly undersized when cold; the clearance between the piston skirt and cylinder wall produces a knocking sound until the piston expands with heat and the clearance tightens within the first few seconds of operation

B. A worn crankshaft main bearing

C. A loose flywheel bolt

D. A faulty oil pump that takes several seconds to build pressure

53. A vehicle has a warning message: "Key Battery Low." The vehicle still starts with the push-button start. Which of the following is correct?

A. The message can be ignored since the vehicle starts normally

B. The vehicle's 12-volt battery is low and needs to be tested

C. The immobilizer antenna ring needs to be replaced

D. The key fob battery should be replaced promptly — while the vehicle can still start because the fob's passive transponder chip is powered by the vehicle's antenna at close range, the fob's active functions

(remote lock/unlock, remote start, proximity detection for passive entry) will progressively fail as the fob battery continues to weaken

54. A vehicle's scan tool shows the following freeze frame data for a P0171 (System Too Lean — Bank 1): ECT 190°F, RPM 750, vehicle speed 0 mph, LTFT +22%, STFT +8%, MAP 38 kPa. Which of the following is the MOST significant diagnostic clue in this freeze frame?

A. The vehicle speed of 0 mph indicates the vehicle was parked and the code is irrelevant

B. The code set at idle (0 mph, 750 RPM) with the engine at operating temperature — this eliminates cold-start enrichment issues and points to an idle-specific lean condition such as a vacuum leak (which has the greatest proportional effect at idle when total airflow is lowest) or an idle-speed fuel delivery problem

C. The MAP reading of 38 kPa is abnormally high for idle, indicating a restricted exhaust

D. The ECT of 190°F indicates the engine is running too cool to maintain proper fuel mixture

55. A vehicle has a P0300 (Random Misfire) code. The technician connects a scan tool and monitors individual cylinder misfire counters. Cylinders 1 through 4 each show between 5 and 15 misfires per 1,000 revolutions — relatively equal distribution across all cylinders. No single cylinder dominates. Which of the following is the MOST likely type of root cause?

A. A single fouled spark plug on one cylinder

B. A failed ignition coil on one specific cylinder

C. A systemic cause affecting all cylinders equally — such as low fuel pressure, a large vacuum leak, contaminated fuel, a restricted exhaust, or a failing mass airflow sensor; the approximately equal misfire distribution across all cylinders eliminates any single-cylinder component as the cause

D. A burned exhaust valve on one cylinder

Practice Exam 13: Answer Key and Full Explanations

1. A — API and ILSAC engine oil specifications are designed to be backward-compatible: each new generation meets or exceeds all the requirements of the previous one while adding new protections. API SP supersedes SN Plus, and ILSAC GF-6A supersedes GF-5. An oil meeting SP/GF-6A is safe and

recommended for any engine that specifies SN Plus/GF-5 or earlier. The newer specification adds enhanced LSPI protection (critical for turbocharged GDI engines), improved timing chain wear resistance, and better fuel economy retention.

2. C — The trajectory guidelines displayed on the screen are generated by the head unit's software — they are overlaid onto the camera's video feed. The fact that guidelines appear proves the display, head unit, and reverse-gear activation are all working. The missing image means the camera itself is not transmitting video. The most common cause is a completely obstructed lens (mud, ice, road grime coating the camera) or a failed camera module. Cleaning the lens first is the simplest diagnostic step.

3. B — AWD systems use a center differential, transfer case, or electronically controlled coupling that distributes torque between the front and rear axles. These components are designed to operate with all four tires at the same rolling circumference. A new tire with full tread depth has a significantly larger circumference than three tires with 7/32nds remaining, creating a constant speed differential between axles that forces the AWD components to slip continuously. Having the replacement tire shaved to match the other three eliminates this circumference mismatch.

4. D — A properly terminated CAN bus network has two 120-ohm resistors in parallel, measuring 60 ohms total. The 65-ohm reading is close enough to suggest both terminating resistors are present (if one were missing, the reading would be 120 ohms). The communication failure is therefore likely caused by a signal-level problem rather than a termination problem — a module with a shorted CAN driver pulling the bus to an incorrect voltage, a damaged wire creating intermittent opens or shorts, or physical damage to the CAN-H or CAN-L line between modules.

5. C — This question tests understanding of how voltage distributes across a resistive load. The defroster grid IS a resistor — it converts electrical energy to heat. When the grid is intact, current flows through the resistive element, and the full source voltage drops across the grid from the powered end to the grounded end. A 12-volt reading across a complete grid is exactly what you'd expect from a working element carrying its full rated current. An OPEN grid would show 12V at the break point — not across the full length.

6. A — Ultrasonic parking sensors emit a sound pulse and measure the return echo to calculate distance. When a sensor fails internally, it can send a continuous or false echo signal that the control module interprets as a close-proximity object. A sensor that has shifted in its mounting — particularly after bumper contact or a parking lot scrape — may aim toward the vehicle's own body panel or an aftermarket trailer hitch, detecting the vehicle's own structure as an obstacle and generating a constant warning tone.

7. D — The knock sensor is the PCM's "ear" for detecting detonation. When it detects knock, it commands the PCM to retard ignition timing, reducing cylinder pressures and eliminating the ping. When the sensor circuit fails, the PCM loses this protective feedback loop — it cannot hear detonation and therefore cannot retard timing. The engine continues to run at its base timing calibration (or may even advance further under load), which allows detonation to occur unchecked. The code and the symptom are directly linked through the lost knock-protection strategy.

8. B — Rain-sensing wiper systems use an optical sensor bonded to the inside of the windshield with a transparent gel pad. The sensor emits infrared light into the glass and measures how much returns — water on the outer surface changes the refraction pattern, telling the module it's raining. When the gel pad degrades, lifts, or becomes contaminated, the optical coupling between the sensor and the glass is disrupted. The sensor misreads the light return pattern and commands wipers even when the glass is dry.

9. A — GM's dexos specification imposes requirements that go beyond the API service category. While API SP covers general engine protection standards, dexos1 Gen 3 adds specific testing for low-speed pre-ignition (LSPI) protection in turbocharged GDI engines, enhanced turbocharger deposit control, stricter aeration limits, and timing chain wear performance. An oil can meet API SP without passing the additional dexos tests. Using non-dexos oil in a dexos-required engine may void the powertrain warranty and can risk engine damage in turbo-GDI applications.

10. D — The noise disappearing in Neutral at the same engine RPM is the critical diagnostic clue. In Neutral, the engine spins the torque converter's pump, but the turbine and everything downstream (planetary gears, clutch packs, output shaft, final drive) are unloaded. In forward gears, the gear train is loaded and spinning. Since the noise requires gear engagement, it originates from a component that is loaded only when the transmission is in gear — the planetary gear sets, bearings, or output shaft within the transmission itself.

11. C — Both technicians are correct about their respective systems. GDI systems require 500–3,000+ psi to inject fuel directly into the combustion chamber against the 150+ psi of compression pressure. A mechanical high-pressure pump driven by a camshaft lobe generates this extreme pressure from a low-pressure supply. Port injection systems only need 30–60 psi because they inject into the intake port where pressure is below atmospheric (vacuum). Understanding this pressure difference is essential for safe service — never open a GDI fuel line without depressurizing the system first.

12. B — The heated steering wheel uses a resistive heating element woven into or bonded beneath the steering wheel leather/material. Current reaches this element through the clockspring — the same coiled ribbon cable that connects all steering wheel components to the fixed wiring. The button illuminating proves the switch circuit works. The heating element or the clockspring circuit that carries current to it is

the fault. Since the steering wheel's other functions (horn, airbag, controls) work, the clockspring's heating-element-specific conductor may have an open, or the element itself has burned out internally.

13. B — Seat belt pretensioners are pyrotechnic devices that fire during a collision to pull the seat belt tight against the occupant before the airbag deploys. They are single-use — once fired, they cannot be reset. Deployed pretensioner covers that have "blown open" are physical evidence that the SRS system activated during a collision. If the customer says the vehicle was never in an accident, the vehicle likely has unreported collision history. The pretensioners must be replaced and the entire SRS system inspected before the seat belts can provide their designed crash protection.

14. D — Automatic high-beam systems use a forward-facing camera (often the same one used for lane departure and forward collision warning) to detect the headlights of oncoming vehicles and the taillights of vehicles ahead. When the camera is dirty, obstructed by windshield haze, covered by an aftermarket tint strip, or has failed, it cannot detect approaching light sources and leaves the high beams on indefinitely. Manual operation working confirms the headlight circuits, bulbs, and switch are all functional — the fault is in the automatic detection input.

15. A — Automotive coolants use fundamentally different corrosion inhibitor chemistries. IAT (Inorganic Acid Technology — green) uses silicates and phosphates. HOAT (Hybrid Organic Acid Technology — gold/yellow) uses a blend of organic acids and silicates. OAT (Organic Acid Technology — orange/red) uses organic acids only. Mixing these chemistries causes the different inhibitors to react, forming precipitates that clog heater cores, radiator passages, and water pump seals, while simultaneously neutralizing the corrosion protection of both formulations.

16. C — An intermittent TPMS message that appears and disappears randomly — with all pressures correct and stable — points to a communication reliability issue rather than a pressure issue. TPMS sensors transmit RF signals to the module, and a weak signal (from a dying sensor battery, a corroded antenna connection, or external RF interference) may be received sometimes and missed other times. The intermittent nature is the signature of a borderline signal that crosses the detection threshold unpredictably.

17. D — The way an engine stalls tells you what killed it. A mechanical stall (vacuum leak, fuel starvation, loaded-down engine) causes RPM to gradually decline — the engine struggles, slows, and eventually stops as combustion becomes unsustainable. An ELECTRICAL stall — where the ignition or fuel injection is instantaneously interrupted — causes RPM to drop from its current value straight to zero with no intermediate struggle. This instant-death pattern is diagnostic for a CKP sensor dropout, ignition switch interruption, PCM power loss, or ground circuit failure.

18. A — Power liftgate systems have anti-pinch safety logic that reverses the motor direction when it detects excessive resistance during opening. Worn-out gas struts (lift supports) that should assist the motor have lost their gas charge and now act as dead weight rather than assistive springs. The motor must overcome this additional load, the current draw or position feedback exceeds the anti-pinch threshold, and the system reverses as if an obstruction were detected. Replacing the gas struts restores the mechanical assist and allows the motor to complete the opening cycle normally.

19. C — This is an elegant diagnostic test for valve cover vacuum leaks. With the oil filler cap opening unsealed, a vacuum leak at the valve cover gasket draws air from outside AND from the open filler hole — the leak's total air volume is split between two sources. When the cap is loosely placed over the opening, it restricts the air path through the filler hole, forcing more air through the remaining leak path. The change in air dynamics at the leak point alters the noise or reduces it. This confirms the valve cover gasket area as the leak source.

20. B — A floating brake caliper must be precisely aligned over the rotor by its mounting bracket. If the bracket is not fully seated against the steering knuckle — from an untorqued bolt, a missing locating dowel, or debris trapped between the bracket and knuckle — the caliper shifts off-center. This misalignment causes uneven pad contact, accelerated unilateral pad wear, and can produce brake pull or noise. Verifying bracket-to-knuckle fit, cleanliness, and bolt torque is a fundamental step during any brake pad service.

21. D — A P0420 returning after converter replacement requires a comprehensive investigation, not a single-cause assumption. Common reasons include: the replacement converter was a low-quality aftermarket unit that doesn't meet OBD II catalyst efficiency thresholds (many universal-fit converters fail to match OEM efficiency); an underlying engine condition (misfires, oil consumption, rich running) is destroying the new converter the same way it destroyed the original; or the original diagnostic was incomplete and the root cause (exhaust leak, faulty O2 sensor) was never corrected.

22. A — CAN bus communication works by toggling the CAN-High and CAN-Low lines around a 2.5V center point. During a dominant bit, CAN-High goes to ~3.5V and CAN-Low goes to ~1.5V. During a recessive bit, both lines rest at ~2.5V. A DMM cannot display these rapid oscillations (which switch at 250 kbps or 500 kbps) — it displays an AVERAGE. Readings near 2.5V on both lines with a slight spread (CAN-H slightly higher, CAN-L slightly lower) indicate the bus is active and toggling normally. An oscilloscope is needed to see the actual waveform.

23. C — A pothole impact can create a momentary shock to any sensor mounted on the vehicle body or suspension. The yaw rate sensor may have experienced a signal spike from the impact that exceeded the module's expected range, causing it to set a code. However, a momentary spike does not necessarily

indicate permanent sensor damage. Clearing the code and monitoring for return is the cost-effective first step — if the code stays clear through normal driving, the impact caused a one-time event and no repair is needed.

24. B — Oil consumption of 1 quart per 800 miles exceeds the manufacturer's stated threshold of 1 quart per 2,000 miles — it is consuming oil 2.5× faster than the acceptable rate. Documenting the consumption rate and comparing it to the specification provides the factual basis for further diagnosis. The next steps — leak-down test (ring sealing), PCV flow test (ventilation system), and valve stem seal evaluation — determine whether the consumption is from ring/bore wear, valve seal leakage, or PCV system malfunction.

25. D — Some manufacturers (particularly for side curtain airbags, which are exposed to extreme temperature cycling in the roof structure) specify a replacement interval for the pyrotechnic inflator components. The propellant and initiator compounds in airbag inflators can degrade over 10–15+ years due to heat cycling, moisture absorption, and chemical aging. A degraded inflator may not generate adequate gas pressure to fully deploy the airbag in the milliseconds required during a collision. The manufacturer's service information is the authority on whether the expired components require replacement.

26. A — Modern infotainment and entertainment systems have complex power-management routines that cycle through shutdown states after the ignition is turned off. Many aftermarket USB chargers and phone cables draw enough current to keep the USB host controller in the head unit active, preventing the entertainment system module from completing its sleep cycle. The module stays partially awake — drawing 150–200+ mA instead of its normal sleep current of 5–10 mA. Removing the charger and retesting often eliminates the parasitic draw entirely without any repair.

27. C — This is the most definitive form of vacuum leak confirmation: temporarily sealing the suspect leak produced a measurable vacuum improvement (16 to 19 in. Hg = 3 in. Hg recovery) AND a simultaneous improvement in idle quality. Both the quantitative measurement and the qualitative symptom change directly correlate with sealing the leak. This dual confirmation leaves no diagnostic ambiguity — the intake manifold gasket leak is the verified, proven cause of the rough idle, and replacing the gasket is the definitive repair.

28. B — The IMRC (Intake Manifold Runner Control) system uses flaps or valves inside the intake manifold that close at low RPM to narrow the runner cross-section. Narrower runners increase air velocity at low speed, improving fuel atomization and cylinder filling for better low-end torque. At high RPM, the flaps open fully to maximize volume flow. When a flap sticks open, the low-speed air velocity

advantage is lost — the engine breathes like it's in high-RPM mode all the time, sacrificing low-end torque while maintaining normal high-RPM power.

29. A — Key fobs use a small coin-cell battery (typically CR2032 or CR2025) to power a radio transmitter. As the battery weakens, the RF signal strength decreases proportionally. The vehicle's receiver has a fixed sensitivity threshold — a signal that was detectable at 50 feet with a fresh battery may only be detectable at 5 feet with a dying battery. All fob functions still work at close range because the weaker signal is still above the receiver's minimum threshold at that short distance. Replacing the fob battery restores full operating range.

30. D — Directional tires have a tread pattern designed to rotate in only one direction (indicated by an arrow on the sidewall). Staggered fitment means the front and rear tire sizes are different. Together, these constraints eliminate ALL conventional rotation patterns: tires cannot move front-to-rear (different sizes), and they cannot swap sides without being dismounted and remounted reversed on the rim (to maintain correct rotation direction). The only option is same-axle side-to-side swaps with tire remounting — a labor-intensive procedure.

31. C — P0016 indicates the PCM has detected a misalignment between the expected crankshaft position and the actual camshaft position beyond the acceptable tolerance. On VVT-equipped engines, the cam phasers are hydraulically actuated by engine oil pressure. Before investigating complex mechanical causes (stretched chain, failed phaser), the technician should verify the most basic hydraulic input: oil level and condition. Low oil, incorrect viscosity, or sludge-contaminated oil can prevent the phasers from responding accurately, directly causing the correlation error.

32. A — The A/C system is confirmed working (compressor engages, adequate charge), and the heater core is always hot when the engine is at operating temperature. The blend door sits between these two heat sources and physically directs airflow through either the evaporator path (cold) or the heater core path (hot). If the blend door actuator has failed with the door in the full-heat position, ALL air passes through the heater core regardless of the temperature dial setting — the A/C cools the evaporator but the air never reaches it.

33. A — Modern vehicles use a dedicated trailer lighting module or converter that takes the vehicle's multiplex lighting signals and splits them into separate, dedicated circuits for the trailer connector. This module has its own fuse, relay, and wiring independent of the vehicle's tail light circuit. A blown trailer fuse, failed converter module, or damaged wiring between the module and the trailer connector would disable trailer lights without affecting the vehicle's own lights — exactly the symptom described.

34. B — Unplugging the IAC and seeing the idle drop confirms the IAC is currently passing air. But the key question is WHY it's passing too much air. Option A (stuck open mechanically) is one possibility, but option B adds the critical insight: the PCM may be COMMANDING the IAC to open excessively because it's compensating for another load — a vacuum leak, a dragging A/C compressor, a charging system overload, or a tight engine. The technician must determine whether the high idle is an IAC hardware fault or a PCM compensation for a different underlying problem.

35. C — A chirping noise at exactly half engine speed with the serpentine belt removed eliminates all external belt-driven accessories. On a 4-stroke engine, the camshaft and timing components operate at half crankshaft speed. A worn timing chain guide or tensioner shoe — made of plastic or rubber-coated metal — produces a chirping or squeaking noise as the chain slides across the degraded surface. The noise occurs at the timing system's rotational frequency (half engine speed) and is localized to the front of the engine where the timing cover is.

36. A — A smoke test that reveals no physical leaks in the EVAP plumbing, combined with a verified good fuel cap, shifts suspicion to the electrically controlled valves that seal the system during the OBD II EVAP leak test. The vent solenoid must CLOSE to seal the atmospheric side of the system, and the purge solenoid must CLOSE to seal the engine side. If either valve fails to close when the PCM commands the leak test, the system has a direct path to atmosphere that the PCM interprets as a large leak — even though no hose or connection is physically broken.

37. D — A correctly torqued valve cover gasket that leaks repeatedly points to a pressure problem, not a sealing problem. The PCV system's job is to evacuate crankcase gases (blowby) to prevent internal pressure buildup. If the PCV valve is stuck closed, the PCV hose is clogged, or the PCV passages in the intake manifold are blocked with carbon, crankcase pressure has no exit path and builds until it overwhelms the weakest seal — typically the valve cover gasket. Repairing the PCV restriction eliminates the pressure that is defeating the gasket.

38. B — A normal parasitic draw of 35 mA is acceptable for daily driving where the alternator recharges the battery during each drive cycle. But math determines whether it's acceptable for extended parking: 35 mA × 336 hours (14 days) = 11,760 mAh = ~11.8 Ah consumed. A typical 60 Ah battery starts struggling to crank below ~40 Ah remaining. After losing nearly 12 Ah to parasitic draw alone (plus natural self-discharge), the battery drops below the cranking threshold. The draw is normal — the parking duration simply exceeded the battery's capacity to sustain it.

39. C — The paper test is a quick PCV system evaluation. A healthy PCV system creates slight vacuum in the crankcase — enough to gently hold a piece of paper over the oil filler opening. If the paper is blown OFF, positive pressure exists inside the crankcase. Two causes: the PCV system is blocked (valve

stuck, hose clogged, passage restricted), trapping normal blowby gases, or the engine has excessive blowby from worn rings or a damaged gasket that produces more gas than the PCV system can handle. Either way, positive crankcase pressure drives oil past seals.

40. A — The sensor and its immediate connections have been verified: correct resistance, correct air gap, intact tone ring. The remaining unverified component is the wiring between the sensor and the ABS module — often several feet of harness routed along the frame, through wheel well areas, and across suspension components where it is exposed to road spray, salt, rock strikes, and repeated flexing. A wire can have perfect continuity when tested statically with a DMM but open intermittently under vibration, heat, or moisture — exactly the conditions that occur during driving.

41. D — A fuel odor in the cabin with no visible external fuel leaks and HVAC in recirculation mode points to a vapor source near the cabin air intake. The EVAP system's charcoal canister stores fuel vapors from the fuel tank. A small leak at a canister connection, vent line, or the canister itself releases fuel vapor. At idle with the vehicle stopped, these vapors are not dispersed by airflow and accumulate near the cowl area where the HVAC fresh air intake draws air — even in recirculation mode, the system still pulls some outside air. The vapors are drawn into the cabin.

42. B — The driver's mirror moves up-down but not left-right: this confirms the mirror receives power, ground, and switch signals for vertical movement. The passenger mirror working in ALL directions confirms the switch sends signals correctly for every direction. The fault is isolated to the horizontal motor inside the driver's mirror assembly. Power mirrors use two separate motors — one for each axis of movement. When one motor fails, only that direction of adjustment is lost while the other continues to function normally.

43. C — This is the transmission fluid specification lesson that appeared in Exams 7, 11, and now 13 — because it matters that much. "Universal" ATF is formulated with generic friction modifiers intended to work acceptably in many transmissions but may not match the specific friction coefficient required by any particular one. When the friction properties are wrong, clutch packs engage too aggressively (harsh shifts) or too weakly (slipping). Draining the incorrect fluid and refilling with the manufacturer's exact specification typically corrects the shift quality immediately.

44. A — The lateral accelerometer measures the G-force acting on the vehicle sideways during cornering. The ESC system compares this measured lateral acceleration against the steering wheel angle (what the driver is commanding) and the yaw rate (how fast the vehicle is rotating). If the measured lateral force exceeds what the steering and yaw inputs predict — the vehicle is sliding rather than turning — the ESC applies individual brakes to specific wheels to bring the vehicle back onto the driver's intended path.

45. D — A ticking noise at engine speed (once per revolution per cylinder) that localizes to the exhaust manifold via stethoscope is an exhaust leak. Exhaust pulses escape through a crack, a blown gasket, or a loose/broken bolt once per firing event on each cylinder served by that manifold. The stethoscope pinpointing the noise directly at the manifold — rather than at the valve cover (valve train) or timing cover (timing chain) — confirms the exhaust manifold area is the source. Visual inspection for carbon tracking (black soot trails) at the manifold-to-head interface confirms the leak point.

46. B — When pressing a new wheel stud through the hub using a lug nut and washer, the nut's threads are subjected to extreme friction and stress as they draw the stud against the interference fit of the hub hole. This process work-hardens and damages the nut's thread engagement surfaces. If this same nut is reused to mount the wheel, it may not provide accurate or consistent clamping force — the damaged threads create unpredictable friction that makes torque readings unreliable. A fresh lug nut must be used for wheel mounting.

47. C — Both readings are technically within specification but are at the LOW END of every test point. A MAF sensor that consistently reads at minimum threshold is underreporting actual airflow — the PCM delivers less fuel than the engine needs because it thinks less air is entering. This creates a lean condition that the fuel trim tries to correct. The P0101 sets because the PCM recognizes the MAF reading doesn't match expected values based on other inputs (MAP, RPM, throttle position). Cleaning the hot wire element often removes the contamination and restores mid-range readings.

48. A — The driver's side running board operating normally proves the control module, power supply, and door-ajar signal processing are all functional. The fault is isolated to the passenger side's physical components: the electric motor that drives the linkage, the linkage mechanism itself, or the wiring between the control module and the passenger-side motor. A seized linkage pivot, a burned-out motor, or a disconnected/damaged wire at the motor connector are the most common single-side failures.

49. D — Clamping the return line on a return-style fuel system blocks the regulator's pressure relief path. On a properly functioning system, the regulator maintains target pressure regardless of whether the return is blocked — it simply opens less. If pressure RISES significantly when the return is clamped, the regulator was allowing excessive fuel to bypass back to the tank under normal conditions (stuck open or weak spring), meaning the rail was receiving more fuel than the regulator could properly control. This excess fuel causes the rich condition and the -18% STFT correction.

50. A — The harmonic balancer (crankshaft vibration damper) is specifically designed to absorb torsional vibrations from the crankshaft's uneven firing impulses. It consists of an inner hub bonded to an outer ring by a rubber isolator. When this rubber bond deteriorates, separates, or the outer ring shifts, the damper loses its ability to cancel the crankshaft's natural vibration frequency. At idle — where

engine vibrations are most perceptible — the uncanceled torsional pulses transmit through the engine mounts into the vehicle body as a noticeable vibration.

51. C — OBD II emissions inspection programs have two requirements: tailpipe emissions must be within limits AND the MIL (check engine light) must be OFF with no confirmed emissions-related DTCs stored. An illuminated MIL is an automatic failure regardless of how clean the tailpipe readings are. The rationale is that the DTC represents a monitored emissions system that has degraded — even if current emissions are acceptable, the degraded system may cause emissions to exceed limits under conditions not captured by the test.

52. A — Cold piston slap is a well-documented characteristic of certain engine designs — particularly aluminum-block engines and those using hypereutectic pistons. These pistons are deliberately manufactured slightly undersized to account for thermal expansion. When cold, the piston-to-cylinder clearance is at its maximum, allowing the piston to rock slightly in the bore during the power stroke and produce a knocking sound. As the engine warms up in the first few seconds of operation, the piston expands, the clearance tightens, and the noise disappears completely.

53. D — The "Key Battery Low" message specifically refers to the key FOB's internal coin-cell battery, not the vehicle's 12V battery. The vehicle still starts because push-button start systems have a backup: when the fob's active RF transmitter is too weak to communicate wirelessly, the vehicle's antenna ring (near the start button or steering column) can power the fob's PASSIVE transponder chip at extremely close range — this is why holding the fob against the start button works. However, remote lock/unlock, proximity-based passive entry, and remote start will progressively fail as the fob battery weakens further.

54. B — Freeze frame analysis requires reading ALL the data points together as a snapshot. This code set at idle (0 mph, 750 RPM) with the engine at full operating temperature (190°F ECT). The idle-and-warm condition is the most significant diagnostic clue because it eliminates cold-start enrichment variables and high-load fuel demand issues. A vacuum leak has its GREATEST proportional effect at idle — when total intake airflow is at its minimum, even a small leak represents a large percentage of total air. At higher RPM and load, the same leak becomes a proportionally smaller fraction of total airflow.

55. C — The approximately equal distribution of misfires across all four cylinders (5–15 each per 1,000 revolutions) eliminates any single-cylinder component as the cause. A bad plug, a bad coil, a bad injector, or a burned valve would produce a heavily skewed count — one cylinder dominating while the others show zero or near-zero misfires. The even distribution pattern means something is affecting ALL cylinders equally: low fuel pressure (all injectors starved), a vacuum leak (overall lean condition),

contaminated fuel (all cylinders affected), restricted exhaust (all cylinders back-pressured), or a failing MAF (incorrect airflow data for all cylinders).