PRACTICE EXAM 12: ASE A6 SIMULATION (50 QUESTIONS)

1. A technician measures 3 amperes flowing through a circuit with a 4-ohm resistor. What is the voltage across the resistor?

A. 0.75 volts during operation

B. 7 volts across the element

C. 12 volts of drop

D. 1.33 volts at steady state

2. Two 8-ohm resistors are connected in parallel to a 12-volt source. The total current drawn from the source is:

A. 3 amperes through the circuit

B. 1.5 amperes at steady state

C. 0.75 amperes total

D. 16 amperes during operation

3. A technician is reading a wiring diagram and sees a wire labeled "PPL/WH." This indicates the wire has:

A. A white base color with a purple primary stripe

B. Two separate wires bundled together, purple and white

C. A solid purple wire with no tracer markings

D. A purple base color with a white tracer stripe

4. When current flows through a conductor, heat is generated due to:

A. The magnetic field interfering with adjacent circuits

B. Electrical resistance converting energy to heat

C. The voltage creating friction at molecular levels

D. Electromagnetic induction within the conductor material

5. A technician connects a DMM in series with a 4-ampere circuit using the current jacks. The meter displays 0.25 amperes. The MOST likely cause is:

A. An internal shunt resistor is incorrectly calibrated in the meter

B. The load is drawing less current than expected

C. A broken test lead preventing accurate measurement

D. Improper range selection on the rotary dial

6. A short to ground in an automotive circuit:

A. Prevents current flow and causes the load to stop working

B. Creates an open circuit that disables all vehicle functions

C. Creates a low-resistance path to ground causing excessive current

D. Increases resistance in the circuit forcing overheating

7. The relationship between voltage, current, and resistance in a DC circuit is described by:

A. Kirchhoff's law of voltages around a closed loop

B. Watt's law for calculating power dissipation

C. Faraday's law of electromagnetic induction

D. Ohm's law relating these three quantities mathematically

8. A technician finds a fuse that has blown in a vehicle. Before installing a replacement, the correct next step is:

A. Install a higher-rated fuse to prevent recurrence of failure

B. Identify the cause of the fuse failure and correct it

C. Jumper the fuse terminals with a wire to test circuit operation

D. Replace the entire fuse block as a precautionary measure

9. A soldered splice with heat-shrink tubing that includes an adhesive liner is:

A. Limited to signal-level circuits at low current applications

B. Approved only for interior locations with minimal moisture exposure

C. Suitable for underhood and exposed locations requiring environmental sealing

D. Required exclusively for SRS and airbag circuit repairs

10. A technician measures 12 volts at both terminals of a closed switch. Voltage at the load is zero. The fault is located in:

A. The wiring between the switch output and the load connection

B. The switch itself, which has failed to close properly

C. The battery supplying the switch input circuit

D. The ground connection at the load component side

11. Kirchhoff's current law states that:

A. Voltage around a closed loop must sum to zero always

B. Power equals voltage squared divided by resistance value

C. Resistance is inversely proportional to conductor area

D. Current entering a node must equal current leaving that node

12. A wire color code of "BN/YE" means the wire has:

A. A yellow base color with brown secondary stripe

B. A brown base color with a yellow tracer stripe

C. Two separate wires bundled together, brown and yellow

D. A solid brown wire without any tracer marking

13. A technician uses a lab scope and observes a signal that ramps up linearly and drops sharply back to zero at regular intervals. This waveform pattern is MOST consistent with:

A. A sawtooth signal from a capacitor being charged and discharged

B. A standard AC sine wave at 60 hertz frequency

C. A pulse-width modulated signal with 50 percent duty cycle

D. A digital logic gate switching between high and low states

14. A battery at rest shows 12.2 volts. The state of charge is approximately:

A. Fully charged at 100 percent capacity

B. 75 percent of rated capacity

C. 50 percent of the rated capacity

D. Completely discharged, below 25 percent

15. An AGM battery is appropriate for applications requiring:

A. Low-cost flooded battery performance in warm climates

B. Maximum capacity for continuous accessory operation

C. Minimal vibration resistance during normal driving

D. Repeated deep-cycle discharge capability such as start-stop

16. A starter motor cranking current that exceeds rated specification by 200% indicates:

A. A healthy starter drawing normal current levels

B. Internal binding or shorted windings in the starter motor

C. Excessive battery voltage forcing overcurrent operation

D. Normal cold-weather performance for the application

17. Before performing a parasitic draw test, the technician should:

A. Allow the vehicle to sleep for at least 30 minutes

B. Disconnect the alternator from the charging system

C. Remove all fuses from the main fuse panel

D. Fully discharge the battery for accurate measurements

18. The correct sequence for connecting jumper cables is:

A. Both negatives first, then both positives simultaneously

B. Negative to dead vehicle first, then positive to good vehicle

C. Positive to dead, positive to good, negative to good, ground on dead

D. Any sequence as long as polarity matches on both vehicles

19. Cold Cranking Amperes (CCA) is measured at:

A. Room temperature for standard rating calculations

B. 0°F for 30 seconds while maintaining 7.2 volts minimum

C. 32°F for 60 seconds at half the rated value

D. −40°F under extreme cold weather conditions

20. A battery load test requires that the battery:

A. Be at full capacity for the test to have meaning

B. Be connected to a running alternator during testing

C. Show specific gravity values equal across all cells

D. Maintain above 9.6 volts for 15 seconds at 70°F

21. Battery registration on a modern vehicle with BCM-controlled charging is required because:

A. Federal law requires documentation of battery installation

B. The BCM's charging strategy must be updated for the new battery

C. The battery's warranty begins at registration rather than purchase

D. The BCM must verify battery dimensions before use

22. A starter solenoid performs two simultaneous functions: engaging the pinion with the flywheel and:

A. Timing the fuel injection pulse for smooth engine starting

B. Regulating the voltage supplied to the ignition system

C. Activating the neutral safety switch circuit protection

D. Switching high battery current to the starter motor windings

23. A starter that engages with a whining sound but does not crank the engine MOST likely has:

A. A discharged battery preventing solenoid engagement

B. A failed voltage regulator in the alternator

C. A failed overrunning clutch or broken pinion assembly

D. A shorted armature winding in the starter motor

24. The voltage regulator in a modern alternator controls output by:

A. Varying the current through the rotor field winding

B. Switching between three-phase and single-phase operation

C. Changing the drive belt ratio at the crankshaft

D. Modulating the stator output through pulse-width modulation

25. A rectifier bridge in an alternator converts:

A. Single-phase AC into DC output for the battery

B. Three-phase AC from the stator into DC for vehicle use

C. DC output back into AC for electrical system cooling

D. High voltage AC into low voltage DC at reduced current

26. Drive belt slippage causes charging system symptoms because:

A. The slipping belt generates excessive heat at the alternator

B. The slipping belt transfers electrical current incorrectly

C. The slipping belt increases alternator voltage output

D. The slipping belt reduces torque transferred to the alternator

27. A voltage drop test between the alternator B+ terminal and the battery positive post reads 0.8 volts during normal charging. This indicates:

A. A healthy charging cable with minimal resistance

B. A failed voltage regulator in the alternator assembly

C. Excessive resistance in the charging cable or connections

D. An overcharging condition requiring immediate service

28. A computer-controlled charging system may intentionally reduce voltage when:

A. The battery temperature drops below freezing conditions

B. The battery is detected as fully charged during stable cruise

C. The engine is in idle mode at low RPM speed

D. The vehicle is decelerating from highway speeds

29. Excessive AC ripple measured at the battery terminals during alternator operation indicates:

A. One or more failed rectifier diodes in the alternator

B. A healthy alternator operating at peak efficiency conditions

C. A weak drive belt slipping under electrical load

D. An overcharged battery approaching its voltage limit

30. HID (xenon) bulbs require a ballast that produces what initial ignition voltage?

A. Approximately 12 volts DC during cold start

B. Between 200 and 500 volts AC during warm-up

C. 5000 volts DC through a boost capacitor network

D. 15,000 volts or higher to strike the initial arc

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

A. Skin oils transferred during handling of the glass envelope

B. Incorrect wattage rating for the vehicle's circuit

C. A voltage spike during engine start overloading the filament

D. Moisture contamination from condensation inside the bulb

32. A turn signal on one side of a vehicle flashes at twice the normal rate. This indicates:

A. A failed turn signal flasher affecting both sides equally

B. A short to ground in the hazard flasher circuit wiring

C. An open circuit in the brake light system on that side

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

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

A. Individual state motor vehicle inspection regulations

B. SAE International recommended practice J2012

C. Federal Motor Vehicle Safety Standard 108

D. Manufacturer-specific OEM design requirements

34. A customer reports that the headlights dim significantly when other electrical loads are turned on. Battery voltage is 14.2 volts. The MOST likely cause is:

A. A failed alternator producing insufficient output

B. Voltage drop in the headlight wiring or ground circuit

C. An overcharged battery with internal damage

D. A defective headlight relay switching incorrectly

35. Daytime Running Lights (DRLs) typically operate by:

A. Switching the headlights on only when ambient light is low

B. Flashing intermittently to indicate vehicle operation

C. Using dedicated LED lamps at full brightness always

D. Operating the headlights at reduced voltage for daytime visibility

36. A modern instrument cluster displays engine coolant temperature based on:

A. A network message broadcast by the engine control module

B. A direct analog signal from the coolant temperature sensor

C. A mechanical capillary tube from the coolant passage

D. The cluster's internal calibration lookup tables

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

A. A normal operation during the vehicle's bulb verification

B. The system the lamp monitors is functioning properly

C. A fault in the lamp itself or its driver circuit

D. A low battery voltage condition during the check

38. A fuel level gauge reads empty even when the tank is full. The sending unit's resistance is correct. The wiring to the BCM is intact. The fault is MOST likely in:

A. The fuel pump drawing excessive current from the tank

B. The instrument cluster's internal fuel gauge circuit

C. The fuel pressure regulator limiting system flow

D. The battery ground at the vehicle chassis

39. A head-up display (HUD) shows a ghost image above the primary display. This indicates:

A. A standard replacement windshield installed on a HUD vehicle

B. A weak HUD projector requiring immediate replacement

C. Software corruption in the HUD control module

D. A dirty windshield where the HUD is projected

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

A. A blown fuse during the replacement procedure

B. A disconnected wiring harness at the cluster connector

C. The battery discharged during the replacement work

D. The cluster not being programmed to the vehicle immobilizer

41. A power window operates only in the UP direction but not DOWN. The motor rotates normally when bench-tested. The MOST likely cause is:

A. A failed pinch protection sensor disabling DOWN travel

B. A discharged battery affecting only the DOWN direction

C. A defective switch contact or break in the DOWN-direction wiring

D. A failed window regulator cable in the door assembly

42. Pinch protection on a modern auto-up power window system works by:

A. Monitoring motor current for a spike caused by obstruction

B. Using infrared sensors across the window opening path

C. Timing the up-travel cycle against a stored maximum duration

D. Measuring mechanical force on the window glass surface

43. A rain-sensing wiper system detects precipitation using:

A. Piezoelectric sensors that measure raindrop impact force

B. Infrared optical sensors measuring changes in internal reflection

C. Ultrasonic sensors detecting surface moisture on the glass

D. Humidity sensors within the cabin HVAC system

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

A. A completely failed horn requiring replacement

B. A stuck horn button on the steering wheel

C. Low battery voltage affecting all vehicle electrical functions

D. Voltage drop in the horn circuit wiring or ground connections

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

A. A defective vehicle radio receiver module

B. Radio frequency interference from external sources

C. A weak or depleted battery inside the key fob

D. An unsynchronized rolling code between fob and vehicle

46. A rear defogger grid has one trace not heating while others operate normally. The fault is located in:

A. The specific broken trace on the glass surface itself

B. The defogger relay controlling the entire grid operation

C. The dashboard defogger switch and indicator lamp

D. The body control module timer function circuit

47. Before performing any service on SRS components, the technician MUST:

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

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

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

D. Discharge the SRS capacitors manually through the connector

48. A squib connector in an airbag system includes a shorting bar that:

A. Measures squib resistance during normal SRS operation cycles

B. Provides a low-resistance ground reference for testing

C. Reduces electromagnetic interference from the squib wiring

D. Automatically shorts the squib wires when disconnected

49. A healthy high-speed CAN bus measured across CAN-H and CAN-L with ignition off reads approximately:

A. 60 ohms, representing two parallel 120-ohm terminators

B. 120 ohms, representing a single terminator in the bus

C. 240 ohms, representing both terminators in series

D. 30 ohms, representing three terminators in parallel

50. A U0100 diagnostic trouble code typically indicates:

A. A calibration fault in the instrument cluster hardware

B. A high-voltage condition detected on the CAN bus

C. Lost communication with the engine control module

D. A power supply fault in the body control module

Practice Exam 12: Answer Key and Explanations

1. C — Applying Ohm's Law, E = I × R, so 3 amperes × 4 ohms = 12 volts. This calculation determines voltage across any component when current and resistance are known. Fluency with the three rearrangements of Ohm's Law is fundamental for virtually every automotive electrical diagnostic scenario on the A6 exam.

2. A — Two 8-ohm resistors in parallel combine to 4 ohms (8 ÷ 2). Applying Ohm's Law, I = E ÷ R, so 12 volts ÷ 4 ohms = 3 amperes. Parallel combinations always reduce total resistance and increase total current draw, a key concept for understanding automotive electrical bus loading during diagnostic work.

3. D — The standard wire color code convention lists the base color first and the tracer stripe second. "PPL/WH" indicates a purple (PPL) base color with a white (WH) tracer stripe. This notation appears throughout service information and is essential for identifying the correct wire within a harness bundle during diagnostic and repair work.

4. B — Heat generated in a conductor carrying current is due to electrical resistance converting electrical energy into heat. This is the principle behind fuses, heating elements, and why voltage drop across high-resistance connections produces heat and eventual damage. Understanding this relationship is essential for diagnosing overheated connectors and resistive faults.

5. B — A DMM in series with a circuit measures the actual current flowing through the circuit at that moment. A reading of 0.25 amperes suggests the load is drawing less current than expected (perhaps due to partial operation, higher resistance, or reduced voltage). This diagnostic approach reveals whether the circuit is performing as specified.

6. C — A short to ground creates a direct low-resistance path from power to ground, allowing excessive current that blows the protective fuse. This is how protective fuses work — they interrupt the circuit before damaging currents can persist. Identifying and repairing shorts to ground is essential before replacing blown fuses.

7. D — Ohm's Law ($E = I \times R$) mathematically describes the relationship between voltage, current, and resistance in a DC circuit. This fundamental law allows calculation of any one quantity when the other two are known. Mastery of Ohm's Law and its three rearrangements is foundational for all automotive electrical diagnostic work.

8. B — Before installing a new fuse, the technician must identify why the original fuse blew. Fuses blow because of a fault — a short to ground, a shorted component, or sustained overload. Installing a replacement without addressing the cause simply wastes another fuse and may cause additional damage when the fault causes another failure.

9. C — Heat-shrink tubing with an adhesive liner combines mechanical crimp protection with thermoplastic environmental sealing when heated. The adhesive flows and seals against moisture intrusion, producing a splice suitable for underhood and exposed locations. Non-adhesive heat-shrink provides only mechanical protection and is limited to interior locations.

10. A — Twelve volts at both switch terminals confirms the switch is working correctly and the wiring to the switch is intact. Zero voltage at the load means voltage is being lost somewhere downstream of the switch. The fault is in the wiring between the switch output and the load, indicating an open circuit or severely high resistance in that specific wire segment.

11. D — Kirchhoff's current law states that the total current entering a node must equal the total current leaving that node. This principle reflects conservation of charge — current cannot accumulate at a point. It is the foundation for analyzing parallel circuits and understanding how current divides at junction points throughout automotive electrical systems.

12. B — The standard wire color code convention lists the base color first and the tracer stripe second. "BN/YE" indicates a brown (BN) base color with a yellow (YE) tracer stripe. This notation appears throughout service information and is essential for identifying the correct wire within a harness bundle during diagnostic and repair work.

13. A — A sawtooth waveform that ramps up gradually and drops sharply is characteristic of a capacitor being charged through a resistor, then discharged rapidly. This pattern appears in some ignition circuits, timer circuits, and analog-to-digital conversion circuits. Recognizing waveform shapes is essential for effective lab scope diagnosis.

14. C — A flooded lead-acid battery reading 12.2 volts at rest is approximately 50% state of charge. The voltage-to-SOC relationship is: 12.6+ V = 100%, 12.4 V = 75%, 12.2 V = 50%, 12.0 V = 25%, below 11.9 V = essentially discharged. Recognizing these thresholds is essential for accurate battery diagnosis.

15. D — AGM batteries tolerate repeated deep-cycle discharge far better than conventional flooded batteries, making them ideal for start-stop applications where the battery is repeatedly discharged during engine-off periods. Start-stop cycles would quickly destroy a flooded battery. The enhanced durability of AGM construction is why OEMs specify AGM for this application.

16. B — A starter drawing 200% of rated current indicates starter internal damage — typically binding bushings, a dragging armature, or partial shorts in the field or armature windings. This excess draw suggests mechanical or electrical internal problems. Starter replacement is typically required; rebuilding starters is increasingly uncommon due to the availability of remanufactured units.

17. A — Parasitic draw testing requires the vehicle to be in its fully asleep state. Modern vehicles take approximately 30 minutes after shutdown for all modules to complete their shutdown sequences and

enter standby mode. Testing too soon produces inflated readings that include module wake-up activity, leading to false diagnosis of excessive parasitic draw.

18. C — The correct jumper cable sequence is: positive to discharged battery first, positive to good battery second, negative to good battery third, and the final ground connection on the discharged vehicle's engine or chassis (not directly on the dead battery negative). This places any spark away from accumulated hydrogen gas around the dead battery.

19. B — Cold Cranking Amperes is specified at 0°F (−17.8°C) for 30 seconds while maintaining at least 7.2 volts at the battery terminals, per SAE J537. This test simulates worst-case cold-start conditions when battery chemistry is slowest and engine oil is thickest. The 7.2-volt threshold ensures sufficient voltage for ignition and fuel injection to function during cranking.

20. D — A battery load test is passed if the battery voltage remains above 9.6 volts at the end of the 15-second test at 70°F per SAE J537. A reading below 9.6 volts indicates excessive internal resistance. This threshold is fundamental to battery diagnosis and is one of the most heavily tested specifications on the A6 exam.

21. B — Battery registration informs the BCM that a new battery has been installed, allowing the BCM to update its charging strategy to match the new battery's characteristics. The BCM adapts its charging profile over time based on the installed battery's characteristics; without registration, the outdated profile continues to be applied to the new battery, potentially leading to premature failure.

22. D — 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 turned to START. This dual-function design makes the solenoid essential to starter operation.

23. C — A starter that engages (solenoid activates, pinion extends) but produces a whining sound without cranking indicates the pinion is spinning without transferring torque to the flywheel. A failed overrunning clutch allows the starter armature to spin without driving the pinion, or the pinion itself is broken. Starter replacement or overhaul is required.

24. A — The voltage regulator controls alternator output by varying the current through the rotor field winding. Stronger field current creates a stronger magnetic field, which induces higher voltage in the

stator. Weaker field current reduces output voltage. This electrical field control enables voltage regulation independent of RPM and load conditions.

25. B — A rectifier bridge uses six diodes arranged in pairs to convert three-phase AC from the stator into DC output. Three positive diodes and three negative diodes form the bridge, with two diodes conducting at any instant corresponding to whichever two phases currently have the greatest voltage difference. This produces the smooth DC output for vehicle loads.

26. D — Drive belt slippage reduces the mechanical torque transferred from engine to alternator. When the belt slips, less torque reaches the alternator, reducing its electrical output capacity. This produces charging symptoms that appear identical to an alternator fault, which is why belt inspection is a critical early diagnostic step in any charging complaint.

27. C — A 0.8-volt drop across the charging cable is excessive (typical specification is under 0.5 volts). This indicates corroded connections, damaged wire, or loose terminals causing high resistance. Many "alternator failures" are actually cable problems — voltage drop testing prevents unnecessary alternator replacement when the wiring is the actual fault.

28. B — Modern computer-controlled charging systems intentionally reduce voltage when the battery is detected as fully charged during stable cruise conditions. This conserves fuel by reducing alternator load and protects the battery from overcharging. Understanding this adaptive behavior prevents unnecessary alternator replacement when the system is simply operating within its programmed strategy.

29. A — A healthy alternator produces less than 100 millivolts of AC ripple at the battery terminals. Excessive AC ripple indicates one or more failed rectifier diodes — the diodes that convert three-phase AC to DC have lost their ability to prevent AC from reaching the output. This requires alternator replacement before excess ripple damages other vehicle electronics.

30. D — HID (xenon) bulb ballasts generate an ignition pulse of 15,000 volts or higher to strike the initial arc between the electrodes. Once the arc is established, the ballast drops to the sustaining AC voltage (typically 85-95 V). The high-voltage ignition is essential for arc initiation and is why HID systems require fully de-energizing before service.

31. A — Skin oils transferred during handling create thermal stress concentration points on halogen bulb glass envelopes, causing premature failure. This is the single most common cause of early halogen bulb

failure. Proper installation technique — handling by base or with clean cloth, and cleaning any finger contact with isopropyl alcohol — prevents this problem and allows normal service life.

32. 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.

33. C — The Center High-Mount Stop Lamp (CHMSL) is required by Federal Motor Vehicle Safety Standard (FMVSS) 108, which regulates all vehicle exterior lighting and signaling. CHMSL has been required on all U.S. passenger cars since 1986 and on light trucks since 1994 as a safety measure to reduce rear-end collisions by providing an additional brake signal to following drivers.

34. B — When battery voltage is adequate (14.2 volts), but headlights dim under load, voltage drop in the headlight circuit is the issue. Excessive resistance in the supply wiring, ground path, or connections drops voltage specifically at the headlights under additional electrical load. Voltage drop testing under load identifies the specific fault location for repair.

35. D — Daytime Running Lights typically operate the headlight filaments at reduced voltage (around 60-70% of normal voltage), producing dimmer output than full headlights while providing daytime visibility. Some implementations use dedicated DRL lamps or operate fog lights at reduced intensity. The dimmer output provides daytime visibility without the full glare of normal headlights.

36. A — Modern instrument clusters receive engine data as network messages broadcast by the engine control module. The ECM reads the coolant temperature sensor, processes the signal, and transmits the value on the CAN bus. The cluster receives this message and renders the display accordingly. Direct sensor-to-cluster wiring is largely obsolete on modern vehicles.

37. C — A warning lamp that fails to illuminate during the key-on bulb check indicates the lamp itself or its driver circuit has failed. The self-test verifies each lamp is functional. A non-lighting lamp confirms a lamp-circuit fault. This is distinct from a lamp that stays illuminated after bulb check (which indicates a fault in the monitored system).

38. B — If the sending unit and wiring test correctly, but the cluster displays incorrect values, the fault must be in the cluster itself. Modern clusters include internal electronic processing of fuel gauge signals

that can fail independently of external components. Cluster repair or replacement is typically required to address these internal electronic failures.

39. A — HUD-equipped vehicles require a special 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.

40. D — Modern clusters store immobilizer authentication data that must match other vehicle modules. A replacement cluster not properly programmed to the vehicle is rejected by the immobilizer, which denies the engine-enable signal and prevents starting. Programming or pre-programmed cluster supply is required on modern vehicle cluster replacement; a simple physical swap alone is insufficient.

41. C — A window that operates in one direction but not the other, with a working motor, indicates the fault is in the control wiring for the failing direction. A defective switch contact or break in the wiring for the DOWN direction prevents the circuit from commanding DOWN motor rotation, even though the motor itself is functional. Switch or wiring repair is required.

42. A — Modern pinch protection monitors motor current through the H-bridge driver during up-travel. An obstruction causes a sudden current spike that the module detects and immediately reverses motor direction to prevent injury. This function is federally mandated on auto-up windows and protects occupants from pinching hazards. Current monitoring is the most practical and responsive sensing method.

43. B — Rain-sensing wiper systems use infrared optical sensors that measure changes in total internal reflection from the windshield. Water droplets on the outer glass surface reduce the reflected signal, and the sensor interprets this as precipitation, commanding wiper activation. This is the dominant rain-sensing technology on modern vehicles and requires a clean windshield and proper optical coupling.

44. D — 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.

45. C — A fob working at short range but failing at longer distances is the classic signature of a weak battery. 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. A — A defogger grid has multiple parallel horizontal 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.

47. 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 removing the steering wheel is not sufficient; the full system must be de-energized before physical service.

48. D — Squib connectors include a mechanical shorting bar that automatically shorts 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.

49. A — A healthy 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 is a fundamental CAN diagnostic check; significant deviation indicates missing, damaged, or shorted terminators.

50. C — The U0100 code specifically indicates lost communication with the engine control 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 U0100 suggests the ECM is offline, in bus-off state, or has lost its network connection.