

PRACTICE EXAM 5: ASE T6

SIMULATION

1. A technician uses a DMM to measure resistance across a 12-volt light bulb that has been removed from the circuit. The meter reads 3.2 ohms. The technician reinstalls the bulb, energizes the circuit, and measures voltage drop across the bulb. The reading is 11.4 volts instead of the expected 12.6 volts. Applying Ohm's Law, what can the technician conclude?

- A. The bulb's resistance has decreased since the bench test, indicating an internal short developing in the filament
- B. The battery is undercharged and unable to deliver the full 12.6 volts to the circuit
- C. The missing 1.2 volts is being dropped across unwanted resistance elsewhere in the circuit between the battery and the bulb
- D. The 3.2-ohm reading was incorrect because the bulb's actual resistance increases dramatically when heated

2. A heavy-duty truck has four batteries in a parallel bank. During a routine inspection, the technician discovers that one battery has a cracked case with visible electrolyte leakage. The other three batteries appear in good condition. What is the proper course of action?

- A. Replace only the cracked battery with a new unit of the same group size and CCA rating
- B. Seal the crack with battery-approved epoxy and top off the electrolyte level with distilled water
- C. Remove the cracked battery from the bank and operate on the remaining three until the next service interval
- D. Replace all four batteries as a matched set to ensure consistent capacity and internal resistance across the bank

3. A technician is diagnosing a truck where the scan tool communicates with the engine control module and the transmission module but cannot connect to the ABS module. All other modules respond normally. What does this pattern indicate?

- A. A fault specific to the ABS module — either a module power supply failure, a module ground fault, or a localized bus connection issue at the ABS module connector
- B. A global CAN bus backbone failure that intermittently drops the ABS module from the network
- C. A scan tool software incompatibility with the specific ABS module firmware version installed
- D. A failed CAN bus termination resistor located inside the ABS module

4. A commercial vehicle's hazard flasher switch is stuck in the on position and cannot be disengaged. The driver discovers that with the hazards on, the turn signals do not function — selecting left or right turn produces no change from the four-way flash pattern. What explains this behavior?

- A. The hazard flasher is bypassing the turn signal flasher module, preventing it from receiving power
- B. The hazard switch overrides the turn signal switch by connecting all turn signal bulbs to the hazard flasher, preventing individual left or right selection
- C. A short-to-ground in the hazard switch circuit is draining current from both turn signal circuits simultaneously
- D. The multifunction switch is mechanically blocked by the hazard switch actuator, preventing turn signal activation

5. A fleet maintenance manager asks a technician to explain why two trucks of the same model with the same alternator rating have different idle-speed charging voltages — one reads 13.8 volts and the other reads 14.2 volts. Both trucks are in good condition with no fault codes. What is the most likely explanation?

- A. One truck has a slipping alternator belt that reduces output at idle speed
- B. The alternators are from different manufacturers with different internal specifications
- C. One truck has a failing voltage regulator that will need replacement soon

D. Different battery states of charge or different electrical loads at the time of measurement cause the alternators to produce different output levels as the regulators respond to system demand

6. A technician is using an oscilloscope to diagnose an alternator. The waveform shows a smooth, even pattern on two of the three phases, but the third phase shows a flat line with no waveform at all. What does this indicate?

A. One stator winding is open, producing no output from that phase

B. All six rectifier diodes associated with that phase have failed simultaneously

C. The rotor field winding has a partial short that affects only one stator phase

D. The oscilloscope probe is malfunctioning and producing a false reading on the third channel

7. A 12-volt truck circuit has a 20-amp fuse, 12-gauge wire rated for 25 amps, and a load that normally draws 15 amps. During diagnosis, the technician measures 22 amps of current flowing in the circuit. The fuse has not blown. What condition exists?

A. The circuit is operating normally because 22 amps is within the 25-amp wire rating

B. The fuse is defective and should have blown at 20 amps, requiring immediate replacement

C. The circuit has a partial short-to-ground or a developing fault that is drawing more current than the load's normal 15-amp specification

D. The 12-gauge wire is undersized for this application and should be upgraded to 10-gauge

8. Technician A says that when replacing a halogen headlight bulb in a composite headlight housing, the technician should wear clean gloves to avoid touching the quartz capsule. Technician B says that if the quartz capsule is accidentally touched, it should be cleaned with isopropyl alcohol before installation. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Technician B only

D. Neither Technician A nor Technician B

9. A medium/heavy truck driver reports that the truck started and ran normally on Monday, sat parked Tuesday through Thursday without being started, and had completely dead batteries on Friday morning. The truck has no aftermarket accessories and all factory systems are in original condition. Parasitic draw tests within specification at 45 milliamps. What should the technician investigate next?

A. The battery condition, as one or more batteries may have internal defects causing excessive self-discharge despite testing within specification on parasitic draw

B. The alternator for a shorted diode that allows reverse current flow only after the vehicle sits for 24 hours

C. The ignition switch for an internal current leak that only occurs when the switch is in the off position for extended periods

D. The body controller module for a delayed wake-up cycle that activates after 48 hours of key-off time

10. A truck's passenger-side headlight is noticeably brighter than the driver-side headlight. Both bulbs are new and the same part number. A voltage drop test shows 0.08 volts on the passenger-side headlight ground and 1.9 volts on the driver-side headlight ground. What should the technician do?

A. Replace the driver-side headlight bulb because the high ground-side voltage drop indicates the bulb has excessive internal resistance

B. Check the alternator output for uneven voltage distribution between the left and right sides of the vehicle

C. Install a higher-wattage bulb on the driver side to compensate for the voltage drop

D. Repair the driver-side headlight ground connection to eliminate the excessive resistance causing the 1.9-volt drop

11. A driver reports that the truck's windshield wipers operate at only one speed regardless of which speed setting is selected on the wiper switch. The wipers run at what appears to be the high-speed rate on every setting. What is the most likely cause?

- A. A failed wiper switch that does not properly route current through the speed selection contacts
- B. A faulty wiper motor with an internal ground fault on the low-speed brush
- C. A shorted blower motor resistor block in the adjacent HVAC circuit bleeding current into the wiper circuit
- D. An aftermarket wiper motor installed with incorrect wiring connections

12. A technician is testing a truck's starting system after a slow-crank complaint. The positive cable voltage drop is 0.4 volts and the negative cable voltage drop is 0.25 volts. The batteries pass a load test. The starter current draw test shows 380 amps — significantly above the 200-amp specification for this engine. What is the most likely cause of the slow cranking?

- A. The battery cables have marginal resistance that worsens under the high current draw of the faulty starter
- B. The starter motor has an internal fault — worn bushings, shorted windings, or a dragging armature — causing excessive current draw and reduced cranking speed
- C. The batteries are undersized for the application and cannot deliver sustained current at the 380-amp draw level
- D. The engine has excessive mechanical resistance from a seized accessory or incorrect oil viscosity

13. A truck's electronic speedometer occasionally jumps to maximum reading momentarily and then returns to the correct speed. The tachometer and all other gauges operate normally. No DTCs are stored. What is the most likely cause?

- A. An intermittent fault in the vehicle speed sensor circuit — a loose connection, damaged wiring, or a cracked reluctor ring producing occasional false signal spikes
- B. A failing instrument cluster stepper motor that overshoots during rapid speed changes
- C. A data bus message collision that occasionally corrupts the speed data packet reaching the cluster
- D. A software glitch in the transmission control module that periodically broadcasts an incorrect speed value

14. A heavy-duty truck's horn relay has been replaced three times in six months. Each new relay works for a few weeks before the coil burns open. The horn itself tests good, the horn fuse never blows, and the horn circuit wiring passes inspection. What underlying condition is most likely causing the repeated relay coil failures?

- A. A faulty horn button that remains partially engaged, keeping the relay coil energized continuously and overheating it
- B. An oversized relay being used as a replacement that has a coil resistance incompatible with the circuit
- C. Corrosion on the horn button ground wire creating high resistance that reduces coil current below holding threshold
- D. The relay coil circuit has a voltage spike from the horn's electromagnetic collapse that is not being suppressed by a diode or resistor

15. A commercial vehicle's charging system produces 14.3 volts with all loads off, but drops to 12.9 volts when the headlights, blower motor, and heated mirrors are activated simultaneously. The alternator is rated at 130 amps. The drive belt is in good condition. What should the technician evaluate?

- A. Whether the total electrical load exceeds the alternator's rated capacity at the current engine speed
- B. Whether the total electrical load exceeds the alternator's rated capacity at the current engine speed
- C. The alternator's internal stator resistance for signs of a developing winding failure
- D. The battery capacity to determine if the batteries are absorbing excessive charging current

16. A medium/heavy truck's fuel gauge gradually reads lower over time even though the fuel level remains constant — verified by dipping the tank. The gauge reads approximately one-quarter tank lower than actual. What is the most likely cause?

- A. A failing instrument cluster module that is progressively losing stepper motor calibration accuracy
- B. An intermittent open in the sending unit signal wire that sporadically drops the gauge reading lower
- C. A contaminated or worn fuel level sending unit whose resistor element has developed increased resistance at certain positions
- D. A ground fault on the fuel gauge circuit that increases over time as corrosion builds on the connection

17. Technician A says a truck's charging system warning light illuminates when there is a voltage difference between the ignition feed and the alternator output at the indicator bulb. Technician B says the warning light should extinguish within a few seconds of the engine starting if the charging system is functioning correctly. Who is correct?

- A. Both Technician A and Technician B
- B. Technician A only
- C. Technician B only
- D. Neither Technician A nor Technician B

18. A truck's power window motor has been replaced, but the window now operates in the wrong direction — the up switch lowers the glass and the down switch raises it. What is the most likely cause?

- A. The replacement motor is designed for the opposite side of the vehicle and has reversed internal polarity
- B. The two motor power wires were connected to the wrong terminals during installation, reversing the polarity
- C. The window switch has been installed upside down in the door panel during reassembly
- D. The motor's internal brush timing is set for counterclockwise rotation instead of the required clockwise

19. A heavy-duty truck's scan tool shows active U-codes for lost communication with the engine control module, transmission control module, and ABS module simultaneously. The instrument cluster is blank and unresponsive. Battery voltage at the terminals measures 12.4 volts. What is the most likely cause?

- A. All three modules have simultaneously failed due to a voltage surge from a defective alternator
- B. The batteries are too weak to power all modules and the cluster simultaneously under key-on conditions
- C. The instrument cluster module has failed and is not relaying data from the other modules to the scan tool
- D. A CAN bus backbone fault — an open, short, or grounding of the bus wires — has disrupted communication across the entire network

20. A truck has two batteries connected in parallel. Battery 1 reads 12.6 volts and Battery 2 reads 11.8 volts when measured individually with the batteries disconnected from each other. When reconnected in parallel, the combined voltage reads 12.2 volts. What does this indicate?

- A. Both batteries are within acceptable range and the 12.2-volt reading is normal for a parallel combination
- B. Battery 1 has an internal short that is pulling the combined voltage down below either battery's individual reading
- C. The lower-voltage Battery 2 is drawing current from Battery 1, creating an equalization drain that settles at a voltage between the two individual readings
- D. The battery cable connections between the two batteries have excessive resistance causing a voltage loss

21. A fleet technician is diagnosing multiple trucks that experience the same fault — the right rear tail light connector melts and fails approximately every 12 months. The bulbs and wiring are replaced each time. What should the technician investigate as the root cause?

- A. Whether the connector is undersized for the current flowing through it, or whether a corrosion cycle at the connection is introducing enough resistance to generate heat that progressively melts the housing
- B. Whether the alternator is overcharging and providing excessive voltage to the tail light circuit
- C. Whether aftermarket LED trailer lights are creating current feedback through the tail light circuit
- D. Whether the ground point for the right rear lights is located too far from the light assembly

22. A truck's engine cranks at normal speed but will not start. The technician notices the charging system warning light does not illuminate during key-on prove-out — all other warning lights illuminate normally. After installing a new bulb, the engine starts on the first attempt. What is the connection between the bulb and the starting problem?

- A. A faulty alternator that was not properly resetting between start attempts
- B. A failed ignition switch that was not delivering full voltage to the starter control circuit
- C. An open in the fusible link that powers both the charge indicator and the fuel system

D. The charge indicator bulb provides the initial excitation current to the alternator field winding, and without it, the alternator could not build residual magnetism to assist the ECM power supply during cranking

23. A driver reports that the truck's brake lights stay on at all times, even when the brake pedal is fully released. The truck has a mechanical push-type brake light switch at the brake pedal. What is the most likely cause?

- A. A short-to-power in the brake light wiring connecting it to an always-hot circuit
- B. A misadjusted brake light switch that is being held in the closed position by the brake pedal rest position
- C. A failed body controller module commanding the brake light output on continuously
- D. A faulty brake pedal return spring that does not fully release the pedal from the switch plunger

24. A technician is performing a battery capacitance test on a heavy-duty truck battery. The tester reports 780 CCA available, and the battery is rated at 950 CCA. The battery is fully charged at 12.65 volts. What action should be taken?

- A. Return the battery to service because 780 CCA exceeds the minimum 500 CCA required for any heavy-duty application
- B. Recharge the battery and retest because capacitance testers are unreliable on fully charged batteries
- C. Replace the battery because 780 CCA represents only 82% of the rated 950 CCA, which is above the 70% replacement threshold but should be monitored closely during the next service interval
- D. Replace the battery immediately because any CCA loss indicates imminent failure

25. A truck is equipped with a telematics system that includes GPS tracking and fleet management communication. The driver reports that the GPS position updates have become inaccurate and intermittent. The telematics module shows no DTCs. What should the technician check first?

- A. The telematics antenna connection and mounting location for damage, corrosion, or obstruction that could degrade GPS signal reception
- B. The J1939 data bus for communication faults between the telematics module and the ECM

- C. The cellular network signal strength in the areas where the GPS faults occur
- D. The telematics module firmware version for a known GPS calculation bug that requires an update

26. A commercial vehicle driver reports a burning smell from under the dash after driving in heavy rain. Upon inspection, the technician finds a melted connector at the firewall pass-through where the engine harness enters the cab. What is the most likely sequence of events that caused this failure?

- A. Excessive alternator output during rain overloaded the firewall connector beyond its current rating
- B. A failed body controller module sent excessive current through the connector during a ground fault recovery
- C. Engine vibration gradually loosened the connector over time, and the burning smell is coincidental to the rain event
- D. Water intrusion at the firewall pass-through penetrated the connector, corroded the terminals, introduced resistance, and the resulting heat from normal current flow through the high-resistance connection melted the housing

27. A technician is testing a magnetic pickup speed sensor at the rear axle with a DMM set to AC millivolts. With the wheel raised and spinning by hand, the meter reads 250 millivolts AC. The specification calls for a minimum of 200 millivolts AC. What does this test confirm?

- A. The speed sensor is producing insufficient voltage and should be replaced immediately
- B. The speed sensor is generating an adequate AC signal and is functioning within specification
- C. The sensor's permanent magnet has weakened and the sensor should be replaced as preventive maintenance
- D. The reading is invalid because speed sensors should be tested with a DMM set to DC millivolts

28. A heavy-duty truck's batteries are equalized at 15.5 volts for the manufacturer's specified time. After equalization, the technician measures specific gravity in all six cells. Five cells read 1.260 to 1.265, but one cell reads 1.210. What does this indicate?

- A. The equalization charge was not long enough and should be repeated for an additional cycle

- B. The electrolyte level in the low cell is below the plates and needs distilled water added before retesting
- C. The battery has a defective cell that did not respond to equalization, and the battery should be replaced
- D. Normal post-equalization variation that will self-correct within 24 hours as the cells stabilize

29. A commercial vehicle's right marker lights are all slightly brighter than the left marker lights when viewed side by side. All bulbs are the same type and age. A DMM shows 12.1 volts at the right-side markers and 11.3 volts at the left-side markers with the circuit energized. What is the most likely cause?

- A. A voltage regulator fault that produces asymmetric output to the left and right sides of the vehicle
- B. Higher-wattage bulbs mistakenly installed on the right side drawing more voltage from the circuit
- C. A data bus signal error causing the body controller to increase voltage to the right-side lighting output
- D. Higher resistance in the left-side marker circuit — either in the power feed, connections, or ground path — causing greater voltage drop before the left-side bulbs

30. A driver reports that the truck's horn works intermittently — sometimes it sounds normally, and other times pressing the button produces no response. The problem has worsened over the past month. A bench test of the horn and relay confirms both are functional. What is the most likely cause?

- A. A faulty horn relay socket at the fuse panel with worn or corroded terminals
- B. A worn clock spring in the steering column that intermittently loses the electrical connection to the horn button as the steering wheel is turned
- C. An aftermarket steering wheel that occasionally grounds the horn circuit on its mounting hardware
- D. A corroded horn mounting bracket that produces an intermittent open in the horn ground path

31. A truck's wiper motor is replaced with a new unit, but after installation the wipers park at the top of the windshield instead of at the bottom. All wiper speeds operate correctly and the arm travel pattern is normal except for the park position. What is the most likely cause?

- A. The replacement motor has a defective park switch that activates at the wrong position

- B. The wiper motor crank arm was installed at the incorrect orientation on the output shaft, offsetting the entire wiper pattern including the park position
- C. The wiper switch has a faulty park-position contact that sends the arms to the wrong location
- D. The wiper transmission linkage has been reassembled incorrectly during the motor swap

32. A technician is diagnosing a truck where the scan tool shows the ECM is broadcasting a coolant temperature of -40°F , even though the engine is warm. The dash temperature gauge confirms the -40°F reading. What is the most likely cause?

- A. A completely failed ECM temperature input circuit that has defaulted to the lowest possible value
- B. A coolant temperature sensor connector that has vibrated loose, creating an intermittent open
- C. An open circuit in the coolant temperature sensor wiring, causing the ECM to read maximum resistance and interpret it as the coldest possible temperature
- D. A shorted coolant temperature sensor driving the resistance to near zero and producing the minimum voltage reading

33. A fleet of trucks has experienced repeated blower motor resistor block failures. Each truck has had the resistor replaced two or three times in the past year. The blower motors themselves test within specification. What underlying condition is most likely causing the repeated resistor failures?

- A. Clogged HVAC evaporator or heater core fins restricting airflow through the resistor block's cooling path
- B. Excessive alternator voltage output causing the resistors to operate above their rated power dissipation
- C. Incorrect resistor block part numbers being ordered by the parts department
- D. A wiring fault between the blower switch and the resistor that sends continuous current to all resistor elements simultaneously

34. A technician is testing a starter solenoid on the bench. Applying 12 volts to the S terminal produces a strong click and the plunger pulls in firmly. However, checking resistance across the main battery terminals on the solenoid with the plunger engaged reads 0.8 ohms instead of the expected near-zero reading. What does this indicate?

- A. The solenoid's internal contact disc is worn, pitted, or burned, introducing excessive resistance across the main contacts
- B. The solenoid pull-in winding has excessive resistance causing the plunger to engage slowly
- C. The test is invalid because the main terminals should be tested under actual cranking load, not bench conditions
- D. Normal contact disc resistance for a heavy-duty starter solenoid that has been in service

35. A commercial vehicle's backup alarm activates only when the transmission is shifted into reverse and functions correctly. However, the alarm continues sounding for approximately five seconds after the transmission is shifted out of reverse. What is the most likely cause?

- A. A faulty backup alarm unit with a defective internal timer that extends the activation period
- B. A momentary delay in the transmission range sensor or its circuit updating the reverse position signal, keeping the alarm circuit energized briefly after the shift
- C. Normal operation designed to alert pedestrians that the vehicle has recently been in reverse
- D. A sticking relay in the backup alarm circuit that holds closed for several seconds after losing its coil signal

36. A technician needs to verify that a truck's alternator drive belt tensioner is maintaining proper tension. What is the correct inspection method?

- A. Apply a belt tension gauge and compare the reading to the manufacturer's specification
- B. Check that the belt deflects approximately one inch when pressed firmly at the midpoint between pulleys
- C. Verify the tensioner arm moves smoothly through its range and has adequate spring pressure by checking the position indicator against the acceptable range markings on the tensioner body

D. Remove the belt and spin the tensioner pulley by hand, listening for bearing noise that would indicate wear

37. A commercial vehicle's body controller module controls the marker lights through a switched output. The BCM output is commanded on by the scan tool, and the technician measures 12.2 volts at the BCM connector output pin. However, at the marker light connector 25 feet away, only 9.8 volts is present. What does this voltage difference indicate?

- A. The BCM's internal output driver is weak and cannot sustain voltage over a long wire run
- B. The marker light bulbs have too high a wattage for the BCM's output driver capacity
- C. The 25-foot wire run is too long for 12-gauge wire and must be upgraded to 10-gauge
- D. Excessive resistance in the 25-foot wire run or its connections between the BCM and the marker lights, dropping 2.4 volts before the current reaches the lights

38. A heavy-duty truck's four batteries are tested individually. Three batteries show 12.6 volts open circuit and pass load testing. The fourth battery shows 10.5 volts open circuit and fails the load test. What does the 10.5-volt reading specifically indicate?

- A. The battery has experienced a deep discharge and simply needs charging before retesting
- B. The battery has at least one dead cell — each cell contributes approximately 2.1 volts, and the loss of one cell drops the total voltage from 12.6 to approximately 10.5 volts
- C. The battery has a high self-discharge rate but its cells are all structurally sound
- D. The battery terminal connections are corroded, reducing the measured voltage by approximately 2 volts

39. A truck's electronic instrument cluster shows a message reading "CHECK TRANS" while the transmission appears to operate normally with no shift quality concerns. The scan tool shows no active DTCs in the transmission control module. What should the technician do?

- A. Check the instrument cluster for stored historical codes and review the transmission module for pending or previously active codes that may have triggered the message before clearing

- B. Disregard the message as a false alert since the transmission operates normally and no active codes are present
- C. Replace the instrument cluster because it is generating false warning messages
- D. Reprogram the transmission control module to the latest software to clear the message

40. A technician is measuring parasitic draw and reads 350 milliamps initially. After waiting 35 minutes, the reading has dropped to 110 milliamps. After waiting an additional 15 minutes, the reading is still 110 milliamps. The manufacturer's specification is 50 milliamps maximum. What does the stabilized 110-milliamp reading indicate?

- A. The modules are still in the process of entering sleep mode and the technician should wait longer
- B. Normal parasitic draw for a truck with this level of electronic content and telematics equipment
- C. A module timeout configuration error that can be corrected by resetting the body controller
- D. All modules have completed their shutdown sequences, and the remaining 110-milliamp draw represents a genuine excessive parasitic drain that requires fuse-pull isolation testing

41. A commercial vehicle has an aftermarket auxiliary lighting system installed. Since the installation, the truck's CAN bus has experienced intermittent communication faults. The aftermarket lights function correctly. What is the most likely cause of the bus faults?

- A. The aftermarket lighting wiring was routed too close to the CAN bus wiring and is not properly shielded
- B. The aftermarket lighting circuit is drawing more current than the alternator can support, causing voltage drops that affect module communication
- C. The aftermarket wiring is generating electromagnetic interference that is being induced into the adjacent CAN bus wires, corrupting data signals
- D. The aftermarket lighting is connected to a fuse that also powers a CAN bus module, overloading the shared circuit

42. A truck's scan tool reads the battery voltage parameter from the ECM as 14.1 volts. A DMM connected directly to the battery terminals reads 13.5 volts. Both readings were taken simultaneously with the engine running. What is the most likely explanation for the 0.6-volt difference?

- A. The ECM measures voltage at its own power input pins, which are closer to the alternator output than the battery terminals, resulting in a higher reading due to charging circuit voltage drop between the alternator and battery
- B. The scan tool adds a calibration offset to the voltage reading for diagnostic display purposes
- C. The DMM is incorrectly calibrated and reading 0.6 volts below actual battery terminal voltage
- D. The ECM has an internal voltage fault that adds a fixed offset to its voltage monitoring circuit

43. A truck driver reports that the cruise control set speed gradually drifts upward by 2 to 3 MPH over several minutes of highway driving. No DTCs are stored, and the speedometer reading matches the actual vehicle speed verified by GPS. What should the technician investigate?

- A. The engine control module's cruise control software for a known calibration drift issue
- B. The vehicle speed sensor signal for gradual frequency drift caused by a temperature-sensitive component in the sensor circuit
- C. The cruise control resume switch for an intermittent contact that periodically sends a speed-increase signal
- D. The throttle position sensor for a slow calibration drift that causes the ECM to gradually increase throttle opening

44. A technician discovers that a truck's SAE J560 trailer connector has been replaced with an aftermarket unit. Since the replacement, the trailer left turn and right turn signals are reversed — the left indicator on the tractor activates the right trailer signal and vice versa. What is the most likely cause?

- A. The aftermarket connector has a different pin arrangement than the standard J560 specification
- B. The replacement connector was wired with the yellow and green wires transposed during installation
- C. The multifunction switch has developed a crossover fault coinciding with the connector replacement

D. The yellow and green wires were swapped at the connector — yellow (left turn) was connected to the green (right turn) pin and vice versa

45. A truck's starter clicks once when the key is turned to start, and the headlights dim severely during the click. The batteries measure 12.5 volts at rest. What does the combination of the single click with severe headlight dimming indicate?

A. The batteries are unable to deliver adequate cranking current despite measuring 12.5 volts at rest, indicating a capacity problem

B. A failed starter relay that clicks but does not fully close its contacts to deliver current to the solenoid

C. The solenoid is engaging and attempting to close the main contacts, but a high-resistance connection in the main battery cables limits the massive current draw and causes the severe voltage drop visible at the headlights

D. The starter motor armature is locked due to a hydrostatic lock condition in the engine

46. A commercial vehicle's dome light flickers rapidly when the truck is driving over rough roads. The flickering stops when the road surface is smooth. The door is confirmed fully closed and latched. What is the most likely cause?

A. A door jamb switch with worn or loose internal contacts that open and close with vehicle vibration

B. A cracked dome light lens allowing the bulb to vibrate in its socket during rough road conditions

C. A body controller module software fault that misinterprets vibration signals as door open/close events

D. A loose ground wire at the dome light fixture that intermittently loses contact under vibration

47. All of the following measurements or observations are part of a complete charging system diagnostic evaluation EXCEPT:

A. Measuring alternator output voltage at the battery terminals with the engine at 2,000 RPM

B. Performing an alternator amperage output test under full electrical load

C. Testing charging circuit voltage drop between the alternator B+ terminal and battery positive post

D. Measuring the alternator's stator winding resistance with the alternator installed and the engine running

48. A heavy-duty truck's electronic throttle pedal position sensor is reporting erratic readings to the ECM. The technician checks the sensor connector and finds the reference voltage pin reads 4.2 volts instead of the specified 5.0 volts. The signal and ground pins test normally. What is the most likely cause of the low reference voltage?

A. A partially shorted sensor element that is loading down the reference voltage supply

B. Excessive resistance in the reference voltage wire between the ECM and the sensor connector, dropping 0.8 volts before reaching the sensor

C. An ECM reference voltage driver circuit that is failing and providing reduced output

D. A corroded ECM connector pin on the reference voltage output that limits current delivery

49. A truck's LED tail light assemblies were recently upgraded from incandescent units. The brake lights, turn signals, and marker functions all work correctly. However, the driver notices that the turn signal flash rate is now significantly faster than before the LED upgrade. What is the cause?

A. The LED assemblies have internal driver circuits that pulse at a higher frequency than incandescent bulb circuits

B. The LED assemblies are not compatible with the truck's 12-volt system and require a voltage converter

C. The LED assemblies draw much less current than the incandescent units they replaced, and the flasher module interprets the reduced current draw as a burned-out bulb, increasing the flash rate

D. The body controller module requires reprogramming to recognize the different resistance characteristics of LED assemblies

50. A technician replaces the clock spring in a truck's steering column to resolve an SRS fault code. After installation, the airbag warning light is off, but the horn no longer works and the cruise control switches on the steering wheel are also inoperative. What is the most likely cause?

- A. One or more connectors on the replacement clock spring were not fully seated during installation, leaving the horn and cruise control circuits disconnected while the SRS circuit is properly connected
- B. The replacement clock spring has a different pin count than the original and is incompatible with this vehicle
- C. The steering wheel must be removed and reinstalled to reset the clock spring's rotational position
- D. The SRS module is overriding the horn and cruise control circuits as a safety precaution after the clock spring replacement

PRACTICE EXAM 5: ANSWER KEY

1. C — Kirchhoff's Voltage Law states that all voltage drops in a circuit must equal the source voltage. If the bulb drops 11.4 volts and the source is 12.6 volts, the missing 1.2 volts is being consumed by unwanted resistance elsewhere in the circuit — corroded connections, damaged wiring, or a high-resistance ground. A voltage drop test along the circuit path will pinpoint the exact location of the unwanted resistance.
2. D — Batteries in a parallel bank should be matched in age, group size, CCA rating, and internal condition to ensure even current sharing. A single new battery connected in parallel with three older batteries will have lower internal resistance and will absorb a disproportionate share of the charging and discharging current, accelerating its degradation. Replacing all four as a matched set ensures balanced performance and maximum service life.
3. A — All other modules communicating normally confirms the CAN bus backbone is intact and the scan tool is functioning properly. A single module failing to respond while the rest of the network operates normally isolates the fault to that module's specific connection — its power supply, ground, bus connector pin, or the module's internal bus transceiver. Bus-level diagnosis is unnecessary when the backbone is proven healthy.
4. B — The hazard switch connects all four turn signal bulbs to the hazard flasher simultaneously, overriding the turn signal switch's ability to select individual left or right operation. With the hazard switch locked on, all four lights are commanded to flash in unison regardless of turn signal switch position. The turn signals cannot function independently until the hazard switch is disengaged.
5. D — Alternator output voltage is not fixed — it is dynamically adjusted by the voltage regulator in response to system demand. A truck with partially discharged batteries or more active electrical loads demands more charging current, causing the regulator to increase field current and produce higher voltage. A truck with fully charged batteries and fewer loads requires less output, so the regulator reduces field current and voltage settles lower. Both readings are normal responses to different operating conditions.
6. A — Each stator phase produces a separate AC waveform. Two phases showing normal waveforms and a third showing a flat line means that phase is producing no output — the winding is open. An open stator winding disconnects that phase from the rectifier bridge, reducing maximum alternator output by approximately one-third while the remaining two phases continue to function normally.
7. C — The load's normal specification is 15 amps, but the circuit is drawing 22 amps — a 47% increase above normal. While the fuse has not yet blown because 22 amps is close to the 20-amp rating and fuses have a tolerance range, the elevated current indicates a developing fault such as a partial short-

to-ground. The technician should investigate the cause of the excess current before the condition worsens and blows the fuse.

8. A — Both technicians are correct. Skin oils deposited on a halogen bulb's quartz capsule create a hot spot when the bulb is energized, weakening the quartz and causing premature failure. Wearing clean gloves prevents contamination entirely. If the capsule is accidentally touched, cleaning with isopropyl alcohol removes the oils before they can cause damage. Both practices protect the bulb and are industry standard.
9. A — With parasitic draw within specification at 45 milliamps, no external drain is pulling the batteries down. Three days of 45-milliamp draw on healthy batteries should not cause complete discharge. A battery with internal defects — dendritic growth, plate shedding, or contaminated electrolyte — can pass a standard load test while having an abnormally high self-discharge rate that drains stored energy internally without any external current flow.
10. D — The voltage drop measurements tell the complete story: the passenger-side ground at 0.08 volts is excellent, and the driver-side ground at 1.9 volts far exceeds the 0.3-volt maximum. The 1.9 volts being consumed by the high-resistance ground connection is voltage that should be available to the driver-side headlight, directly causing the reduced brightness. Cleaning, repairing, or replacing the driver-side ground connection eliminates the resistance and restores equal brightness.
11. C — Wipers operating only at high speed regardless of switch selection indicates that current is bypassing the speed-control resistor paths inside the motor and always flowing through the direct high-speed path. A shorted wiper switch or a wiring fault that permanently connects the motor's high-speed input creates this condition. The switch should be tested for internal shorts across its speed selection contacts.
12. B — Cable voltage drops and battery capacity have been confirmed within specification, eliminating those components as causes. The starter drawing 380 amps against a 200-amp specification is the definitive finding — the motor itself is consuming nearly double its normal current. Worn bushings allowing armature-to-field contact, shorted armature windings, or a dragging commutator create internal friction and electrical faults that demand excessive current while delivering reduced cranking speed.
13. A — An occasional spike to maximum reading that self-corrects points to a momentary false signal rather than a sustained data or module fault. The vehicle speed sensor generates pulses from a reluctor ring, and a cracked tooth, loose sensor mounting, or intermittent wiring connection can produce a brief signal anomaly that the cluster interprets as maximum speed. The fault is too brief to trigger a DTC but visible as a momentary needle spike.
14. D — When a relay coil is de-energized, the collapsing magnetic field generates a reverse voltage spike that can be many times higher than the supply voltage. Without a suppression diode or resistor across the coil, this spike arcs across the relay's internal contacts each time the horn button is released.

Over time, this repeated arcing burns the coil winding, eventually causing it to fail open. Installing a suppression diode across the coil eliminates the spike.

15. B — The alternator producing 14.3 volts with no load but dropping to 12.9 volts under heavy load indicates the system demand is exceeding the alternator's output capacity at the current engine speed. A 130-amp alternator may not have sufficient reserve to power headlights, blower motor, and heated mirrors simultaneously, especially at idle where output is lowest. Comparing total load amperage against alternator rated output at the operating RPM confirms or rules out insufficient capacity.
16. C — A fuel level sending unit with a contaminated or worn resistor element can develop increased resistance at certain float positions, causing the gauge to read lower than actual level at those positions. As the contamination or wear progresses over time, the discrepancy gradually worsens. The gauge responds correctly to the resistance it receives — the sending unit is simply providing an incorrect resistance value for the actual fuel level.
17. A — Both technicians are correct. The charge indicator light is wired between the ignition feed and the alternator output. During key-on engine-off, the ignition side has battery voltage while the alternator side has no output, creating a voltage difference that illuminates the bulb. When the engine starts and the alternator begins producing voltage equal to the ignition feed, the potential difference drops to zero and the light extinguishes within seconds.
18. B — A DC motor's direction of rotation is determined by the polarity of the voltage applied to its terminals. Reversing the two power wires at the motor connector reverses the current direction through the motor, causing it to spin in the opposite direction. The fix is straightforward — swap the two motor power wires back to their correct terminals to restore proper up and down operation.
19. D — Multiple modules simultaneously losing communication and a blank instrument cluster indicate a network-wide failure, not individual module faults. The CAN bus backbone is the single shared infrastructure that all modules depend on for communication. An open wire, a short between CAN_H and CAN_L, or a ground fault on the bus wires disrupts the entire network at once, producing simultaneous U-codes from every module that can no longer exchange data.
20. C — When two batteries with different voltages are connected in parallel, current flows from the higher-voltage battery into the lower-voltage battery as the system attempts to equalize. The combined terminal voltage settles at a point between the two individual voltages, reflecting the equalization drain. Battery 2 at 11.8 volts is significantly discharged and should be individually tested — the voltage difference indicates it may have a weak cell or excessive self-discharge.
21. A — A connector that melts and fails on a regular cycle points to a thermal failure caused by resistance at the connection point. If the connector terminals are undersized for the current flowing through the circuit, or if corrosion develops on the terminal surfaces between replacements, the resistance generates heat proportional to the current squared ($P = I^2R$). Each replacement restores a clean connection, but the corrosion cycle restarts, and the connector fails again at roughly the same interval.

22. D — In some alternator designs, the charge indicator bulb provides the initial excitation current path to the rotor field winding during startup. Without this small current, the rotor has no field to generate the initial magnetic flux needed for the alternator to begin producing output. The lack of alternator output affected the ECM's power supply stability during cranking, preventing the engine from starting. Installing the new bulb restored the excitation path.
23. B — A push-type brake light switch is positioned so that the brake pedal pushes against the switch plunger when the pedal is in the rest position, holding the switch open. If the switch is mounted too far from the pedal arm or the pedal rest position has changed, the plunger may not be pushed far enough to open the contacts when the pedal is released. Adjusting the switch position so the pedal fully depresses the plunger at rest restores normal brake light operation.
24. C — At 82% of rated CCA (780 out of 950), the battery is above the 70% replacement threshold and does not require immediate replacement. However, it has lost 18% of its original capacity, indicating aging that will continue to progress. The battery should be returned to service with a note for close monitoring at the next service interval. If CCA drops below 70% (665 CCA) at the next test, replacement is warranted.
25. A — GPS signal reception depends on a clear antenna with an unobstructed view of the sky. A damaged antenna cable, a corroded antenna connector, or an antenna mounting location that has become obstructed — by cargo, aftermarket equipment, or physical damage to the antenna itself — degrades the signal quality and causes intermittent or inaccurate position updates. Checking the antenna system is the logical first step before investigating module or network issues.
26. D — Water intrusion through the firewall pass-through is the root cause. The water penetrated the connector housing, contacted the terminal pins, and initiated corrosion. The corroded terminals developed high resistance at the contact surfaces. Normal current flowing through the high-resistance connection generated heat according to $P = I^2R$. Over time, the heat increased as corrosion worsened, eventually melting the connector housing.
27. B — The magnetic pickup speed sensor produces an AC voltage signal whose amplitude is proportional to the speed of the reluctor teeth passing the sensor. At the hand-spinning speed, 250 millivolts AC exceeds the 200-millivolt minimum specification, confirming the sensor's permanent magnet and coil are producing adequate signal strength. At actual driving speeds, the signal amplitude will be significantly higher as the teeth pass faster.
28. C — Equalization charging is specifically designed to break down sulfate deposits and bring all cells to an equal state of charge. Five cells responding to equalization at 1.260–1.265 confirms the process worked for those cells. The one cell remaining at 1.210 after equalization has a defect that cannot be corrected by charging — likely a shorted plate, physical damage, or irreversible sulfation. The battery must be replaced.
29. D — Both sides share the same power source, fuse, and switch, and the bulbs are confirmed identical. The 0.8-volt difference between the right side (12.1V) and left side (11.3V) indicates the left-side

circuit has more resistance consuming voltage before it reaches the bulbs. This additional resistance — in a connection, a splice, a ground point, or a section of wire on the left side — is the cause of the reduced brightness.

30. B — The clock spring is the spiral ribbon cable inside the steering column that maintains electrical connections between the stationary vehicle wiring and the rotating steering wheel. As the clock spring wears, the conductor traces can develop cracks that intermittently open and close with steering wheel movement. The horn button connects through the clock spring, so a failing clock spring produces exactly this symptom — intermittent horn function that worsens over time.
31. B — The wiper motor crank arm must be installed at a specific orientation on the motor output shaft so that the motor's internal park switch cam aligns with the arm position that corresponds to the bottom of the windshield. If the crank arm is installed one or more spline positions off, the entire wiper sweep pattern is offset — the park position shifts to the top of the windshield while the arm travel range remains normal.
32. C — An NTC thermistor-based coolant temperature sensor has high resistance when cold and low resistance when warm. An open circuit in the sensor wiring presents infinite resistance to the ECM, which the module interprets as the coldest possible temperature in its lookup table — typically -40°F , which is the point where the Fahrenheit and Celsius scales converge. This extreme cold reading despite a warm engine is the classic indicator of an open temperature sensor circuit.
33. D — The blower motor resistor block is located in the HVAC airflow path and depends on the air passing over it to dissipate the heat generated by the resistors. If the blower motor spins but the airflow is restricted — by a clogged evaporator core, a blocked cabin filter, or a collapsed duct — the resistors overheat because the cooling airflow is insufficient. The motors testing good eliminates motor failure as the cause, pointing to the airflow restriction.
34. A — The solenoid's main contact disc is responsible for bridging the two heavy battery terminals to complete the high-current cranking circuit. A worn, pitted, or burned contact disc creates resistance across the connection that should be near zero. The 0.8-ohm reading means the solenoid will introduce a significant voltage drop during cranking, reducing current delivery to the starter motor. The solenoid or its contact disc assembly must be replaced.
35. B — The most likely cause of a brief delay in alarm deactivation after shifting out of reverse is a small time lag in the transmission range sensor or its circuit updating the position signal. The sensor may have worn contacts that take a moment to transition cleanly from the reverse position to the next gear position, keeping the reverse signal active briefly. The alarm responds to the signal, not the physical gear position.
36. C — Modern serpentine belt systems use automatic spring-loaded tensioners with position indicator marks on the tensioner body. The correct inspection method is to verify the tensioner arm position falls within the acceptable range markings — this confirms adequate spring pressure. The arm should

also move smoothly through its range without binding, grinding, or excessive play. If the indicator is outside the acceptable range, the tensioner has lost spring pressure and must be replaced.

37. D — The BCM output of 12.2 volts at the connector pin confirms the module is delivering adequate voltage. The 2.4-volt drop over the 25-foot wire run to the marker lights means excessive resistance in the wire, its connections, or its splices is consuming voltage that should reach the lights. The wire, connectors, and ground path between the BCM and the lights must be inspected for corrosion, damaged splices, or undersized wire for the circuit's current demand.
38. B — A 12-volt battery that reads 10.5 volts has lost the output of exactly one cell. Each cell in a six-cell battery produces approximately 2.1 volts — five functional cells produce 10.5 volts while the sixth contributes nothing. A dead cell is a permanent internal failure that cannot be restored by charging. The battery must be replaced, and the remaining three batteries should be tested to verify they are still adequate for the application.
39. A — A warning message without active DTCs suggests the triggering condition occurred in the past and the active fault has since cleared, but the message persists on the display. Checking the instrument cluster for stored historical message events and the transmission module for pending or previously active DTCs that may have triggered the message before self-clearing identifies whether a real fault occurred. Ignoring the message without investigation risks missing a developing condition.
40. D — The initial 350-milliamp reading represented modules in their active shutdown phase. The draw stabilizing at 110 milliamps after 50 total minutes — with no further decrease after an additional 15 minutes — confirms all modules have completed their sleep cycles. The remaining 110 milliamps represents the true steady-state parasitic draw, which exceeds the 50-milliamp specification by more than double. Fuse-pull isolation testing identifies the circuit causing the excess drain.
41. C — Aftermarket wiring routed alongside or bundled with the CAN bus wiring can generate electromagnetic interference that induces noise into the bus conductors. The CAN bus uses differential signaling to reject common-mode noise, but if the aftermarket wiring generates asymmetric interference — affecting CAN_H and CAN_L unequally — the noise corrupts data and causes intermittent communication faults. Rerouting the aftermarket wiring away from the bus wiring or adding shielding resolves the interference.
42. A — The ECM measures system voltage at its own power input pins, which may be electrically closer to the alternator output than the battery terminals are. The charging circuit has resistance between the alternator and the battery, so the voltage measured at the ECM's location is higher than the voltage at the battery terminals. The 0.6-volt difference represents the voltage drop in the charging circuit between the alternator and the battery — the same phenomenon measured during a charging circuit voltage drop test.
43. B — A cruise control set speed that gradually drifts upward without driver input or DTCs suggests a phantom resume or accelerate signal is being sent intermittently. A faulty cruise control resume/accelerate switch with an intermittent internal contact periodically sends a brief speed-

increase command, nudging the set speed up by small increments over time. Testing the switch for intermittent continuity while manipulating it identifies the faulty contact.

44. D — The SAE J560 seven-pin connector standard assigns the yellow wire to the left turn/stop circuit and the green wire to the right turn/stop circuit. If the installer connected the yellow wire to the green pin and the green wire to the yellow pin during the connector replacement, the left and right turn signals are transposed at the connector. Correcting the two wire positions on the connector pins restores proper left-right operation.
45. C — The single click confirms the solenoid is energizing and attempting to close the main contacts — the control circuit is functional. The severe headlight dimming during the click reveals a massive current draw occurring at that instant as the solenoid contacts close and the starter attempts to draw cranking current. A high-resistance connection in the main battery cables creates a bottleneck that limits the current delivery while causing a severe system-wide voltage drop visible at the headlights.
46. A — A door jamb switch with worn or loose internal contacts that make and break contact during vehicle vibration produces exactly this symptom — the dome light circuit's ground path opens and closes rapidly as the switch bounces. The door being confirmed closed and latched eliminates actual door movement as the cause. Replacing the worn switch or tightening its mounting restores stable contact and eliminates the flickering.
47. D — Stator winding resistance cannot be accurately measured with the alternator installed and the engine running because the stator is actively producing AC voltage and current. The energized stator windings, the connected rectifier bridge, and the spinning rotor create conditions that make any resistance measurement meaningless. Stator resistance testing requires the alternator to be removed and the stator disconnected from the rectifier bridge for an isolated bench measurement.
48. B — The reference voltage should be 5.0 volts at the sensor connector, but only 4.2 volts is present — a 0.8-volt loss. The signal and ground circuits testing normally at the connector eliminates the sensor and ground as causes. The most likely explanation is resistance in the reference voltage wire between the ECM and the sensor connector — a corroded splice, a damaged wire, or a high-resistance connector pin in that specific circuit — dropping 0.8 volts before the reference reaches the sensor.
49. C — LED assemblies draw significantly less current than the incandescent bulbs they replace — often 80–90% less. The turn signal flasher module monitors circuit current to determine if all bulbs are functioning. The much lower LED current falls below the module's expected threshold, mimicking the current reduction that occurs when a bulb burns out. The flasher responds by increasing the flash rate, just as it would for a genuine burned-out bulb.
50. A — The clock spring contains multiple separate conductor circuits — typically for the SRS airbag, the horn, and the steering wheel switches (cruise control, audio, etc.). If the SRS connector was fully seated but one or more of the other connectors were not properly clicked into their mating halves during installation, the airbag circuit functions correctly while the horn and cruise control circuits remain disconnected. Reseating all clock spring connectors resolves the issue.