

PRACTICE EXAM 6: ASE A6 SIMULATION (50 QUESTIONS)

1. A technician reads 14.3 volts and 35 amperes on a running vehicle's charging system output. The power being produced is:

- A. 35 watts under typical load
- B. 14.3 watts at peak output
- C. 49.3 watts of continuous output
- D. 500.5 watts of DC power

2. A technician is looking at a wiring diagram and sees a wire labeled "BK/YE." This indicates the wire has:

- A. A yellow base color with a black primary stripe
- B. A black base color with a yellow tracer stripe
- C. Two separate wires twisted together in the harness
- D. A black color only, with no identifying tracer

3. The forward voltage drop across a typical silicon diode in the forward-biased direction is approximately:

- A. 0.6 to 0.7 volts
- B. 1.5 volts at nominal current
- C. 3.3 volts for standard diodes
- D. 12 volts when conducting

4. Technician A says that a short to power will blow the protective fuse immediately. Technician B says that a short to ground will typically blow the protective fuse. Who is correct?

- A. Technician A only, because power shorts are more severe
- B. Both A and B, both faults blow fuses
- C. Technician B only; short to ground is the typical fuse-blowing fault
- D. Neither, because fuses only blow from overloads

5. A technician is troubleshooting a circuit and measures 12 volts at both the switch input and switch output with the switch closed. Voltage at the load is zero. The fault is in:

- A. The switch itself, which has failed open
- B. The load, which is drawing no current
- C. The battery, which has inadequate output
- D. The wiring between the switch output and the load

6. A conductor's length is tripled while all other factors remain the same. Its resistance will:

- A. Triple, increasing the circuit's voltage drop under load
- B. Decrease by one-third of the original value
- C. Remain unchanged because material is the same
- D. Double, based on linear extrapolation from doubling

7. A technician tests a solenoid coil with a DMM. A coil that reads 2.5 ohms is:

- A. Likely failed open, requiring replacement immediately
- B. A normal operating value for a typical solenoid coil
- C. Definitely shorted, based on the low resistance value
- D. Indicative of a broken wire inside the coil assembly

8. When servicing a vehicle with electronic modules, Technician A says that jumper wires should never be used to bypass relays when diagnosing module-controlled circuits. Technician B says that signal-level inputs to modules can safely be tested with a 12-volt incandescent test light. Who is correct?

- A. Both A and B, to be safe
- B. Technician B only, a test light works fine
- C. Technician A only; direct jumpers can damage modules and the test light can damage signal circuits
- D. Neither, because these are standard diagnostic techniques

9. A wire that has been soldered and heat-shrink sealed should be inspected for:

- A. Proper crimp mechanical connection and insulation sealing integrity
- B. Temperature-induced color changes in the solder joint
- C. Correct routing without any bends greater than 90 degrees
- D. Resistance between the solder joint and the original wire insulation

10. A technician measures 0.15 volts drop across a ground wire during a 20-ampere test. This reading indicates:

- A. The ground wire is completely broken and must be replaced
- B. A failed load causing excessive current through the ground
- C. Normal resistance in the wire, but investigation of the source is recommended
- D. An acceptable reading within typical specification for most applications

11. A fuse rated at 20 amperes is protecting a circuit. The fuse color-coded for this rating is:

- A. Yellow under the SAE standard
- B. Blue, as in a 15-amp fuse
- C. Red, matching a 10-amp fuse

D. Green, as for a 30-amp fuse

12. Technician A says that a digital multimeter has infinite internal resistance on the voltage range. Technician B says a DMM typically has 10 megaohms of internal resistance on the voltage range. Who is correct?

- A. Neither, the DMM has 1 megaohm of internal resistance
- B. Both, because both are technically high-impedance
- C. Technician A only, because DMMs are theoretically infinite
- D. Technician B only; 10 MΩ is the typical specification

13. A technician measures 400 amperes of starter current during cranking on a vehicle. The technician should use:

- A. A DMM with its test leads placed in series with the starter
- B. A standard incandescent test light to verify current flow
- C. A clamp-style ammeter suitable for high current ranges
- D. The ohmmeter function to calculate current from resistance

14. The voltage of a fully charged 12-volt battery at rest is approximately:

- A. 14.4 volts after driving
- B. 12.6 volts under rest conditions
- C. 13.8 volts during charging
- D. 10 volts under load testing

15. Technician A says that AGM batteries require a special charger with lower voltage than traditional flooded batteries. Technician B says that AGM batteries can be overcharged and damaged if charged with standard flooded-battery profiles. Who is correct?

- A. Technician A only
- B. Neither, any charger works fine
- C. Technician A only
- D. Both, AGM batteries require specific charging profiles

16. Parasitic draw testing is most effectively performed with:

- A. A current clamp around the negative battery cable after sleep time
- B. A voltmeter measuring battery voltage over several days
- C. An ohmmeter reading the vehicle's total resistance
- D. A conductance tester connected to both battery terminals

17. A starter that engages but produces a loud grinding noise is MOST likely suffering from:

- A. A weak battery unable to supply full current
- B. A failed voltage regulator allowing overcharge
- C. A damaged flywheel ring gear or stuck pinion
- D. A disconnected solenoid wire preventing engagement

18. Hydrogen gas produced during battery charging is hazardous because it:

- A. Corrodes the battery terminals and plates within hours
- B. Can explode if an ignition source is present
- C. Causes electrolyte to leak from the battery cells
- D. Prevents the battery from holding a full charge properly

19. The Battery Council International group size 94R specifies:

- A. The battery's physical dimensions and terminal configuration
- B. The battery's CCA rating at 0°F under cold conditions
- C. The battery's amp-hour capacity at 20-hour discharge
- D. The battery's warranty period in years after purchase

20. Voltage drop testing a vehicle's negative battery cable during cranking should read:

- A. Exactly 12.6 volts matching battery voltage
- B. Between 5 and 7 volts during normal operation
- C. Zero volts regardless of cable condition
- D. Less than 0.2 volts for a healthy ground path

21. A battery registration procedure is required on many modern vehicles after battery replacement because:

- A. Federal law requires documentation of all battery service work
- B. The battery's warranty begins at registration rather than purchase
- C. The BCM must verify the battery's size before charging
- D. The BCM's charging strategy must be reset to match the new battery

22. A vehicle's charging lamp stays illuminated even with the engine running. The FIRST check the technician should make is:

- A. Battery state of charge and voltage under normal conditions
- B. Alternator output current at various RPM values
- C. Drive belt tension and condition for proper operation
- D. The charging lamp circuit for short-to-ground conditions

23. An alternator produces three-phase AC output because:

- A. Three stator windings are arranged 120 degrees apart around the rotor
- B. The voltage regulator switches between three distinct phases alternately
- C. A single-phase output would not support modern vehicle electrical loads
- D. Three-phase allows for exact voltage regulation without diode use

24. A rectifier diode fails open (not conducting) in an alternator. The MOST likely result is:

- A. Complete loss of alternator output during operation
- B. Increased AC ripple and reduced DC output capacity
- C. Overcharging with voltage exceeding 17 volts
- D. No change in output because other diodes compensate

25. Technician A says a computer-controlled charging system intentionally reduces voltage during cruise to extend battery life. Technician B says this system produces a constant 14.2 volts under all operating conditions. Who is correct?

- A. Both, because modern systems vary within a tight range
- B. Technician B only, 14.2 volts is the industry standard
- C. Technician A only; modern systems vary voltage based on battery state
- D. Neither, because systems actually produce varying voltages randomly

26. A voltage drop test between the alternator B+ terminal and the battery positive post reads 1.2 volts. This indicates:

- A. Normal resistance in the charging cable under load
- B. A failed voltage regulator in the alternator
- C. Excessive resistance in the charging cable or terminations
- D. An overcharging condition requiring attention

27. Drive belt tension should be checked:

- A. Using a belt tension gauge or by checking tensioner position
- B. By listening for squeaking during engine acceleration
- C. By pressing the belt to estimate deflection and stiffness
- D. Only if there are audible symptoms of belt problems present

28. HID bulbs require time to reach full brightness because:

- A. The ballast charges a storage capacitor during the warm-up phase
- B. Metal halide salts inside the capsule must vaporize before full arc establishment
- C. The bulb filament must reach operating temperature incrementally
- D. The ignition pulse heats the electrodes to prepare them for arc conduction

29. A halogen headlight bulb fails within hours of installation. The MOST likely cause is:

- A. A voltage spike during engine start overloading the filament
- B. Moisture contamination of the bulb's internal gas mixture
- C. Skin oils transferred during handling of the glass envelope
- D. Incorrect wattage rating for the vehicle's electrical system

30. A center high-mount stop lamp (CHMSL) on a modern vehicle is:

- A. Required by federal law on all passenger cars and light trucks
- B. Optional equipment that may be deleted during vehicle repair
- C. Identical in operation to standard tail and brake light circuits
- D. A recent innovation that has not been widely adopted yet

31. A customer reports that one headlight on their vehicle is dimmer than the other. Battery voltage is 14.3 volts. The MOST likely cause is:

- A. A weak alternator not producing full output
- B. Voltage drop in the wiring to the dim headlight
- C. A dirty lens cover affecting light distribution only
- D. A problem with the bulb socket alignment

32. Daytime running lights (DRLs) typically:

- A. Operate only when the headlight switch is in the ON position
- B. Flash intermittently to indicate vehicle presence to drivers
- C. Use separate dedicated lamps in all vehicle applications
- D. Operate automatically whenever the engine is running

33. When installing a replacement xenon HID ballast, the technician must:

- A. Connect the negative cable first, then positive cable last
- B. Operate the system only at engine idle for calibration purposes
- C. Verify system is de-energized and discharged before service
- D. Use only OEM ballasts to avoid electromagnetic interference issues

34. A modern instrument cluster's speedometer typically obtains its reading from:

- A. The ABS module's wheel speed sensor data via the CAN bus
- B. A dedicated speed sensor hardwired to the cluster directly
- C. The engine control module's fuel injection timing calculations
- D. A mechanical cable driven by the transmission output shaft

35. A fuel level gauge on a reconfigurable cluster reads incorrectly. The sending unit tests correct, and wiring to the BCM is intact. The fault is MOST likely in:

- A. The fuel pump drawing excessive current during operation
- B. The instrument cluster's fuel gauge rendering or calculation
- C. The ground connection at the battery negative post terminal
- D. The fuel pressure regulator limiting fuel system flow

36. A warning lamp that fails to illuminate during the key-on bulb check indicates:

- A. A normal condition; the lamp only illuminates during active faults
- B. A low battery voltage condition affecting cluster self-test
- C. A fault in the monitored system that has not yet been set
- D. A fault in the lamp itself or its driver circuit

37. A vehicle shows the master warning triangle on the cluster with an accompanying text message. The technician should:

- A. Reset the cluster by disconnecting the battery for 10 minutes
- B. Ignore the warning and continue normal vehicle operation
- C. Read the text message and scan the relevant module for DTCs
- D. Replace the cluster as the fault resides within its display circuitry

38. The odometer reading on a replacement instrument cluster must be:

- A. Programmed to match the original cluster's mileage reading
- B. Left at zero to indicate a new cluster installation
- C. Multiplied by a factor based on the vehicle's age
- D. Verified by the customer and then manually set at service

39. A HUD (head-up display) shows incorrect vehicle speed. The fault is MOST likely in:

- A. The HUD module's projection optics that need cleaning
- B. The source of the speed data being transmitted to the HUD
- C. The windshield's HUD-compatible coating wearing off
- D. The HUD's software requiring a calibration reset procedure

40. A power window operates only when the master switch is used but not from its own door switch. The MOST likely cause is:

- A. A blown fuse affecting only the door switch circuit
- B. A completely failed window motor on that door
- C. A discharged battery affecting one door's operation
- D. A defective door-mounted switch or break in its wiring

41. A rain-sensing wiper system activates on a dry, sunny day. The MOST likely cause is:

- A. A failed wiper motor relay stuck in the ON position
- B. A BCM software glitch commanding continuous operation
- C. Contamination on the windshield where the rain sensor is located
- D. A weak washer pump that has built up pressure abnormally

42. The horn on a vehicle sounds at reduced volume. The FIRST diagnostic step is:

- A. Voltage drop testing on the horn circuit during operation
- B. Replacement of the horn relay immediately to restore volume
- C. Increasing the horn's ground wire gauge for better current flow
- D. Installation of a supplemental horn in parallel with the original

43. A rear defogger grid has most horizontal traces working but one is not heating. The fault is in:

- A. The defogger relay supplying power to the entire grid
- B. The defogger fuse protecting the complete circuit
- C. The dashboard defogger switch or its indicator lamp
- D. The specific trace on the glass, which is broken

44. Before performing service on SRS airbag components, the technician MUST:

- A. Disconnect the air bag connectors while the battery is connected
- B. Disconnect the battery and wait the manufacturer-specified time
- C. Scan the SRS module for DTCs with ignition on before service
- D. Remove the steering wheel first for clock spring access

45. A high-speed CAN bus measured across CAN-H and CAN-L with ignition off reads 60 ohms. This indicates:

- A. Two parallel 120-ohm termination resistors, as designed
- B. An open circuit indicating both wires are completely broken
- C. A short between CAN-H and CAN-L ground reference
- D. A missing terminator at one end of the bus

46. The LIN bus protocol is used for:

- A. High-speed engine control module communication
- B. Safety-critical airbag system communication
- C. Infotainment video streams and high-bandwidth applications
- D. Low-speed, low-cost applications like switches and actuators

47. Technician A says that a gateway module failure can affect multiple unrelated systems simultaneously. Technician B says that gateway faults are always identified by a single DTC in one specific module. Who is correct?

- A. Technician B only, faults are always isolated
- B. Both, depending on the severity of the fault
- C. Technician A only; gateway failures cause widespread symptoms
- D. Neither, because gateways cannot fail in modern vehicles

48. A U0140 DTC typically indicates:

- A. Engine control module failing to recognize ignition cycle
- B. Lost communication with the body control module
- C. Traction control module detecting wheel speed discrepancy
- D. Airbag module has detected a crash condition

49. The passive entry function of a keyless entry system typically works by:

- A. Requiring the driver to push an unlock button on the fob
- B. Using a mechanical key inserted into a lock cylinder
- C. Voice recognition from a microphone in the driver's door
- D. Detecting the fob's presence via low-frequency antennas

50. An occupant classification system must be calibrated after:

- A. Any service to the front passenger seat assembly
- B. Replacing the vehicle's main 12-volt battery
- C. Any engine control module software reprogramming
- D. Work on the brake master cylinder fluid system

Practice Exam 6: Answer Key and Explanations

1. D — Power equals voltage times current: $14.3 \text{ V} \times 35 \text{ A} = 500.5 \text{ watts}$. Watt's Law applies to any electrical calculation where power must be determined from voltage and current. This calculation is fundamental for evaluating charging system output, fuse sizing, and understanding overall electrical system capacity demands on the vehicle.
2. B — The wire color code convention lists the base color first and tracer stripe second. "BK/YE" means a black base with a yellow tracer stripe. This notation appears throughout service information and is critical for identifying the correct wire within a harness bundle during diagnostic work.
3. A — A silicon PN junction in forward bias drops approximately 0.6 to 0.7 volts — a characteristic property of silicon that applies to every diode, transistor base-emitter junction, and rectifier diode. This voltage drop is fundamental knowledge for diode testing and understanding semiconductor behavior in automotive electrical systems.
4. C — A short to ground creates a direct low-resistance path from power to ground, allowing excessive current that immediately blows the protective fuse. A short to power on a normally-grounded circuit may cause unexpected operation but typically doesn't produce fault currents large enough to blow fuses. Technician B is correct about the typical fuse-blowing mechanism.
5. D — Twelve volts at both switch terminals confirms the switch is working and the wiring to the switch is intact. Zero voltage at the load means voltage is being lost somewhere downstream of the switch — between switch output and load. This indicates an open circuit or severely high resistance in the wiring between switch and load.
6. A — Resistance is directly proportional to a conductor's length. Tripling the length triples the resistance because current must travel through three times the material. This is why long wire runs accumulate more resistance and higher voltage drops, a key factor in automotive harness design and repair work.
7. B — A solenoid coil with 2.5 ohms of resistance is within the normal range for typical automotive relay and solenoid coils (typically 50-150 ohms) or smaller fuel injector solenoids (1-3 ohms). Very low resistance values like 2.5 ohms are normal for high-current solenoid applications. An open coil would read infinite resistance; a shorted coil would read near zero.

8. C — Jumper wires bypassing modules can feed excessive current to control circuitry not designed to handle direct battery voltage. Incandescent test lights drawing 150-300 milliamperes can damage sensor output drivers and module input circuits. Technician A is correct about both safe diagnostic practices in modern electronic vehicles.

9. A — A properly executed solder-and-shrink-wrap splice should have a mechanically sound connection before soldering (wires twisted or crimped together), solder that has penetrated all strands without excess, and heat-shrink tubing that has fully contracted and seals against moisture intrusion. Both the mechanical connection and environmental seal are essential for long-term reliability.

10. D — A voltage drop of 0.15 volts across a ground wire at 20 amperes represents a resistance of about 0.0075 ohms, which is within acceptable specification for most applications. Maximum acceptable ground circuit voltage drop is typically 0.2 volts at operating current. This reading indicates a healthy ground connection.

11. A — The SAE color code standard assigns yellow to 20-amp fuses across all standard blade fuse form factors (mini, ATO, maxi). Memorizing the standard fuse color code enables rapid visual verification of fuse rating without pulling the fuse from the fuse box, which saves diagnostic time.

12. D — A professional-grade DMM typically has 10 megaohms of input impedance on the voltage range. This is high enough to avoid loading most circuits but is not infinite. Understanding meter input impedance is important because very high source-impedance signals (like some sensor outputs) can be loaded by even a 10 M Ω meter.

13. C — Starter currents of 400 amperes exceed the 10-20 ampere limit of handheld DMMs. A clamp-style ammeter measures current inductively without breaking the circuit and can handle the high amperages involved. This is the standard tool for starter current testing, charging system current measurement, and any high-current automotive diagnostic work.

14. B — A fully charged 12-volt lead-acid battery at rest produces approximately 12.6 volts at the terminals. This is the reference for state-of-charge testing. Voltages of 12.4 V indicate 75% charge, 12.2 V indicates 50%, and below 12.0 V indicates significant discharge. Surface charge from recent charging can temporarily inflate readings.

15. D — AGM batteries have different voltage requirements during charging than flooded batteries. A standard flooded-battery charging profile can apply voltages too high for AGM technology, causing

damage. Both technicians identify this important difference, making both correct — modern chargers have specific AGM modes that must be selected.

16. A — Parasitic draw testing is best performed with a current clamp around the negative battery cable after the vehicle has been allowed to sleep (typically 30-45 minutes). This method is non-invasive and doesn't require disconnecting the battery, which would reset module adaptations and trigger wake-up cycles that obscure the test result.

17. C — Grinding noise during cranking indicates physical contact between the starter pinion and damaged flywheel ring gear teeth or a stuck pinion that won't retract properly. Missing or chipped ring gear teeth cause grinding during engagement. Visual inspection of the ring gear is required before installing any replacement starter; a new starter will immediately be damaged by a worn ring gear.

18. B — Hydrogen gas produced during battery charging is explosive when concentrations reach 4% or higher. An ignition source (spark, flame, static discharge) can cause an explosion that sprays battery acid and shatters the case. This is why charging areas must be well-ventilated and all sources of spark or flame must be kept away from the battery during charging.

19. A — BCI group size (like 94R, 35, H7, etc.) specifies the battery's physical dimensions — length, width, height — and terminal configuration. This determines whether a battery will physically fit in a specific vehicle's battery tray. Group size is separate from electrical ratings like CCA or RC, which must also match the vehicle's specifications.

20. D — A healthy ground return path from the engine block to the battery negative post during cranking should drop less than 0.2 volts. Higher readings indicate ground strap corrosion, loose ground bolts, or damaged cables — all of which reduce cranking performance and contribute to slow starting problems.

21. D — Modern vehicles with battery management systems adjust their charging strategy based on the battery's specific characteristics (age, chemistry, capacity). When a new battery is installed, the BCM must be reset to reflect the new battery's properties, or it will continue using outdated charging parameters calibrated to the old battery.

22. C — Drive belt slippage is the most common cause of "undercharge" symptoms and should always be inspected first. A glazed, cracked, or loose belt transfers less torque to the alternator, reducing its

output capacity. Belt inspection takes less than a minute and eliminates or confirms this common and inexpensive cause before proceeding to more complex electrical diagnosis.

23. A — An alternator produces three-phase AC because three stator windings are arranged 120 degrees apart around the rotating rotor. The rotor's magnetic field sweeps past each winding in sequence, producing three overlapping AC waveforms that are 120 degrees out of phase. This arrangement produces smoother rectified DC output than a single-phase design would.

24. B — A failed (open) rectifier diode prevents one of the six diodes from conducting, leaving a gap in the rectified output every alternator revolution. This causes increased AC ripple on the DC output and reduces the alternator's maximum current capacity. Healthy ripple is less than 100 mV; a failed diode may produce 500 mV or more of ripple.

25. C — Modern computer-controlled charging systems intentionally vary voltage based on battery state, temperature, and operating conditions. During cruise with a fully charged battery, voltage may be reduced to 13.2 volts to prevent overcharging and extend battery life. Technician A correctly describes this adaptive behavior.

26. C — A 1.2-volt drop across the charging cable is excessive (typical specification is under 0.5 volts). This indicates corrosion, damaged wire, or loose connections causing high resistance. Many "alternator failures" are actually cable or termination problems — voltage drop testing prevents unnecessary alternator replacement on vehicles where the wiring is the actual fault.

27. A — Modern belt tensioners have pointers or indicators that show correct tension range. For non-tensioner belts, tension is checked with a belt tension gauge that measures deflection under a specific load. Pressing with a thumb is not reliable enough to verify correct tension. Audible symptoms often appear too late for preventive service.

28. B — HID bulbs contain metal halide salts that must vaporize before the arc fully establishes. During the warm-up period (10-30 seconds), the arc is gradually building from low brightness to full output as the salts transition from solid to vapor. This delay is normal and inherent to the HID technology.

29. C — Skin oils transferred during handling of the glass envelope create thermal stress concentration points that cause the bulb to crack and fail within hours of operation. This is the single most common cause of premature halogen bulb failure. Always handle halogen bulbs by the base and clean any accidental finger contact with isopropyl alcohol before installation.

30. A — The Center High-Mount Stop Lamp (CHMSL) has been required on all U.S. passenger cars since 1986 and on light trucks since 1994 under FMVSS 108. It provides a third brake signal that dramatically improves visibility to following drivers and reduces rear-end collisions. It is mandatory safety equipment, not optional.

31. B — If battery voltage is 14.3 volts, the charging system is producing adequate voltage. A dim headlight on one side with adequate battery voltage indicates voltage drop in the wiring to that specific headlight. Corroded connections, damaged wire, or poor ground returns on that side alone explain the dimness. Voltage drop testing under load identifies the specific fault location.

32. D — Daytime running lights (DRLs) operate automatically whenever the engine is running, regardless of the headlight switch position. This provides continuous vehicle visibility to other road users during daytime. DRLs are mandatory in Canada and some other markets; they are optional but common in the United States. Implementation varies (dedicated lamps or reduced-voltage headlights).

33. C — HID ballasts operate at high voltages (85-95 V AC sustained, 15,000+ V ignition pulses) capable of causing serious electrical injury. The system must be fully de-energized and any capacitors discharged before servicing. Technician safety demands specific manufacturer procedures for HID system service, including appropriate PPE and waiting periods.

34. A — Modern instrument clusters receive essentially all data through vehicle serial networks rather than dedicated sensor wiring. The ABS module reads wheel speed sensors, calculates vehicle speed, and broadcasts the value on the CAN bus. The cluster receives this network message and renders the speedometer display. This centralized architecture replaced mechanical speed cables on modern vehicles.

35. B — If the sending unit is correct, wiring is intact, and the cluster shows incorrect fuel level, the fault must be in the cluster itself. Modern clusters include electronic processing of sensor signals that can fail independently of external components. Cluster internal electronics may require repair or the cluster may need replacement if the internal fault cannot be addressed.

36. D — A warning lamp that fails to illuminate during the bulb check indicates the lamp itself or its driver circuit has failed. The self-test verifies each lamp is functional by briefly illuminating it. A non-lighting lamp confirms a lamp-circuit fault specifically, distinct from a lamp that stays illuminated after self-test (which indicates a fault in the monitored system).

37. C — A warning message accompanying the master warning triangle contains specific information about the detected fault. The technician should read the message and then scan the module most closely associated with that fault type for stored DTCs. This systematic approach identifies the actual fault source rather than arbitrarily replacing components.

38. A — Federal law prohibits odometer tampering. A replacement cluster must be programmed to match the original cluster's mileage exactly. This preserves legal compliance and maintains vehicle value by accurately representing the cumulative miles driven. Setting the odometer to zero or otherwise adjusting it creates legal exposure and is prohibited.

39. B — The HUD faithfully displays data received over the vehicle network. If the displayed speed is incorrect, the source of the speed data — typically the ABS module broadcasting wheel-speed-derived values — is the fault, not the HUD itself. Diagnosis targets the source of the incorrect data, not the display system.

40. D — A window that operates from the master switch but not the door switch isolates the fault to the non-working switch's circuit. The motor, regulator, and master switch wiring are all functional since the master switch works normally. A defective door-mounted switch or broken wiring between the switch and door module is the most likely cause.

41. C — Rain-sensing wiper systems interpret changes in infrared light reflection from the windshield. Dirt, grime, or residue on the glass in the sensor area absorbs or scatters infrared light, mimicking water droplets and falsely activating the system. Cleaning the windshield in the sensor area resolves this common nuisance complaint without any repair to the system.

42. A — Reduced horn volume indicates voltage drop somewhere in the horn circuit — corroded ground, degraded wire, or failing switch contacts. Voltage drop testing from the battery positive to the horn connector during operation reveals the location of unwanted resistance. The horn itself is rarely the fault when volume is merely reduced; wiring and grounds are typically the cause.

43. D — A defogger grid consists of multiple parallel traces; one broken trace disables only that one line while others continue operating normally. A voltmeter walking along the broken trace locates where voltage drops abruptly from battery voltage to zero. Small breaks can be repaired with silver-ceramic paint kits; larger damage requires glass replacement.

44. B — Every SRS requires a manufacturer-specified disabling procedure including battery disconnection and a waiting period (typically 1-10 minutes) for deployment-energy capacitors to discharge. Accidental airbag deployment during service causes severe injury. Scanning DTCs or probing circuits with an active SRS is not sufficient; full system de-energization is mandatory before physical service.

45. A — A high-speed CAN bus uses two 120-ohm termination resistors at its physical endpoints. Measured across CAN-H and CAN-L with the ignition off, these two resistors appear in parallel, giving a combined reading of approximately 60 ohms. This measurement is a fundamental CAN diagnostic check; significant deviation indicates missing or shorted terminators or wire faults.

46. D — LIN (Local Interconnect Network) is a low-cost, low-speed single-wire network protocol operating at 1-20 kbit/s using master-slave communication. It is used for simple applications like window switches, mirror motors, and sensor modules where CAN's higher speed and complexity are unnecessary. LIN complements CAN in modern vehicle network architecture.

47. C — Gateway module failures affect the translation between network types, causing multiple seemingly unrelated modules to lose communication with each other. Symptoms appear across systems that don't share obvious functional connections — cluster, infotainment, climate, and safety systems can all exhibit issues simultaneously. Technician B is wrong; gateway faults typically produce cascading symptoms across multiple systems.

48. B — The U0140 code specifically indicates lost communication with the body control module. U-codes (network family) identify communication faults; each specific number points to a particular module. This DTC is set by other modules when they detect the BCM has stopped responding to expected broadcasts, which may result from BCM failure, bus-off state, or power/ground issues to the module.

49. D — Passive entry systems use low-frequency antennas distributed throughout the vehicle (door handles, inside the cabin) to detect the key fob's presence. When the driver approaches, the fob transmits an authenticated signal, allowing door handle touches to unlock the door without requiring the driver to press the fob button. This is the standard passive entry technology on modern vehicles.

50. A — The occupant classification system must be calibrated after any service involving the passenger seat — cushion replacement, sensor repair, or cover changes. Uncalibrated systems may misclassify occupants (child as adult or empty as occupied), making dangerous airbag deployment decisions. This safety-critical calibration must be performed before returning the vehicle to service.