PRACTICE EXAM 7: ASE A6 SIMULATION (50 QUESTIONS)

1. A 12-volt source is connected across a 150-ohm resistor. Using Ohm's Law, what current flows through the resistor?

A. 1.25 amperes through the circuit

B. 80 milliamperes through the resistor

C. 1,800 amperes during operation

D. 12 amperes at steady state

2. Technician A says that in a parallel circuit the voltage across each branch is the same as the source voltage. Technician B says that in a parallel circuit the total current equals the sum of the branch currents. Who is correct?

A. Technician A only

B. Technician B only

C. Neither A nor B

D. Both A and B

3. A digital multimeter set to the DC voltage range reads 00.0 when placed across a live 12-volt circuit. The MOST likely cause is:

A. A battery that is completely discharged

B. A faulty meter display unable to show value

C. Test leads plugged into the current jacks by mistake

D. A wire broken at both probe tips simultaneously

4. Four 8-ohm resistors are connected in parallel. The total resistance of this combination is:

A. 2 ohms total resistance

B. 8 ohms regardless of count

C. 32 ohms from series addition

D. 16 ohms from averaging values

5. A technician finds that tapping the body control module with a plastic handle causes the fault to appear briefly. This suggests:

A. The BCM software has an intermittent bug

B. A connector on the BCM is fully seated

C. Electromagnetic interference from the tap

D. A loose connection or failing internal component in the module

6. The abbreviation "PWM" on a wiring diagram indicates:

A. Power wire module with direct battery connection

B. Pulse-width modulation used for signal or power control

C. Programmable warning monitor sending diagnostics

D. Primary winding module within the ignition system

7. A technician wishes to locate a short to ground that repeatedly blows a 15-amp fuse. The correct approach is:

A. Install a 20-amp fuse to overcome the intermittent short

B. Jumper the fuse terminals with a wire to complete the circuit

C. Install a circuit breaker and wiggle the harness to locate the short

D. Replace the fuse block entirely to eliminate the issue

8. An automotive wire with 2.0 mm² cross-sectional area is approximately equivalent to what AWG size?

A. 14 AWG in the American standard

B. 22 AWG for signal-level wiring

C. 8 AWG for high-current applications

D. 4 AWG for main battery feeds

9. A soldered electrical splice inside a heat-shrink tube without an adhesive liner is:

A. Approved for underhood applications in all conditions

B. Recommended for high-vibration engine mounting locations

C. Acceptable only in protected interior locations where moisture is minimal

D. Required for safety-critical SRS circuit repairs

10. A technician observes a diode symbol on a wiring diagram with a triangle pointing toward a vertical bar. The cathode end is:

A. The flat triangle end showing direction of positive flow

B. The vertical bar end where current exits during forward bias

C. The center of the symbol between the two features

D. The open-ended side of the triangle geometry

11. Technician A says a MOSFET uses voltage to control current flow between drain and source. Technician B says a bipolar junction transistor uses current at the base to control current flow between collector and emitter. Who is correct?

A. Technician A only

B. Technician B only

C. Both A and B

D. Neither A nor B

12. A technician observes that a lab scope waveform shows a square wave that fluctuates between 0 and 5 volts with approximately 70% on-time. The duty cycle of this signal is:

A. 70 percent of full duty cycle

B. 30 percent of full duty cycle

C. 50 percent of normal output

D. 100 percent of continuous on time

13. A ground strap between the engine and the body is commonly referred to as:

A. A primary alternator grounding cable

B. The battery's main charging return path

C. The engine control module reference lead

D. An engine-to-body ground bond wire

14. A battery reads 12.5 volts at rest after sitting overnight. The state of charge is:

A. Fully charged at 100 percent capacity

B. Approximately 75 percent state of charge

C. Completely discharged, must be replaced

D. Over-charged from an alternator fault

15. A technician performs a load test on a battery rated at 550 CCA and applies 275 amperes of load for 15 seconds at 70°F. To pass the test, the battery voltage must remain above:

A. 12.6 volts for the full test duration

B. 10.5 volts for the last five seconds

C. 9.6 volts at the end of the test period

D. 7.2 volts throughout the test

16. Absorbed Glass Mat (AGM) batteries differ from flooded batteries primarily in:

A. The electrolyte is held in fiberglass mats between plates

B. The terminals are on the side rather than the top

C. The plates are lead oxide rather than lead sulfate

D. The voltage output is higher at 15 volts nominal

17. A battery's rest voltage is 10.8 volts after the vehicle has sat for several hours. The technician should:

A. Retest in 30 minutes to see if voltage recovers

B. Immediately crank the engine to verify the battery works

C. Connect a trickle charger for 8 hours before retesting

D. Recharge the battery fully and then retest for state of health

18. The purpose of a starter solenoid in an automotive starting system is to:

A. Step up battery voltage to increase cranking torque

B. Mechanically engage the pinion and simultaneously switch high current to the motor

C. Convert DC battery voltage into three-phase AC for the motor

D. Provide a timed delay between key turn and starter engagement

19. A starter draws 450 amperes during cranking on a vehicle rated for 200 amperes of normal draw. This indicates:

A. A completely healthy starter system

B. A normal cold-weather condition

C. Excessive battery voltage supply

D. Starter internal binding or a partial short in windings

20. Sulfation in a lead-acid battery typically occurs when:

A. The battery is left in a discharged state for extended periods

B. The battery is overcharged at high voltages

C. New electrolyte is added to an old battery

D. The alternator produces AC ripple above normal levels

21. Before jump-starting a vehicle, the technician should:

A. Verify both batteries are the same voltage and type

B. Connect the jumper cables with ignition switches on

C. Test the alternator output while connected to the dead vehicle

D. Leave the discharged vehicle running during the entire procedure

22. A vehicle's charging system warning light remains on after starting. The FIRST action the technician should take is:

A. Replace the alternator as the most likely cause

B. Disconnect the battery to reset the warning system

C. Scan the vehicle for diagnostic trouble codes

D. Check the drive belt tension and condition visually

23. An alternator rotor is driven by the engine through:

A. A direct mechanical link to the camshaft

B. A drive belt connected to the crankshaft pulley

C. Gears inside the engine timing cover

D. An electrical pulse synchronized with ignition

24. A failed rectifier diode in an alternator causes:

A. Complete loss of alternator output

B. Rapid engine overheating from belt slippage

C. Excessive AC ripple in the DC output

D. Increased CAN bus error DTCs across the network

25. A vehicle's alternator produces 14.6 volts at idle and 13.2 volts at 2500 RPM. This indicates:

A. A failed voltage regulator commanding incorrect output

B. Normal operation of a computer-controlled charging system

C. A completely discharged battery pulling down the voltage

D. A broken drive belt slipping under higher engine loads

26. The voltage drop across a healthy positive charging cable during normal operation should be:

A. Over 1.5 volts during maximum charging

B. Between 0.8 and 1.2 volts during cruise conditions

C. Higher than the alternator output voltage value

D. Less than 0.3 volts during operation

27. A technician tests the AC ripple at the battery terminals with the engine running at 2000 RPM and a moderate electrical load. The acceptable reading is:

A. Between 1 and 2 volts of AC content

B. Anywhere from 0 to 5 volts peak-to-peak

C. Less than 100 millivolts of AC ripple

D. Exactly 60 hertz at a fixed amplitude

28. Halogen headlight bulbs operate at higher filament temperatures than conventional incandescent bulbs because:

A. The bulb is filled with oxygen to support combustion

B. A halogen gas cycle redeposits evaporated tungsten on the filament

C. The filament is made of pure platinum for heat resistance

D. The glass envelope is coated with a heat-resistant ceramic

29. HID (xenon) headlights require a ballast to:

A. Generate the high-voltage ignition pulse and sustain AC arc current

B. Convert AC utility power into automotive-compatible DC voltage

C. Prevent electromagnetic interference with radio receivers

D. Step down the alternator voltage to protect the bulb electrodes

30. A LED headlight bulb installed in a housing designed for halogen produces:

A. Improved beam focus and patterns due to LED precision

B. Full compliance with FMVSS 108 regulations automatically

C. A non-compliant beam pattern that may project glare toward oncoming drivers

D. Required electromagnetic shielding that blocks radio interference

31. A turn signal flashes normally on one side but significantly faster on the other side. This is caused by:

A. A failed hazard flasher relay

B. An open circuit in the brake light system

C. A short-to-ground in the dome light circuit

D. A burned-out turn signal bulb on the fast-flashing side

32. The Center High-Mount Stop Lamp (CHMSL) is required by:

A. State vehicle inspection standards only

B. Federal Motor Vehicle Safety Standard 108

C. SAE International standard J2012

D. Individual vehicle manufacturer preference

33. A customer reports that the headlight beam pattern is pointing too high after replacing a headlight assembly. The technician should:

A. Perform headlight aiming using the proper procedure for the vehicle

B. Replace the bulb with a lower-wattage alternative

C. Adjust the tire pressure to level the vehicle first

D. Recheck the alternator output to verify voltage

34. A modern instrument cluster's tachometer displays engine RPM based on:

A. A direct mechanical cable from the camshaft

B. Analog voltage from the ignition coil primary

C. The cluster's internal oscillator circuit frequency

D. A network message broadcast from the engine control module

35. An oil pressure warning lamp illuminates during engine operation. The technician should:

A. Clear the code and return the vehicle to the customer

B. Continue driving to see if the light extinguishes

C. Mechanically verify actual oil pressure with a gauge

D. Replace the oil pressure switch as the most likely fault

36. A reconfigurable cluster displays inconsistent information. The display works normally but shows incorrect values. The MOST likely fault is:

A. A failed cluster backlight dimming module

B. Incorrect or missing data from the source module

C. A physically damaged display panel face

D. A faulty cluster switch on the steering wheel

37. A head-up display shows images that appear to double, with a faint ghost image above the primary display. This is caused by:

A. A weak projector lamp producing insufficient brightness

B. An incorrect polarizing filter in the HUD assembly

C. Software corruption in the HUD control module

D. A non-HUD-compatible windshield on a HUD-equipped vehicle

38. When replacing an instrument cluster on a modern vehicle, the technician must:

A. Program the new cluster with the correct odometer reading and configuration data

B. Match the part number of the new cluster to the old one physically only

C. Clear all DTCs before installation to prevent storage

D. Calibrate the steering angle sensor during the procedure

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

A. The system the lamp monitors is working properly

B. The ignition switch is positioned incorrectly during the test

C. A fault in the lamp or its driver circuit

D. The battery voltage is too low to power the test

40. A power window operates from the passenger door switch but not from the master switch. The MOST likely cause is:

A. A failed passenger window motor assembly

B. A defective master switch or fault in its wiring to the window

C. A blown fuse for the entire power window circuit

D. A low battery voltage affecting the master circuits

41. A power seat has memory positions but the seat will not move to the recalled position. It operates manually. The MOST likely cause is:

A. A failed seat heater element affecting module operation

B. A position sensor is out of calibration and needs a relearn

C. A defective power seat motor on the affected axis only

D. A disconnected wiring harness at the seat module

42. Technician A says a rain-sensing wiper system uses an infrared sensor on the inside of the windshield. Technician B says the sensor detects water droplets by measuring changes in total internal reflection of infrared light. Who is correct?

A. Technician A only, the system only uses infrared sensors

B. Technician B only, optical reflection detects moisture

C. Neither, the system uses a piezoelectric sensor

D. Both, the infrared sensor works via reflection changes

43. A rear defogger is operating with visibly uneven heating. One specific horizontal trace is cooler than the others. The fault is in:

A. The defogger relay that supplies the entire grid

B. The dashboard defogger switch controlling activation

C. A broken or damaged segment of that specific trace

D. The body control module timer function for the grid

44. A horn that sounds weakly is MOST likely caused by:

A. Voltage drop in the horn circuit wiring or connections

B. A completely failed horn requiring replacement

C. A stuck horn button on the steering wheel

D. Low battery voltage affecting the whole vehicle

45. A remote keyless entry fob operates at close range but not at longer distances. The MOST likely cause is:

A. Damage to the vehicle's keyless entry receiver

B. A weak battery in the fob reducing transmitter power

C. Radio frequency interference from external sources

D. A programming mismatch between fob and vehicle

46. Before service on any SRS component, the technician MUST:

A. Scan the SRS module for active DTCs with ignition on

B. Disconnect only the airbag deployment connectors temporarily

C. Remove the steering wheel to access the clock spring directly

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

47. A shorting bar in a squib connector:

A. Shorts the two squib wires together when disconnected to prevent deployment

B. Measures the squib resistance during normal SRS operation cycles

C. Provides electromagnetic shielding for the squib harness wiring

D. Allows the SRS module to monitor connector seating properly

48. A gateway module in a modern vehicle is primarily responsible for:

A. Distributing 12-volt power to body electrical systems

B. Storing all diagnostic trouble codes from every module

C. Translating messages between different vehicle network types

D. Generating ignition signals for the engine control module

49. A high-speed CAN bus measured across CAN-H and CAN-L with ignition off reads 120 ohms. This suggests:

A. The bus is operating within normal specifications

B. One termination resistor is missing or one wire is broken to it

C. Both termination resistors are damaged or missing entirely

D. A short between CAN-H and CAN-L at a common ground

50. A U0121 DTC typically indicates:

A. Engine control module has lost communication with transmission

B. Instrument cluster is not responding to network commands

C. Power steering control module has lost communication

D. Lost communication with the anti-lock brake system module

Practice Exam 7: Answer Key and Explanations

1. B — Applying Ohm's Law, I = E ÷ R, so 12 volts ÷ 150 ohms = 0.08 amperes, or 80 milliamperes. Expressing small currents in milliamperes is standard practice for signal-level and low-power automotive circuits. Fluency converting between amperes and milliamperes is essential for interpreting specifications and DMM readings.

2. D — In a parallel circuit, voltage across each branch equals the source voltage because each branch provides an independent path from source to ground. Total current equals the sum of individual branch currents because current splits among the paths and recombines at the node. Both statements describe Kirchhoff's laws applied to parallel circuits correctly.

3. C — Test leads plugged into the current (amperage) jacks place a low-resistance shunt across the measurement points, effectively shorting the circuit to the meter's internal shunt resistor. The meter cannot measure voltage through this configuration and displays 00.0. This is one of the most common DMM operating errors — also one of the most damaging because it can blow the meter's internal current fuse.

4. A — Four equal resistors in parallel combine to R÷N, where N is the number of resistors. Four 8-ohm resistors in parallel produce 8 ÷ 4 = 2 ohms. This formula applies only when all parallel resistors are equal. Parallel combinations always produce less resistance than the smallest individual resistor.

5. D — A fault that responds to physical tapping indicates a loose connection (at a connector, solder joint, or internal component) that temporarily makes contact when disturbed. This is a classic signature of intermittent electrical faults in modules, connectors, and wiring. Visual inspection, connector seating, and sometimes module replacement addresses this category of fault.

6. B — PWM stands for pulse-width modulation, a technique that controls average voltage to a load by rapidly switching between full on and full off. The ratio of on-time to total cycle time (duty cycle) determines the effective voltage. PWM is used for fuel injector control, alternator field regulation, electric fan speed control, and LED dimming throughout modern vehicles.

7. C — A circuit breaker substituted for the blown fuse resets automatically, allowing the technician to energize the circuit repeatedly while manipulating the harness to locate the short. Higher-rated fuses or jumper wires defeat the circuit protection and can cause wiring damage or fires. A circuit breaker is the correct tool for systematic short-to-ground localization.

8. A — A cross-sectional area of 2.0 mm² corresponds approximately to 14 AWG in the American Wire Gauge system. The relationship between AWG and metric sizing is standardized, and familiarity with common conversions (0.5 mm² ≈ 20 AWG, 1.0 mm² ≈ 18 AWG, 2.0 mm² ≈ 14 AWG) helps when working on vehicles that specify either system.

9. C — Heat-shrink tubing without an adhesive liner provides only mechanical protection, not environmental sealing. Moisture can enter the splice area, leading to corrosion and eventual failure. This type of splice is acceptable only in interior locations with minimal moisture exposure. Underhood or exposed locations require adhesive-lined heat-shrink for long-term reliability.

10. B — The diode symbol shows a triangle pointing toward a vertical bar. The vertical bar represents the cathode (negative side), where current exits during forward bias. The triangle's flat side represents the anode (positive side), where current enters. Conventional current flows in the direction the triangle points during forward bias — essential knowledge for rectifier and clamping diode diagnosis.

11. C — Both technicians correctly describe the operating principles of these semiconductor devices. MOSFETs are voltage-controlled with virtually no gate current; BJTs are current-controlled with base current controlling collector-emitter current. These devices dominate modern vehicle electronics, and understanding the distinction is essential for appreciating why specific circuits are designed around one or the other.

12. A — Duty cycle is the percentage of each cycle that the signal is on (high). If the signal is on 70% of the time and off 30%, the duty cycle is 70 percent. This interpretation applies to PWM fuel injectors, alternator field control, and many other automotive applications where duty cycle measurement is diagnostic.

13. D — An engine-to-body ground strap provides a low-resistance electrical connection between the engine and the vehicle body. This is essential for circuits that return through the body structure and for signal integrity in electronic control systems. A corroded or missing engine-to-body ground causes widespread electrical symptoms including communication faults, dim lighting, and sensor problems.

14. B — A flooded lead-acid battery at rest showing 12.5 volts is approximately 75% state of charge. The voltage-to-SOC relationship is: 12.6+ volts = 100%, 12.4 V = 75%, 12.2 V = 50%, 12.0 V = 25%, below 11.9 V = essentially discharged. Recharging would bring the battery to full capacity before evaluating overall state of health.

15. C — Per SAE J537, a 15-second load test at one-half the battery's CCA rating must maintain at least 9.6 volts at 70°F for the battery to pass. A reading below 9.6 volts indicates excessive internal resistance. This is the standard carbon-pile load test specification and one of the most heavily tested battery procedures on the A6 exam.

16. A — AGM batteries replace the free liquid electrolyte of flooded batteries with electrolyte absorbed into compressed fiberglass mats between the plates. The chemistry remains lead-acid; only the physical form of the electrolyte changes. This provides superior vibration resistance, spill-proof construction, and better deep-cycle performance than flooded designs, making AGM ideal for start-stop and premium applications.

17. D — A rest voltage of 10.8 volts indicates severe discharge. The correct approach is to recharge the battery fully with the appropriate charging profile, then retest for state of health. A single rest-voltage reading on a severely discharged battery cannot predict its actual condition. Many batteries recover to normal function after proper recharge; others reveal defects only after reaching full charge.

18. B — The starter solenoid performs two simultaneous functions: mechanically engaging the pinion with the flywheel ring gear through a plunger mechanism, and electrically switching high battery current to the starter motor windings. Both happen simultaneously when the ignition is in START. This dual-function design is what makes the solenoid essential to starter operation.

19. D — A starter drawing more than twice its normal current indicates starter internal damage — typically binding bushings, a dragging armature, or a partial short in the field or armature windings. This excess draw suggests mechanical or electrical internal problems. Starter replacement is usually required; rebuilding starters is increasingly uncommon due to the cost-effectiveness of remanufactured units.

20. A — Sulfation occurs when a battery remains in a discharged state for extended periods. Lead sulfate crystals harden on the plates over time and eventually stop participating in the charge-discharge reaction. Severe sulfation is permanent and causes reduced capacity, poor cranking performance, and eventual battery failure. Keeping batteries fully charged prevents this damage.

21. A — Before jump-starting, verify that both batteries are the same voltage system (typically 12 volts) and chemistry type. Mismatched voltage systems can damage electronics; different chemistries may have different charging characteristics. Some modern start-stop vehicles have specific jump-start restrictions — always check service information before jumping vehicles with complex electrical systems.

22. D — Drive belt slippage is the most common cause of apparent charging complaints and should be visually inspected first. A glazed, cracked, or loose belt transfers less torque to the alternator, reducing output. Belt inspection takes less than a minute and eliminates or confirms this inexpensive and common cause before proceeding to more complex electrical diagnosis.

23. B — The alternator rotor is driven by a belt connected to the crankshaft pulley. Engine rotation drives the belt, which rotates the alternator pulley, which spins the rotor. The rotor's magnetic field induces voltage in the stator windings. Drive belt condition and tension directly affect alternator output — a slipping belt reduces charging performance.

24. C — A failed rectifier diode allows AC ripple to pass through to the DC output. Healthy alternators produce less than 100 mV of AC ripple at the battery terminals; diode failures can produce 500+ mV ripple. This ripple can damage vehicle electronics over time. Lab scope diagnosis of rectifier problems shows characteristic waveform patterns specific to each failure mode.

25. B — Modern computer-controlled charging systems intentionally vary voltage based on battery state, operating conditions, and load demands. Lower voltage at cruise (13.2 V) prevents overcharging a full battery, while higher voltage at idle (14.6 V) ensures adequate charging when alternator output capacity is limited. This adaptive behavior is normal, not a fault.

26. D — A healthy charging cable should drop less than 0.3 volts under typical charging load. Higher drops indicate corroded connections, damaged wire, or loose terminals. Many "alternator failures" are actually cable problems — voltage drop testing prevents unnecessary alternator replacement on vehicles where the wiring is the actual fault. This test takes minutes and saves significant diagnostic expense.

27. C — A healthy rectifier bridge produces less than 100 millivolts of AC ripple at the battery terminals under normal load. Some residual AC always remains because three-phase rectification is not perfectly smooth, but output should be predominantly DC. Readings above 500 mV indicate rectifier diode failure and typically require alternator replacement.

28. B — Halogen bulbs operate at higher temperatures than conventional incandescent bulbs because of the halogen cycle — halogen gas inside the bulb combines with evaporated tungsten and redeposits it back on the filament. This prevents blackening of the glass and allows higher filament temperatures, producing brighter, whiter light with longer life than conventional bulbs.

29. A — HID ballasts perform two critical functions: generating the high-voltage ignition pulse (typically 15,000-25,000 volts) needed to strike the arc between bulb electrodes, and then maintaining a

sustained AC arc current at approximately 85-95 volts for continuous operation. Without the ballast, HID bulbs cannot ignite or operate — the ballast is essential, not just a power converter.

30. C — LED headlight bulbs installed in housings designed for halogen typically produce non-compliant beam patterns. The housing's reflector and lens are engineered for the halogen filament's specific geometry, not an LED's different light source position. This mismatch produces scattered light that projects glare toward oncoming drivers and violates FMVSS 108 requirements.

31. D — A fast-flashing turn signal on one side is the flasher circuit's deliberate fault indicator, designed to alert the driver that one of the turn signal bulbs on that side has failed. The reduced current load from the burned-out bulb triggers the flasher to accelerate its flash rate. Replacing the failed bulb on the fast-flashing side restores normal flash rate.

32. B — The Center High-Mount Stop Lamp (CHMSL) is required by Federal Motor Vehicle Safety Standard (FMVSS) 108, which regulates all vehicle exterior lighting including headlights, tail lights, and signal lamps. FMVSS 108 has required CHMSL on passenger cars since 1986 and on light trucks since 1994 as a safety measure to reduce rear-end collisions.

33. A — After replacing a headlight assembly, the aiming must be verified and adjusted using the manufacturer's procedure. Incorrect aim projects glare toward oncoming drivers or limits the driver's visibility. Every vehicle has specific aiming procedures using either visual screen methods or photometric aiming devices, and this must be performed after any headlight service to ensure FMVSS 108 compliance.

34. D — Modern instrument clusters receive engine RPM as a network message broadcast by the engine control module. The ECM reads the crankshaft position sensor, calculates RPM, and transmits the value on the CAN bus. The cluster receives this message and renders the tachometer display. Direct mechanical cables and analog connections are obsolete on modern vehicles.

35. C — An illuminated oil pressure warning lamp must be treated as a real low-oil-pressure condition until verified otherwise with a mechanical gauge test. Engine damage from low oil pressure is rapid and catastrophic — a few minutes of operation at zero pressure destroys bearings and camshafts. Never assume a faulty sending unit without mechanical verification of actual oil pressure.

36. B — A cluster displaying incorrect values while the display hardware works correctly indicates the problem is in the source of the data, not the cluster itself. The sending module (such as the ECM or

BCM) is broadcasting incorrect values, or the sensor input to that module is faulty. Diagnosis should target the data source, not the cluster.

37. D — HUD-equipped vehicles require a specific windshield with a wedge-shaped PVB inner layer that prevents ghost imaging. A standard replacement windshield reflects the projected image from both inner and outer glass surfaces, creating the characteristic "ghost" double image. Replacement with the correct HUD-compatible glass is the only fix for this problem.

38. A — Modern clusters store vehicle-specific configuration, odometer readings, and often immobilizer authentication data. A replacement cluster must be programmed with the original vehicle's data, or the new cluster produces immobilizer rejection, incorrect odometer display, or feature mismatches. Simple physical swap alone is insufficient on modern vehicles.

39. C — 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. This is distinct from a lamp that stays illuminated after self-test (which indicates a fault in the monitored system).

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

41. B — Memory seats rely on position sensors that feed back to the seat module. After battery disconnection, motor replacement, or connector work, position calibration may drift, and stored positions no longer match actual seat positions. A memory relearn procedure, performed per service information, recalibrates the sensors and restores memory function.

42. D — Both technicians are correct. Rain-sensing wiper systems use infrared sensors mounted inside the windshield. These sensors measure changes in total internal reflection of infrared light — water droplets on the outer glass surface reduce the reflected signal, and the sensor interprets this as precipitation, commanding wiper activation. Both statements describe the complete operating principle.

43. C — A defogger grid has multiple parallel horizontal traces; one cooler (not heating) trace indicates that specific trace is broken while others continue operating. 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. A — Reduced horn volume indicates voltage drop somewhere in the horn circuit — most likely a corroded ground connection, degraded wire, or failing switch contacts. Voltage drop testing from 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.

45. B — A key fob that works at close range but fails at longer distances is the classic signature of a weak battery in the fob. The transmitter output is reduced, shortening effective range. This is the simplest and most common RKE complaint; battery replacement almost always restores normal range. Try this before proceeding to receiver or programming diagnosis.

46. D — 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 disconnecting only the airbag connector is not sufficient; the full system must be de-energized before physical service.

47. A — Squib connectors include mechanical shorting bars that automatically short the two squib wires together when the connector is disconnected. This prevents stray voltages from static electricity, inadvertent battery contact, or test equipment from triggering accidental airbag deployment. When the connector reconnects, the bar retracts to allow normal operation. This is a critical safety feature during service.

48. C — Gateway modules translate messages between different network types — high-speed CAN to low-speed CAN, forwarding relevant data to LIN sub-networks, routing between CAN and Ethernet for cameras and ADAS. Without gateways, modern vehicles with multiple network protocols could not coordinate their systems. Gateway failures produce widespread symptoms across apparently unrelated systems.

49. B — A reading of 120 ohms (not 60 ohms) across CAN-H and CAN-L with ignition off suggests that only one of the two 120-ohm termination resistors is present in the circuit. This means the other terminator is missing, damaged, or the wire to it is broken. Proper diagnosis requires locating which end of the bus has lost its termination.

50. D — The U0121 code specifically indicates lost communication with the anti-lock brake system module. U-codes (network family) identify communication faults; each specific number points to a particular module. Multiple U-codes across many modules often indicate bus-level faults; a single U-code pointing to one module suggests that specific module is offline or has lost its network connection.