PRACTICE EXAM 19: ASE A6 SIMULATION (50 QUESTIONS)

1. A customer complains that multiple electrical systems behave strangely — dim dash lights, slow power windows, and intermittent radio operation. The technician should FIRST check:

A. The battery's state of charge and surface condition

B. The ground connections between engine and body

C. The alternator output at various engine RPMs

D. The fuse box for any blown fuses affecting multiple systems

2. A technician is diagnosing an intermittent electrical fault that appears only when the vehicle is driven over rough roads. The MOST effective approach is to:

A. Replace the battery as the most common source of intermittent issues

B. Drive the vehicle on similar roads while monitoring scan tool data

C. Perform a complete electrical system test with the vehicle stationary

D. Use a lab scope to monitor suspect connections while flexing the harness

3. A vehicle with no power to any electrical system after a battery jump-start MOST likely has:

A. A blown main fuse or fusible link in the positive battery cable

B. A failed ignition switch preventing power distribution

C. A discharged auxiliary battery causing system shutdown

D. An alarm system activation during the jump-start procedure

4. A technician suspects a high-resistance ground is causing multiple symptoms. The test that BEST identifies this is:

A. Open circuit voltage measurement at the battery posts

B. Resistance measurement of the ground cable with the DMM

C. Voltage drop testing across ground connections under load

D. Visual inspection of the ground cable routing

5. A complaint of "everything dies when I turn the key to START" indicates:

A. A failed starter with insufficient current capacity

B. A high-resistance connection reducing voltage under cranking load

C. A seized engine preventing starter rotation

D. A failed ignition switch in the accessory position

6. A technician finds that a DMM reads voltage correctly at the battery but zero at the starter solenoid battery terminal during cranking. This indicates:

A. An open circuit in the positive battery cable from battery to starter

B. A discharged battery unable to deliver cranking current

C. A failed starter solenoid that cannot accept voltage input

D. A normal cranking condition for a modern vehicle

7. A wiring repair in an engine bay exposed to heat, vibration, and chemicals should use:

A. Electrical tape wrapped multiple times around the connection

B. Aircraft-grade wire nuts with insulating caps

C. A simple crimp connector without environmental protection

D. A soldered or crimped splice with adhesive-lined heat-shrink tubing

8. A technician diagnosing an electrical fault discovers the OBD-II connector has no power. The MOST likely cause is:

A. A failed BCM output driver to the OBD-II connector

B. A discharged battery affecting only diagnostic functions

C. A blown fuse in the OBD-II power supply circuit

D. A failed scan tool that cannot communicate with the vehicle

9. A customer reports that their vehicle's electrical systems randomly reset themselves. Scan tool shows low battery voltage during these events. The MOST likely cause is:

A. A loose or corroded battery cable connection reducing voltage during load events

B. A failed alternator unable to maintain charging voltage under any load

C. A normal condition for modern vehicles with multiple modules

D. A faulty engine control module causing random resets

10. A technician performing voltage drop testing on a starting circuit finds the following readings during cranking: Positive cable 0.2V, Negative cable 0.15V, Solenoid 0.1V. The total voltage drop is:

A. Within normal specification; no repair needed

B. 0.45 volts total, which is acceptable for a healthy starting circuit

C. Excessive and requires starter replacement immediately

D. Inconclusive without further testing of the starter motor

11. A technician diagnoses a circuit with a blown 20-amp fuse. After replacing the fuse and observing that it blows again within seconds of engaging the circuit, the most effective next step is to:

A. Install a 30-amp fuse to prevent future failures

B. Disconnect the circuit's load to isolate the fault

C. Use a short-circuit locator or circuit breaker to trace the fault

D. Replace the entire fuse block as a precautionary measure

12. A technician troubleshooting a parasitic draw issue pulls fuses one at a time. When fuse 15 is pulled, the draw drops from 200 milliamperes to 40 milliamperes. This indicates:

A. The fault is in a circuit protected by fuse 15

B. All circuits on fuse 15 are failed simultaneously

C. The battery is at fault and not the circuit

D. The drain was caused by normal module operation

13. A vehicle's electrical system is experiencing a ground loop where multiple ground circuits are improperly interconnected. This typically manifests as:

A. Immediate failure of the battery and electrical system

B. An alarm condition that cannot be cleared

C. A completely open ground circuit with no current flow

D. Interference, strange symptoms, or ground voltage differences

14. A battery that tests as "GOOD" on a conductance tester but produces only 90 amperes during a cranking test of an engine normally drawing 180 amperes indicates:

A. The conductance tester may have given a false reading

B. Internal battery resistance or connection issues preventing full current delivery

C. A failed starter drawing less than rated current normally

D. Normal operation of a modern stop-start battery system

15. A vehicle parked for two weeks won't start. The battery tests at 11.8 volts after sitting. After recharging, the battery passes all tests. The MOST likely cause is:

A. A failed battery that needs replacement despite passing tests

B. Normal battery self-discharge during extended storage

C. Excessive parasitic draw from a circuit not entering sleep mode

D. Normal operation for a vehicle with modern electronics

16. A starter that cranks slowly, then won't crank at all after a few attempts MOST likely indicates:

A. A failed starter with damaged armature windings

B. Normal operation after the battery capacity is depleted

C. An overheating starter motor that needs cooling time

D. A combination of low battery capacity and high starter current draw

17. A solenoid's pull-in winding has a much lower resistance than its hold-in winding. This design allows:

A. Higher current during initial engagement, then lower holding current

B. The pull-in winding to fail gracefully without damaging the solenoid

C. The hold-in winding to generate more magnetic field

D. Both windings to share equal current during engagement

18. A technician is troubleshooting a no-crank condition on a vehicle with remote start capability. The engine cranks when started from the ignition switch but not from the remote. The MOST likely cause is:

A. A completely failed starter that only works intermittently

B. A failed remote start module or communication issue with the BCM

C. A discharged battery specifically when remote start is commanded

D. A failed ignition switch that cannot detect the remote signal

19. A battery that has sulfated typically cannot be:

A. Tested accurately with a conductance tester

B. Load tested at normal temperature conditions

C. Recharged with a standard automotive charger

D. Restored to full capacity through conventional charging

20. A vehicle is stored for 30 days during cold weather. On starting attempt, the engine cranks slowly. The battery tests at 60% state of charge. The MOST likely cause is:

A. Normal cold-weather battery degradation combined with partial discharge

B. A completely failed battery requiring immediate replacement

C. A failed charging system that didn't charge the battery before storage

D. A parasitic draw that discharged the battery during storage

21. A vehicle has had repeated battery replacements over 18 months. The charging system and parasitic draw test within specification. The MOST likely cause is:

A. The customer is installing incorrect battery types for the application

B. Normal battery life is shortening due to climate conditions

C. A failed BCM that cannot properly manage the battery

D. A faulty starter drawing excessive current during each start

22. An alternator on a vehicle with a computer-controlled charging system produces no output, yet the voltage regulator tests correctly when removed and bench tested. The MOST likely cause is:

A. A failed rectifier diode bridge

B. A bad connection or communication error between ECM and alternator

C. A broken drive belt preventing alternator rotation

D. A failed stator winding unable to generate output

23. A charging system warning lamp that illuminates only when the vehicle is idling with heavy electrical load indicates:

A. A completely failed alternator with no output capability

B. A condition where the alternator cannot meet demand at idle RPM

C. A burned-out charging warning lamp that flickers randomly

D. A normal low-voltage condition during idle

24. A technician performs an alternator output test and finds 95 amperes at 2,000 RPM on an alternator rated for 140 amperes. The MOST likely cause is:

A. Battery surface charge requiring additional testing

B. A completely healthy alternator operating at specification

C. A worn alternator or belt slippage reducing output capacity

D. Normal operation for the specific vehicle electrical load

25. A customer's alternator has been replaced three times in six months. Each replacement fails within weeks. The MOST likely cause is:

A. A specific alternator manufacturing defect affecting all units

B. A customer driving habit that stresses the charging system

C. The wrong specification alternator being installed each time

D. An external cause such as a parasitic draw or high-load circuit destroying the alternator

26. A vehicle's computer-controlled charging system may command reduced voltage during:

A. Stable cruise conditions with a fully charged battery

B. Engine cranking to protect the ignition system

C. Cold engine warm-up requiring maximum output

D. Heavy electrical load from headlights and accessories

27. A technician measuring an alternator's AC ripple finds 2.5 volts peak-to-peak. Normal is less than 100 millivolts. This indicates:

A. A normal reading for a heavily loaded alternator

B. An incorrect test procedure that needs to be repeated

C. Failed rectifier diodes affecting DC output quality

D. A failed battery unable to smooth out alternator output

28. A halogen headlight flickers or varies in brightness while driving. The MOST likely cause is:

A. A failing bulb nearing the end of its service life

B. A loose or corroded connection in the headlight circuit

C. An overcharging alternator exceeding bulb voltage

D. A failed voltage regulator affecting only headlight brightness

29. A turn signal flashes at normal rate with headlights off but flashes rapidly with headlights on. This MOST likely indicates:

A. A failed turn signal flasher relay requiring replacement

B. A normal condition for vehicles with LED headlights

C. A short to power affecting the turn signal circuit

D. A voltage drop in the turn signal circuit when headlights are active

30. A vehicle's exterior lighting operates correctly except the passenger side tail light, which is dim. The parking light and brake light on that side also appear dim. The MOST likely cause is:

A. A failed passenger side brake light switch

B. A separate tail light bulb failure on the passenger side

C. A poor ground connection or corroded socket on the passenger side

D. A failed BCM output driver to the passenger side tail lights

31. A technician servicing an HID headlight should:

A. Touch the bulb with clean bare fingers for proper installation

B. Check voltage at the ballast with a conventional test light

C. Replace both HID bulbs simultaneously, even if only one has failed

D. Disconnect the battery and wait for residual voltage to dissipate before work

32. A daytime running light (DRL) circuit uses the headlight filaments at reduced voltage. If the DRLs operate but headlights do not work, the MOST likely cause is:

A. A failed DRL module affecting both DRL and headlight circuits

B. A failed headlight relay or voltage supply to the high-beam circuit

C. A normal condition indicating the DRL circuit is bypassing headlights

D. A burned-out DRL indicator causing reduced voltage

33. A fog lamp relay sticks in the closed position after the fog lamp switch is turned off. This causes:

A. Fog lamps to remain illuminated until the battery is disconnected

B. A short to ground that blows the fog lamp fuse

C. A normal delay in fog lamp deactivation

D. The headlight switch to become inoperative

34. A modern instrument cluster's backlight brightness varies based on:

A. Engine RPM and vehicle speed combined

B. The infotainment system's volume setting only

C. A photocell ambient light sensor and the dimmer control

D. Battery voltage alone with no other inputs

35. A vehicle's driver information center (DIC) displays a "Service Vehicle Soon" message accompanied by a check engine lamp. The technician should:

A. Scan the engine control module for stored DTCs first

B. Clear the code immediately without diagnosing

C. Recommend the customer ignore the message if the vehicle runs well

D. Replace the instrument cluster to eliminate the message

36. A fuel gauge that reads empty when the tank is full, with the sending unit resistance correct, may be due to:

A. A failed fuel pump drawing excessive current

B. A blown fuse affecting only the fuel gauge circuit

C. A failed fuel pressure regulator causing fuel starvation

D. A miswired or incorrectly calibrated instrument cluster

37. A head-up display that is completely blank despite the ignition being on has MOST likely experienced:

A. A normal delay during startup self-test

B. A loss of power, data communication, or projector failure

C. A normal result of activating HUD in bright sunlight

D. A miscalibration from a recent battery replacement

38. A tachometer displaying zero RPM while the engine is running indicates:

A. A failed tachometer motor or stepper in the cluster

B. A normal condition during idle-stop operation

C. A loss of RPM signal from the ECM or a cluster fault

D. Low battery voltage affecting the display function

39. After installing a replacement instrument cluster, a vehicle will not start. The MOST likely cause is:

A. A blown fuse from the installation procedure

B. A disconnected harness at the cluster

C. A battery discharged during the installation

D. The new cluster has not been programmed to match the vehicle immobilizer

40. A power window that operates sluggishly in one direction but normally in the other MOST likely has:

A. A worn window regulator or sticky mechanism

B. A failed window motor that operates only partially

C. A defective switch affecting only one direction

D. Low battery voltage affecting half the window circuit

41. A power door lock actuator clicks but the door lock cylinder does not move. The MOST likely cause is:

A. A failed actuator with stuck or broken internal mechanism

B. A weak battery causing intermittent actuator operation

C. A broken linkage between the actuator and the lock cylinder

D. A fault in the BCM's output driver to the actuator

42. A rain-sensing wiper that activates when driving through a carwash but not in normal rain MOST likely indicates:

A. A high volume of water triggers the sensor while light rain does not

B. A failed BCM software error affecting rain detection only

C. A failed wiper motor activating randomly

D. The rain sensor is programmed to ignore steady water streams

43. A horn that only works when the BCM provides ground (not when manually grounded) indicates:

A. The horn has failed and requires replacement

B. A short to power in the horn ground circuit

C. A BCM output driver fault

D. Normal operation for modern networked horn circuits

44. A remote keyless entry fob that unlocks the doors only at very close range, regardless of battery replacement, indicates:

A. An issue in the vehicle's RKE receiver or antenna

B. A fob that needs reprogramming to the vehicle

C. A normal condition for fobs in cold weather

D. A dead battery that requires secondary replacement

45. A rear defogger grid with visible white corrosion on its bus bar connections will typically:

A. Operate normally despite the corrosion appearance

B. Activate a DTC and shut down the entire defogger circuit

C. Produce reduced heating capacity due to increased resistance

D. Cause the entire grid to stop functioning

46. Before servicing any SRS component, the technician must:

A. Engage the parking brake and raise the hood

B. Disconnect the battery and wait the manufacturer-specified time

C. Test the SRS system with a scan tool

D. Remove the airbag cover to inspect the deployment charge

47. A squib in an SRS circuit requires resistance within a very narrow range because:

A. The module uses resistance to verify circuit integrity and safe deployment

B. High resistance prevents the deployment charge from igniting

C. Low resistance causes premature deployment

D. The squib is calibrated to a specific vehicle's crash response

48. An occupant classification system that cannot distinguish adult from child occupant may default to:

A. Full airbag deployment for safety

B. Disabling the airbag entirely

C. Deploying only the seat belt pretensioner

D. Deactivating the passenger airbag as a safety measure

49. A CAN bus showing 0 ohms between CAN-H and CAN-L with ignition off indicates:

A. A normal operating condition of the network

B. A short between the two CAN wires

C. A complete open circuit of both wires

D. A failed gateway module affecting the network

50. A vehicle's gateway module communication to an aftermarket accessory's CAN connection should be:

A. Made freely without any verification

B. Made only through designated aftermarket ports

C. Avoided as aftermarket connections are always problematic

D. Made only with manufacturer-approved interfaces that follow CAN security protocols

Practice Exam 19: Answer Key and Explanations

1. B — When multiple unrelated electrical systems behave strangely simultaneously, a shared ground problem is the most likely root cause. All vehicle circuits return to the battery through the body and engine grounds, so a degraded ground creates voltage drop that affects multiple circuits. Checking and cleaning the engine-to-body and battery ground connections is the efficient first step that often resolves seemingly unrelated symptoms.

2. D — Intermittent faults that appear only during rough-road operation indicate loose connections, broken wire strands inside insulation, or stressed modules in a specific harness location. The most effective approach is to use a lab scope to monitor suspect connections while physically flexing the harness or connector to reproduce the fault. This technique localizes the specific physical point of failure.

3. A — A vehicle with no power to any electrical system after jump-starting has typically blown the main fuse or fusible link in the positive battery cable due to reverse polarity or excess current. The main fuse protects the entire electrical system from catastrophic damage. Testing voltage at the fuse box and checking all main fuses/fusible links is the efficient first step.

4. C — Voltage drop testing across ground connections under load is the most effective method for identifying high-resistance grounds. Unlike resistance measurement (which may not reveal marginal connections) or visual inspection (which can't see internal corrosion), voltage drop testing applies actual current to the connection. A reading above 0.2V typically indicates excessive resistance requiring cleaning or repair.

5. B — "Everything dies when I turn to START" is classic symptom of high resistance somewhere in the starting circuit. The battery can handle light loads (accessories) but the heavy cranking load causes

voltage drop that droops below the threshold needed to run electronic systems. Voltage drop testing while cranking identifies the specific connection with excessive resistance.

6. A — Voltage present at the battery but absent at the starter solenoid battery terminal during cranking indicates an open circuit in the positive battery cable between these two points. Current is not flowing through the cable despite voltage being available at the source. A broken cable, severely corroded connection, or damaged terminal is the probable cause.

7. D — A wiring repair in the engine bay must handle heat, vibration, and chemicals. A soldered or crimped splice with adhesive-lined heat-shrink tubing provides both mechanical integrity and environmental sealing. The adhesive flows when heated and seals against moisture and chemical intrusion. Electrical tape, wire nuts, and basic crimps fail under these harsh conditions.

8. C — The OBD-II connector has its own power supply fuse that must be intact for scan tool communication. If the fuse is blown, the diagnostic port has no power and cannot communicate with modules. Testing voltage at pin 16 of the OBD-II connector (or the appropriate power pin) identifies this issue quickly.

9. A — Random system resets accompanied by low battery voltage during the events indicate intermittent voltage drops. The most common cause is a loose or corroded battery cable connection that occasionally opens under current load, causing voltage to drop briefly below the threshold for module operation. This produces the characteristic "everything resets" symptom.

10. B — The sum of three individual voltage drops (0.2 + 0.15 + 0.1) equals 0.45 volts total. This total is within normal specification for a healthy starting circuit. Acceptable total voltage drop for a starting circuit is typically 0.5V or less. Readings within this range indicate the starting circuit is operating correctly.

11. C — A fuse that blows immediately upon replacement indicates a short circuit (low resistance path from power to ground) in the circuit. A short-circuit locator (sometimes called a short finder) or a circuit breaker inline with the circuit and wiggle-testing is the effective method for tracing the short without blowing repeated fuses. This systematic approach isolates the fault location.

12. A — When removing fuse 15 drops the parasitic draw from 200mA to 40mA, the 160mA drop is drawn by a circuit protected by that specific fuse. This identifies where to focus further diagnosis. The

remaining 40mA is normal standby current for other modules. Continuing to narrow down within the specific circuit identifies the specific fault.

13. D — Ground loops (where multiple ground points are improperly interconnected) create circulating currents that produce interference, strange symptoms, and voltage differences between ground points. Symptoms vary widely — communication errors, module resets, inconsistent operation. Proper ground isolation and clean, dedicated ground returns resolve these issues.

14. B — A battery that tests good on a conductance tester but cannot deliver full cranking current has internal resistance or termination issues that don't appear in the conductance test. The conductance test measures internal resistance at a specific frequency, which may not reflect the battery's performance under high-current cranking load.

15. C — A vehicle that parks for two weeks and loses 0.8 volts (from 12.6 to 11.8) indicates excessive parasitic draw. Normal parasitic draw (30-50 mA) would cause much less discharge over two weeks. A failed module not entering sleep mode is drawing more current than normal, slowly discharging the battery. Battery passing tests after recharging confirms the battery itself is healthy.

16. D — A starter that cranks slowly then stops is typically experiencing the combination of partially depleted battery and starter drawing excessive current. The starter may be drawing more current than the battery can maintain at acceptable voltage, causing progressive voltage collapse. Testing both battery state and starter current identifies the root cause.

17. A — Solenoid windings are designed this way intentionally. The pull-in winding (with low resistance) provides high current briefly during initial engagement to pull the plunger against spring resistance. Once engaged, the hold-in winding (with higher resistance) provides lower sustained current to hold the plunger in position. This design is energy-efficient for continuous operation.

18. B — If cranking works from ignition switch but not remote start, the primary starter system is functional. The fault is in the remote start module or its communication with the BCM. The remote start may have lost authentication, has a blown fuse, or has a communication issue with the main vehicle electrical system.

19. D — Sulfated batteries have hard sulfate crystals on the plates that no longer participate in the charge-discharge reaction. This reduces the effective active material and capacity. Recharging to rated

voltage does not restore the capacity lost to sulfation — the crystals remain. Some desulfation chargers may help with mild sulfation, but severe sulfation is permanent.

20. A — Cold weather slows battery chemistry, reducing capacity and cranking performance. A battery at 60% state of charge in cold weather may not supply enough current for normal cranking, resulting in slow cranking. The battery itself hasn't failed; it's operating at reduced capacity due to the combined effects of cold temperature and partial discharge.

21. C — Repeated battery failures with charging and parasitic draw tests within specification suggest the BCM is not properly managing the battery. Common issues include incorrect charging strategy commands, failure to register new batteries, improperly calibrated charging profiles, or BCM fault causing repeated deep discharge. Diagnosis of the BMS/BCM is essential.

22. D — No alternator output with a functional voltage regulator, no belt slippage, and intact stator suggests a bad connection or communication error between the ECM and the alternator in a computer-controlled charging system. The ECM commands the voltage setpoint via LIN or similar communication; a fault in this communication prevents the alternator from operating.

23. B — Charging warning lamp illuminating only at idle with heavy load indicates the alternator cannot produce enough current at idle RPM to meet the electrical demand. At higher RPM, the alternator produces more current and the warning extinguishes. This is a common indicator of a weakening alternator or one that is too small for the current load profile.

24. C — An alternator producing only 95A when rated for 140A has lost some capacity. Common causes include worn alternator components (bearings, brushes, slip rings), belt slippage, or failing internal components. Reduced capacity doesn't always trigger warnings but affects the system's ability to handle high electrical loads.

25. D — Repeated alternator failures in short time periods with three different replacements indicate an external cause that is destroying each new unit. Parasitic draw, shorts-to-ground in loads, high-current demand issues, or charging voltage problems can all destroy alternators. Diagnosing the root cause prevents another failure of the replacement unit.

26. A — Computer-controlled charging systems intentionally reduce voltage during stable cruise with a fully charged battery to improve fuel economy. The system determines the battery doesn't need

aggressive charging and reduces the load on the engine. This adaptive behavior is normal and represents correct system operation, not a fault.

27. C — An AC ripple of 2.5V peak-to-peak vs. normal of less than 100mV indicates failed rectifier diodes. Healthy rectifiers convert three-phase AC to DC with minimal ripple; failed diodes allow AC to pass through. This ripple can damage vehicle electronics over time and typically requires alternator replacement.

28. B — Flickering or varying headlight brightness while driving typically indicates loose or corroded connections in the headlight circuit. These intermittent connections allow current to vary, producing the flickering effect. Faulty bulbs typically fail completely rather than flickering. Loose grounds or corroded sockets are common culprits.

29. D — A turn signal that flashes normally with headlights off but rapidly with headlights on indicates voltage drop in the turn signal circuit when headlights add load. The load from the headlights reduces available voltage for the turn signal, which the flasher interprets as a failed bulb. This pattern is diagnostic of voltage drop issues.

30. C — When multiple lights on one side of the vehicle are dim but the other side is normal, the most likely cause is a poor ground connection or corroded socket on the dim side. The problem affects all lights sharing that ground path. Cleaning or repairing the ground connection typically resolves all affected lights simultaneously.

31. D — HID ballasts produce dangerously high voltages (15,000+ volts) for arc ignition. The technician must disconnect the battery and wait for residual voltage in the capacitors to dissipate before performing any work. Attempting service without de-energizing is an electrocution hazard. This safety procedure is mandatory for all HID service.

32. B — If DRLs operate (using the headlight filaments at reduced voltage) but headlights do not work at full brightness, the DRL circuit is functional. The fault is in the headlight relay or voltage supply to the high-beam circuit. The DRL uses a different path (often a lower-voltage tap) than the main headlight circuit.

33. A — A sticking fog lamp relay causes the fog lamps to remain illuminated even when the switch is turned off. The relay's contacts are physically stuck closed. Disconnecting the battery is the only way to shut off the fog lamps in this situation. Relay replacement is the permanent fix.

34. C — Modern instrument cluster backlight brightness is controlled by a photocell ambient light sensor combined with the dimmer switch or rheostat. The photocell detects ambient light levels and automatically dims the cluster in low-light conditions. The driver can override with the manual dimmer. This combination provides automatic visual comfort in all lighting conditions.

35. A — A "Service Vehicle Soon" message with check engine lamp indicates the engine control module has detected a fault. The technician must scan the ECM for stored DTCs to identify the specific fault. Clearing the code without diagnosis just removes the symptom; the underlying fault persists and will eventually recur.

36. D — A fuel gauge reading empty with a full tank and correct sending unit resistance indicates the cluster is miscalibrated or miswired. The signal reaches the cluster correctly but the cluster is interpreting it incorrectly. This commonly occurs after cluster replacement without proper programming or if the cluster configuration is for a different fuel tank size.

37. B — A completely blank HUD despite ignition-on indicates loss of power, data communication, or projector failure. Testing voltage at the HUD module power and data connections identifies the fault location. The HUD doesn't respond because it cannot receive power or data from the vehicle electrical system.

38. C — A tachometer displaying zero RPM while the engine runs indicates the cluster is not receiving the RPM signal from the ECM via the data network. This may be a fault in the ECM's transmission of RPM data, a network communication fault, or a cluster internal fault that prevents reading the received signal.

39. D — A replacement cluster that prevents starting indicates the cluster has not been programmed to match the vehicle's immobilizer. Modern clusters store immobilizer authentication data that must match other modules. Until the new cluster is programmed to the specific vehicle, the immobilizer rejects the cluster and denies the engine-enable signal.

40. A — A power window that operates sluggishly in one direction but normally in the other indicates a mechanical issue with the window regulator or the track. One direction of travel is binding or encountering resistance that the motor can overcome only slowly. The motor is functional; the mechanical path is degraded.

41. C — A door lock actuator that clicks but doesn't move the lock has a broken linkage between the actuator and the lock cylinder. The motor is engaging (clicking is the solenoid or motor engaging), but the connection to the lock is broken. Inspection and repair of the linkage is required.

42. A — A rain sensor that activates in a carwash (high water volume) but not in light rain operates based on signal threshold. The carwash provides enough water to trigger the sensor, while light rain does not. This is often normal operation for rain sensors with specific sensitivity thresholds. Adjustment via menu or calibration may improve light rain response.

43. C — If the horn operates only when the BCM provides ground, the horn and ground circuit are functional. Manual grounding bypasses the normal circuit path; if the horn doesn't work when manually grounded, the BCM must be providing a ground-path-replacement via internal circuitry, indicating a BCM output driver fault or circuit issue.

44. D — A remote keyless entry fob that unlocks at close range only, despite battery replacement, indicates a fault in the vehicle's RKE receiver or antenna. The new battery eliminates fob transmitter weakness. The issue is with the receiving end of the signal — either a weak antenna, damaged receiver, or obstructed antenna path.

45. C — White corrosion on defogger grid bus bar connections increases resistance in the connection, reducing current flow to the grid. The defogger still operates but with reduced heating capacity. Cleaning the corrosion and applying protective silicone grease restores full operation. Complete failure typically occurs only with significant corrosion or broken conductive material.

46. B — Before any SRS service, the technician must disconnect the battery and wait the manufacturer-specified time (typically 1-10 minutes) for deployment-energy capacitors to discharge. This prevents accidental airbag deployment during service. Scanning DTCs or testing with ignition on is not sufficient; the full system must be de-energized.

47. A — The SRS module verifies circuit integrity and safe deployment by measuring squib resistance. A specific, narrow resistance range indicates the circuit is intact and can deploy reliably. Values outside this range indicate potential deployment issues — either a damaged squib or a fault in the wiring. The narrow tolerance ensures safe and reliable deployment when needed.

48. C — When an occupant classification system cannot reliably distinguish occupant type, it defaults to the safest operation, which is deploying only the seat belt pretensioner. This activates safety restraints

without deploying the potentially injurious airbag that could harm a child or small adult. This fail-safe behavior prioritizes occupant safety.

49. B — Zero ohms between CAN-H and CAN-L with ignition off indicates a short circuit between the two wires. Normal reading is 60 ohms (two 120-ohm terminators in parallel). A zero reading means the wires are directly connected, which prevents normal differential signaling on the CAN bus. Locating and repairing the short is required.

50. D — Aftermarket accessory CAN connections must use manufacturer-approved interfaces that follow CAN security protocols to prevent network corruption, unauthorized access, or system interference. Random or unapproved aftermarket connections can cause DTCs, communication failures, or gateway rejections. Using approved interfaces protects vehicle system integrity.