PRACTICE EXAM 18: ASE A6 SIMULATION (50 QUESTIONS)

1. A technician views a heated O2 sensor signal waveform on a lab scope. The voltage should cycle between approximately:

A. 0.5 and 1.5 volts at a constant frequency

B. 0.2 and 0.4 volts in a narrow range

C. 0.1 and 0.9 volts, switching 1-3 times per second

D. 2.0 and 4.5 volts as commanded by the ECM

2. A knock sensor's output signal when tapped near its mounting location should appear as:

A. A brief AC oscillation from the piezoelectric crystal

B. A steady DC voltage rising proportionally with force

C. A digital square wave at a fixed frequency only

D. No output signal, because knock sensors are passive only

3. The correct method to test a fuel injector's coil resistance is to:

A. Measure voltage across the injector with the engine running

B. Use a lab scope to view the peak injector current value

C. Connect a 12-volt source directly to the injector terminals

D. Disconnect the injector connector and measure resistance across the terminals

4. A MAF (mass airflow) sensor's signal waveform at idle typically shows:

A. A square wave switching between 0 and 5 volts at high frequency

B. A low-frequency varying voltage between approximately 0.5 and 1.5 volts

C. A constant 5 volts regardless of engine operating condition

D. A zero voltage until the throttle is pressed to open position

5. A MAP (manifold absolute pressure) sensor's output voltage during cranking should:

A. Rise and fall in sync with engine manifold vacuum changes

B. Remain at a constant 5 volts throughout cranking

C. Display zero volts until the engine starts firing

D. Switch between 0 and 5 volts as a digital signal

6. A crankshaft position sensor using a variable reluctance (VR) element produces:

A. A digital square wave that is independent of engine RPM

B. A DC voltage that rises linearly with engine speed

C. An AC signal whose amplitude and frequency increase with speed

D. A PWM signal requiring decoding by the ECM

7. A Hall-effect crankshaft position sensor produces:

A. A low-voltage AC waveform with varying amplitude

B. A DC voltage proportional to crankshaft position

C. A sine wave signal with increasing frequency

D. A square wave switching between 0 and 5 volts

8. A technician observes a misfire pattern and needs to test the ignition primary coil. The correct test is to:

A. Measure voltage between the coil primary terminals during cranking

B. Disconnect the coil and measure its primary resistance across the terminals

C. Use a spark tester at the secondary terminal of the coil

D. Apply 12 volts directly to the coil to test for spark generation

9. A secondary ignition waveform showing a high initial spark line followed by a ringing pattern indicates:

A. A normal ignition event with proper coil saturation

B. A burned-through spark plug requiring replacement

C. An open circuit in the spark plug boot connection

D. A shorted spark plug or excessive coil energy dissipating

10. A technician performing a parasitic draw test finds 180 milliamperes after the vehicle has slept. The typical acceptable range is:

A. 30 to 50 milliamperes for most modern vehicles

B. 100 to 200 milliamperes for all conditions

C. 200 to 500 milliamperes during sleep mode

D. 600 to 800 milliamperes regardless of vehicle

11. A technician is narrowing down a 180-mA parasitic draw. The systematic approach is to:

A. Pull fuses one at a time while monitoring the draw for a reduction

B. Replace the battery to eliminate it as the source first

C. Disconnect the alternator from the charging circuit entirely

D. Start the engine to see if the draw disappears

12. A vehicle's computer system enters a key-off shutdown sequence that can last:

A. Immediate shutdown in under 1 second after key-off

B. Approximately 10 seconds for modules to save states

C. Up to 90 seconds for complete module shutdown

D. Up to 45 minutes for all modules to fully enter sleep mode

13. A technician must repair a broken wire in a harness under light tension. The BEST repair method is:

A. Electrical tape wrapped tightly around the break

B. Wire nuts designed for household wiring applications

C. A proper crimp splice with heat-shrink tubing containing adhesive

D. Solder alone without any mechanical support added

14. An automotive battery's self-discharge rate is typically:

A. Less than 0.5 percent per month at room temperature

B. 1 to 3 percent per week at normal room temperature

C. 10 percent per day for a new battery

D. 50 percent per week for AGM batteries specifically

15. A battery that has been completely discharged below 10 volts for an extended period:

A. May suffer permanent sulfation damage even after recharge

B. Can be fully restored to rated capacity in all cases

C. Should be replaced because the cells are shorted

D. Will operate normally once brought back to full charge

16. A starter solenoid pull-in winding and hold-in winding:

A. Are identical windings for redundancy purposes

B. Have identical resistance values during operation

C. Are wound in opposite directions magnetically

D. Function separately, with hold-in keeping the plunger engaged after pull-in pulls it in

17. When a starter is cranking and the technician hears a high-pitched whining sound, the MOST likely cause is:

A. Normal starter operation on a modern vehicle

B. A failed overrunning clutch or starter drive bushing

C. A failed voltage regulator in the alternator

D. A shorted battery cell reducing the available voltage

18. A starter that engages the engine when the ignition is in the RUN position (not START) indicates:

A. A short to power in the starter control circuit

B. A broken solenoid pull-in winding wire

C. A short to ground in the starter motor brush circuit

D. A normal condition for vehicles with push-button start

19. A battery cable terminal that shows a green or blue crust on the post indicates:

A. Corrosion, typically from electrolyte vapor causing chemical reaction

B. A broken battery case leaking electrolyte slowly

C. Paint overspray from bodywork service

D. Normal operation that requires no attention

20. A conductance tester gives a reading of "REPLACE" for a battery that the voltmeter shows at 12.2 volts. The correct action is to:

A. Ignore the conductance result and accept the voltmeter reading

B. Perform a load test as the most reliable alternative

C. Recharge the battery and retest with the conductance tester

D. Replace the battery based on the conductance tester result

21. A vehicle's battery management system measures temperature because:

A. Battery chemistry varies with temperature, affecting charging strategy

B. Federal law requires battery temperature monitoring for emissions

C. Temperature readings detect electrolyte level changes directly

D. Temperature affects the alternator belt drive ratio calculation

22. A battery's reserve capacity is important because:

A. It determines the battery's cold-cranking capability at 0°F

B. It indicates how long the battery can support loads without charging

C. It measures the battery's physical size fit in the tray

D. It represents the total kilowatt-hours the battery can deliver

23. A charging system with no output at idle but normal output at 2,000 RPM MOST likely has:

A. A loose or glazed drive belt slipping at low engine RPM

B. A failed rectifier diode affecting idle-speed operation only

C. A voltage regulator stuck in the low output mode

D. A discharged battery unable to accept charge at idle

24. A vehicle with a charging system warning lamp that illuminates when electrical load is high (headlights, HVAC on) but extinguishes at light load indicates:

A. A failed lamp bulb in the charging warning circuit

B. Normal behavior of computer-controlled charging systems

C. An alternator that cannot keep up with high electrical demand

D. A failed voltage regulator in the maximum output mode

25. Regenerative braking in a hybrid system generates electrical energy by:

A. Running the starter motor backward during deceleration

B. Using the fuel pump as a generator during coasting

C. Converting engine vibration to electrical current

D. Using the motor/generator as an alternator during braking

26. When a hybrid vehicle's 12-volt battery is discharged, the vehicle:

A. Cannot be started even though the high-voltage pack is full

B. Will start if the high-voltage pack has a charge available

C. Operates normally using the high-voltage pack for all functions

D. Requires jumper cables to the high-voltage pack terminals

27. An alternator with a damaged rectifier bridge that allows current to flow backward through the alternator during key-off causes:

A. Immediate engine damage from the reverse current flow

B. Overcharging of the battery during operation

C. Excessive parasitic draw that discharges the battery overnight

D. Reduced alternator output during normal driving only

28. A halogen headlight that operates at full brightness immediately when switched on differs from an HID because:

A. Halogen has no filament, using gas discharge like HID

B. Halogen uses a filament that reaches operating temperature nearly instantly

C. HID uses a filament that warms faster than halogen

D. HID operates at higher wattage than halogen typically

29. A turn signal circuit that flashes at normal rate when hazards are activated but flashes faster when turn signal is used MOST likely indicates:

A. A short to ground affecting both hazard and turn signal circuits

B. A failed turn signal relay that only affects turn signal mode

C. A normal condition where hazards run at a different rate

D. A burned-out turn signal bulb causing the fast flash only during signal use

30. A courtesy/interior light that stays on indefinitely after the door is closed typically indicates:

A. A door-jamb switch stuck in the "open" position continuously

B. A failed interior light relay in the fuse box assembly

C. A short to power in the interior lighting circuit

D. A failed BCM output driver stuck in the on position

31. Aftermarket LED bulbs that cause the BCM to display a "bulb out" message indicate:

A. A failure of the LED module to communicate properly with the BCM

B. The LEDs draw insufficient current for the BCM's detection circuit

C. A short-to-ground condition in the LED assembly wiring

D. A normal condition that will clear on the next startup cycle

32. The dimming function of an instrument cluster backlight typically uses:

A. A separate dimmer switch with a mechanical rheostat

B. Direct battery voltage variation based on engine operation

C. PWM signal from the BCM or cluster controller

D. A potentiometer wired directly to the cluster power input

33. An instrument cluster displays all gauges at zero (speedometer, tachometer, fuel, temperature). This is MOST likely caused by:

A. A loss of communication with the data network or a powered-down cluster

B. All sensors have failed simultaneously in the vehicle

C. The cluster firmware has corrupted requiring reflash

D. A normal display during the ignition key-on self-test phase

34. A driver information center (DIC) message stating "Service Stabilitrak" typically indicates:

A. A normal reminder for maintenance service interval

B. A stored DTC in the transmission control module

C. A stored DTC in the powertrain control module

D. A stored DTC in the electronic stability control module

35. A head-up display (HUD) image that appears dim during the day but clear at night indicates:

A. The HUD automatic brightness compensation has failed to increase brightness

B. A normal condition because HUDs are designed for night visibility only

C. The windshield has been replaced with a HUD-compatible windshield

D. The projector bulb is nearing the end of its service life

36. A warning chime that sounds repeatedly without an illuminated warning lamp indicates:

A. A cluster hardware failure affecting only the chime circuit

B. A low battery voltage affecting the cluster's audio output

C. A condition that the vehicle has been programmed to chime for without lamp

D. A short to ground in the horn circuit activating the chime

37. An instrument cluster that randomly illuminates all warning lamps simultaneously typically indicates:

A. A power interruption to the cluster or a specific power event

B. A loose ground connection to the instrument cluster assembly

C. A normal behavior during specific diagnostic test sequences

D. A failed microprocessor requiring complete cluster replacement

38. A vehicle's Event Data Recorder (EDR) stores information about:

A. Only the last 10 miles of driving in all conditions

B. Long-term fuel trim values for emission diagnostics only

C. All button presses on the infotainment system for diagnostics

D. Pre-crash and crash event data including speed, brake, and belt status

39. An instrument cluster replacement on a modern vehicle requires:

A. Programming of odometer reading, immobilizer, and vehicle configuration

B. Only physical transfer of mounting hardware from the old cluster

C. A simple connector swap without any programming steps

D. Disconnection of the battery for a minimum of 24 hours

40. A window regulator cable that breaks inside the door causes:

A. The window to rattle but still operate correctly

B. The motor to spin but the window glass to remain stationary

C. The window switch to become inoperative

D. The BCM to set a DTC for a failed position sensor

41. A failed power window motor typically produces:

A. No sound and no glass movement when the switch is activated

B. A loud grinding sound as the glass moves normally

C. A clicking sound with full glass movement

D. A buzzing sound with intermittent glass movement

42. A power window that operates in both directions from the master switch but has inconsistent operation (sometimes works, sometimes doesn't) MOST likely has:

A. A failed window regulator bearing

B. A discharged battery intermittently

C. A fully failed door control module

D. A loose electrical connection or worn switch contact

43. A rain-sensing wiper system that works intermittently in light rain but consistently in heavy rain indicates:

A. A worn rain sensor with reduced sensitivity to light precipitation

B. A calibration issue requiring sensor recalibration to light rain

C. A normal condition because systems prioritize heavy rain detection

D. A failed BCM component affecting the rain detection algorithm

44. A horn that operates from the steering wheel but not from the alarm's panic function may have:

A. A failed horn requiring replacement

B. A disconnected horn ground wire at the mount

C. A fault in the BCM output or the specific panic-activation circuit

D. A weak fob battery affecting the panic function only

45. A remote keyless entry fob works fine for unlocking but will not start the engine on a push-button start vehicle. The MOST likely cause is:

A. A weak fob battery below the threshold for the transponder antenna

B. An immobilizer fault preventing engine enablement

C. A loss of fob-to-vehicle synchronization specific to starting

D. The fob has been removed from the authorized keys list in the immobilizer

46. An SRS crash sensor mounted in the front bumper area is a:

A. Side impact sensor for rollover detection

B. Front impact acceleration sensor for frontal collision detection

C. Rear impact sensor for rear-end collision detection

D. Roll-over sensor for vehicle orientation detection

47. The occupant classification module (OCM) typically uses which sensor type to determine adult vs. child occupant in the front passenger seat?

A. Pressure-sensitive bladder and weight sensors in the seat cushion

B. An infrared temperature sensor detecting body heat

C. A camera in the dashboard with facial recognition processing

D. A simple on/off switch activated by seat compression

48. A vehicle's antitheft system includes an immobilizer that:

A. Locks the steering wheel in place mechanically when activated

B. Disables the power locks entirely when armed for protection

C. Prevents engine starting without an authenticated key or fob

D. Disables the headlights to make the vehicle invisible at night

49. A squib circuit test conducted by the SRS module during ignition-on verifies:

A. The squib wires are shorted together for safety verification

B. The squib has correct resistance and the circuit is intact

C. The airbag has been deployed recently and needs replacement

D. The battery voltage is sufficient for immediate airbag deployment

50. A U-code DTC that sets on both the engine control module and the body control module simultaneously typically indicates:

A. A fault in the engine control module's internal processor

B. A fault in the body control module's output drivers

C. A fault specific to the battery voltage supply

D. A fault in the vehicle network connecting the two modules

Practice Exam 18: Answer Key and Explanations

1. C — A properly functioning heated O2 sensor cycles its voltage between 0.1 volts (lean) and 0.9 volts (rich) approximately 1-3 times per second as the engine management system alternates between slightly rich and slightly lean mixtures. Slow or narrow-range switching indicates a lazy or degraded sensor. This oscillation pattern is the visual signature of a healthy O2 sensor on a scope.

2. A — Knock sensors contain a piezoelectric crystal that generates a small AC voltage when subjected to vibration or mechanical force. Tapping near the sensor's mounting location produces a brief AC

oscillation visible on a scope. The signal is proportional to the force applied. Understanding this passive piezoelectric output is essential for verifying knock sensor function.

3. D — To test a fuel injector's coil resistance, disconnect the injector connector and measure resistance directly across the two injector terminals with the DMM on the ohms range. Typical injector resistance is 11-18 ohms for high-impedance injectors or 1-5 ohms for low-impedance types. Out-of-range readings indicate a failed injector.

4. B — A MAF sensor produces an analog voltage that varies with mass airflow rate. At idle with typical airflow, the signal reads between 0.5 and 1.5 volts with low-frequency variation. Higher airflow during acceleration produces higher voltage. The signal's smooth, varying nature (not digital or square-wave) is characteristic of analog MAF sensors.

5. A — MAP sensors measure manifold absolute pressure (vacuum) and produce a voltage output that varies with that pressure. During cranking, manifold vacuum varies as the engine rotates, producing a corresponding voltage variation. At idle with high vacuum, MAP voltage is low; at wide-open throttle with low vacuum, MAP voltage is high.

6. C — A variable reluctance (VR) crankshaft position sensor produces an AC signal whose amplitude and frequency both increase with engine speed. At low RPM, the signal is small and low-frequency; at high RPM, it becomes larger and higher-frequency. This passive output pattern is characteristic of VR sensors and distinguishes them from Hall-effect sensors.

7. D — Hall-effect crankshaft position sensors produce a digital square wave that switches between 0 and 5 volts (or 0 and battery voltage) as the trigger wheel passes. The signal amplitude is independent of RPM — only the frequency changes. This active sensor requires a power supply and produces a clean square-wave output.

8. B — To test an ignition primary coil's resistance, disconnect the coil and measure resistance directly across the two primary terminals with a DMM on the ohms range. Typical primary resistance is 0.5-2 ohms. Out-of-range readings indicate a failed coil. This is distinct from spark testing, which only verifies that the coil can fire a plug.

9. D — A secondary ignition waveform with a high initial spark line followed by ringing indicates a shorted spark plug or excessive coil energy being dissipated rapidly. A healthy spark event shows a peak spark line followed by a sustained burn time and quick collapse. Shorted or contaminated plugs cause abnormal oscillation patterns that appear as "ringing."

10. A — Typical acceptable parasitic draw for most modern vehicles is 30 to 50 milliamperes after the vehicle has fully entered sleep mode. A reading of 180 mA is significantly above acceptable and indicates a module or circuit is not properly entering low-power state. Excessive draw discharges the battery over several days of parking.

11. A — The systematic approach to locate a specific circuit causing parasitic draw is to pull fuses one at a time while monitoring the current draw. When the draw drops by a significant amount, the faulty circuit has been identified. Then the component within that circuit can be systematically tested. This method is more efficient than replacing components at random.

12. D — Modern vehicles take up to 45 minutes for all modules to complete their shutdown sequences and fully enter sleep mode. Some premium vehicles with many modules can take even longer. Testing parasitic draw before this period produces inflated readings that include module wake-up activity, leading to false diagnostic conclusions.

13. C — A proper crimp splice with heat-shrink tubing containing adhesive provides both mechanical integrity and environmental sealing for wires under tension. The crimp provides the mechanical connection; the adhesive-lined heat-shrink seals against moisture. This approach creates a repair that's durable, weatherproof, and reliable — electrical tape, wire nuts, or solder alone are inadequate.

14. A — Automotive batteries have a self-discharge rate of less than 0.5 percent per month at room temperature. AGM batteries typically have even lower self-discharge rates. Dramatically higher discharge rates indicate internal damage or excessive parasitic draw from the vehicle. This baseline helps distinguish between battery issues and external drain sources.

15. A — A battery discharged below 10 volts for an extended period may suffer permanent sulfation damage even after recharge. Lead sulfate crystals harden on the plates during deep discharge and eventually stop participating in the charge-discharge reaction. Recharging may restore partial capacity, but the battery will have reduced performance and shortened life.

16. D — The starter solenoid contains two windings: the pull-in winding (energized initially to pull the plunger in and engage the pinion) and the hold-in winding (energized continuously to hold the plunger in position during cranking). These windings perform different roles sequentially, not redundantly. Understanding this two-stage design aids diagnosis.

17. B — A whining sound during cranking indicates the starter's overrunning clutch or drive bushing is failing. The clutch allows the pinion to disengage automatically when the engine starts; when it fails, the pinion makes continuous contact and produces the characteristic whine. Starter replacement or clutch service is typically required.

18. A — A starter that engages when the ignition is in RUN indicates a short to power somewhere in the starter control circuit. The solenoid activation signal is reaching the solenoid even without the START position being selected. The short must be located and repaired; continued operation could damage the starter by over-engaging.

19. A — Green or blue crust on a battery post is corrosion — typically a chemical reaction between electrolyte vapor from the battery and the terminal metal or atmospheric contaminants. Left untreated, this corrosion degrades the electrical connection and can cause voltage drop and starting problems. Cleaning the post and applying anti-corrosion spray prevents recurrence.

20. C — Conductance testers can be fooled by a partially discharged battery — they may report "REPLACE" on a healthy battery that just needs charging. The correct action is to recharge the battery to full state of charge and retest. If the conductance tester still reports "REPLACE" after full charge, replacement is confirmed. Never replace based on a single conductance reading of a discharged battery.

21. A — Battery chemistry varies significantly with temperature — cold batteries have slower chemical reactions and produce less current, while hot batteries have accelerated chemistry with higher current capability but shorter life. Battery management systems measure temperature and adjust charging strategy accordingly to protect the battery and optimize performance.

22. B — Reserve capacity is defined as the minutes a fully charged battery at 80°F can deliver 25 amperes before terminal voltage drops to 10.5 volts. This specification indicates how long the battery can support vehicle electrical loads if the charging system fails. Higher RC provides more operating time on battery-only power after alternator failure.

23. A — A charging system with no output at idle but normal output at higher RPM is typical of drive belt slippage. At low RPM, reduced belt tension or glazing prevents the belt from driving the alternator at adequate speed for full output. At higher RPM, the alternator produces normal output despite the belt issues. Belt inspection and replacement addresses this.

24. B — Computer-controlled charging systems intentionally vary voltage based on electrical load. Under heavy load, the ECM may command higher voltage to maintain battery state; under light load, it may command lower voltage to improve fuel economy. A charging warning lamp that illuminates only under heavy load can indicate the system is correctly adapting but the battery isn't being adequately maintained under load.

25. D — Regenerative braking converts kinetic energy to electrical energy by using the vehicle's motor/generator (MG unit) as a generator during deceleration. When the driver lifts off the accelerator or applies light brake pressure, the MG unit generates current that charges the battery. This recovers energy that would otherwise be lost as heat in friction brakes.

26. A — A hybrid vehicle cannot be started if the 12-volt battery is discharged, even if the high-voltage pack is full of charge. The 12-volt battery powers the vehicle's computer systems, brake boost, and other essential functions that must activate before the high-voltage pack can be enabled. Jump-starting the 12-volt battery allows normal operation.

27. C — A rectifier bridge with a damaged diode that allows current to flow backward through the alternator during key-off creates a path for the battery to discharge through the alternator's windings. This produces excessive parasitic draw that discharges the battery overnight. This condition is diagnosed by testing for reverse current flow with key-off.

28. B — Halogen bulbs use a filament that reaches operating temperature almost instantly (sub-second). HID bulbs use an arc discharge between electrodes that must establish and stabilize — typically taking 10-30 seconds to reach full brightness. This technology difference is why HID has characteristic delayed brightness, while halogen is immediate.

29. D — A turn signal circuit that flashes at normal rate with hazards but fast with turn signal indicates a burned-out bulb on the side being used for signaling. Hazard circuits include all bulbs, so current load is distributed; when one bulb fails, the impact is less detectable. When the turn signal activates only the failed side, the reduced load causes the fast flash.

30. A — A courtesy/interior light that stays on indefinitely indicates a door-jamb switch is stuck in the "open" position. This switch normally grounds when the door opens and opens when the door closes. When stuck closed (making the "open" circuit), the interior lights remain activated. Cleaning, adjustment, or replacement of the switch resolves the fault.

31. B — Aftermarket LED bulbs draw significantly less current than incandescent bulbs they replace. Modern BCMs include bulb-out monitoring circuits that detect the reduced current draw and interpret it as a burned-out bulb. The resulting "bulb out" message is a false alarm. Load-leveling resistors or OEM LED assemblies can resolve this nuisance fault.

32. C — Modern instrument cluster backlight dimming uses PWM (pulse-width modulated) signal from the BCM or cluster controller. The PWM duty cycle determines the average brightness — higher duty cycle produces brighter backlight. This electronic approach replaces older mechanical rheostats and allows smooth dimming transitions and automatic dimming based on ambient light.

33. A — All gauges at zero simultaneously typically indicates the cluster has lost power or communication with the data network. The cluster cannot display any data if it's powered down or isolated. This is distinct from a failed cluster (which would typically show erratic readings) or a firmware fault (which would typically affect specific displays).

34. D — "Service Stabilitrak" is a General Motors terminology for the electronic stability control (ESC) system. A DTC in the ESC module triggers this message on the DIC. Stabilitrak integrates wheel speed sensors, steering angle, yaw rate, and lateral acceleration to maintain vehicle stability. DTC diagnosis in the ESC module identifies the specific stability control fault.

35. A — HUD systems include automatic brightness compensation using ambient light sensors. When the compensation system fails, the HUD brightness no longer adjusts correctly — bright in dim conditions and dim in bright conditions. The projector itself is functional; the brightness adjustment control has failed. Calibration or sensor replacement typically resolves this.

36. C — Many modern vehicles have been programmed to produce warning chimes for certain conditions (seat belt unbuckled, door ajar, headlights left on, fuel low, parking brake engaged) even without an illuminated warning lamp. These chimes serve as driver-awareness alerts. Understanding this programming prevents misdiagnosis of the chime as a hardware fault.

37. B — An instrument cluster that randomly illuminates all warning lamps simultaneously is typically responding to a loose or intermittent ground connection to the cluster. Without a stable ground, the cluster's internal processors malfunction and may illuminate warning lamps incorrectly. Inspecting and repairing the cluster's ground connection typically resolves this symptom.

38. D — Event Data Recorders (EDRs) store information about pre-crash and crash events, including speed, brake application, seat belt status, airbag deployment, impact direction, and similar safety-relevant data. This information is critical for crash investigation and insurance claims. EDR data can be accessed only with specific manufacturer-authorized tools.

39. A — Modern instrument cluster replacement requires programming the odometer reading (to match the original), the immobilizer authentication data (so the cluster matches other vehicle modules), and vehicle configuration (so the cluster correctly reflects the vehicle's options). Programming is essential; a simple physical swap does not transfer this stored data.

40. B — A broken window regulator cable results in the motor spinning without moving the glass. The cable connects the motor to the window regulator mechanism that raises and lowers the glass. When the cable breaks, the motor continues to rotate but has no way to move the glass. Replacement of the regulator assembly is typically required.

41. A — A failed power window motor typically produces no sound and no glass movement when the switch is activated. The motor has internally failed and cannot respond to the switching commands. The circuit still receives the command, but the motor cannot convert electrical energy into rotational motion. Motor replacement is required.

42. D — Inconsistent operation of a power window from the master switch that sometimes works and sometimes doesn't is typically caused by a loose electrical connection or worn switch contact in the circuit. Intermittent faults are characteristic of marginal connections that make intermittent contact. Identifying the specific location of the connection or switch fault is essential.

43. A — A rain sensor whose sensitivity has decreased over time responds poorly to light rain (where the signal change is subtle) but works correctly in heavy rain (where the signal change is dramatic). This indicates wear or degradation of the sensor's infrared emitter, detector, or optical coupling. Cleaning may help; replacement is typical for significant degradation.

44. C — A horn that works from the steering wheel but not from the alarm's panic function indicates the horn and wiring are functional. The fault is in the BCM's output driver for the panic activation circuit or in the specific circuit that activates the horn from the alarm system. The horn itself is not at fault since it operates from the steering wheel.

45. C — A fob that works for unlocking but fails to start the engine may have lost synchronization with the starting system specifically. The RKE (unlock) function uses different authentication than the immobilizer (start), and these can fail independently. A relearn procedure for the starting authentication may be required.

46. B — An SRS crash sensor mounted in the front bumper area is a front impact acceleration sensor designed to detect frontal collisions. These sensors feed data to the SRS control module, which analyzes impact severity and commands appropriate airbag and pretensioner deployment. Proper operation of these sensors is critical for correct restraint deployment timing.

47. A — Occupant classification modules (OCMs) typically use pressure-sensitive bladder and weight sensors in the seat cushion to determine whether the seat is occupied and classify the occupant size. An adult's weight distribution and magnitude differ from a child's, and empty seats have no weight. This data determines whether to deploy the passenger airbag.

48. C — An immobilizer prevents engine starting without an authenticated key or fob. When the correct key is detected, the immobilizer enables the engine-start signal. Without authentication, the engine cannot start even with power and fuel available. This theft-prevention technology has dramatically reduced vehicle theft rates since its widespread adoption.

49. B — The SRS module performs a self-test at ignition-on that verifies the squib has correct resistance (indicating it's intact and ready to fire) and the wiring circuit is continuous (allowing deployment signal to reach the squib). This test ensures the system is functional; detected faults illuminate the SRS warning lamp and store DTCs.

50. D — A U-code DTC in both the ECM and BCM simultaneously indicates a fault in the vehicle network connecting them. Each module reports that it cannot communicate with the other, triggering matching U-codes. This pattern is characteristic of network faults — broken wires, terminator failures, gateway issues, or multiple module failures. Network diagnosis is required to identify the specific cause.