PRACTICE EXAM 8: ASE T6 SIMULATION

1. A technician discovers that a truck's 10-gauge wire in a headlight circuit has been spliced to a 16-gauge wire by a previous repair. The circuit is protected by a 20-amp fuse and the headlights draw 15 amps. What risk does this splice create?

A. The 16-gauge section is only rated for approximately 13 amps and will overheat under the 15-amp load before the 20-amp fuse blows

B. The splice will cause a voltage increase at the headlights because the thinner wire has lower resistance per foot

C. The 10-gauge wire will backfeed current into the 16-gauge section causing bidirectional current flow

D. The fuse will blow immediately because the resistance difference between the two wire gauges creates a current spike

2. A heavy-duty truck has been sitting in a fleet yard for three weeks without being started. The batteries read 11.4 volts. The technician slow-charges the batteries to 12.65 volts, waits two hours, and retests. The open circuit voltage has dropped to 12.58 volts. What does this indicate?

A. The batteries have excessive self-discharge and should be replaced immediately

B. The charger malfunctioned and did not fully charge the batteries during the slow-charge cycle

C. The slight voltage decline from 12.65 to 12.58 volts after two hours is normal stabilization and the batteries are at an acceptable state of charge for further testing

D. The batteries require equalization charging before any performance testing can be conducted

3. A driver reports that the truck's hazard flashers work but the turn signals do not function in either direction. The turn signal fuse is good. What should the technician check first?

A. The hazard flasher module since it may be overriding and disabling the turn signal function

B. The turn signal flasher module or its power supply, since the hazards use a separate circuit and proving them functional does not verify the turn signal flasher

C. The multifunction switch output terminals for a short-to-ground affecting both left and right outputs

D. The trailer connector for a grounded turn signal wire that is back-feeding into the tractor circuit

4. A commercial vehicle's body controller module controls the marker lights, clearance lights, and tail lights through separate high-side output drivers. The scan tool shows the BCM commanding all three outputs on, but only the marker lights illuminate. Clearance and tail lights are dark. What does this indicate?

A. A global ground fault affecting only the clearance and tail light circuits while the marker ground remains intact

B. A fuse that is shared by clearance and tail lights but not by the marker lights has blown

C. A CAN bus communication error causing the BCM to display incorrect output status on the scan tool

D. The BCM's internal output drivers for the clearance and tail light channels have failed while the marker output driver still functions

5. A technician is testing a truck's charging system. With the engine at 2,000 RPM and all loads on, the alternator output cable carries 120 amps. A voltage drop test between the alternator B+ terminal and the battery positive post reads 0.7 volts. What is the approximate power being wasted as heat in the charging circuit?

A. 120 watts

B. 12 watts

C. 84 watts

D. 8.4 watts

6. Technician A says that the conventional current flow theory used by the ASE states that current flows from positive to negative through the external circuit. Technician B says that the electron flow theory states that actual electron movement is from negative to positive. 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

7. A fleet manager reports that a truck's GPS telematics unit repeatedly loses satellite signal while other trucks in the same fleet operating on the same routes maintain consistent GPS coverage. The telematics module has no stored DTCs. What should the technician investigate first?

A. The telematics module firmware for a known GPS reception bug specific to this hardware version

B. The J1939 data bus for intermittent communication errors that could reset the GPS receiver

C. The cellular modem connection to determine if network dropout is being misreported as GPS loss

D. The GPS antenna, its cable, and its mounting location for physical damage, corrosion, cable kinks, or obstructions affecting signal reception

8. A commercial vehicle's left front turn signal bulb has been replaced with a bulb of slightly higher wattage than specified. The left turn signal now flashes at a slower rate than the right. What explains this behavior?

A. The higher-wattage bulb generates more heat in the flasher module, slowing its thermal cycle time

B. The higher-wattage bulb draws more current than the standard bulb, and the flasher module interprets the increased draw as a full complement of bulbs, reducing the flash rate below normal

C. The higher-wattage bulb has more resistance, reducing current through the flasher and slowing its response

D. The BCM detects the non-standard bulb and intentionally slows the flash rate as a driver warning

9. A technician measures the voltage across a starter motor during cranking and reads 8.2 volts. Battery voltage during cranking is 9.6 volts. What does the difference between battery voltage and motor voltage indicate?

A. The starter motor has excessive internal resistance consuming 1.4 volts before reaching the armature windings

B. Normal voltage for a heavy-duty starter motor under cranking load conditions

C. A total of 1.4 volts is being dropped in the cables, connections, and solenoid contacts between the battery and the starter motor

D. The batteries are weak and unable to maintain adequate voltage during the heavy current draw of cranking

10. A commercial vehicle equipped with a collision mitigation system displays a "FORWARD RADAR BLOCKED" message on the driver information display. There is no visible obstruction in front of the radar unit. What should the technician check?

A. The collision mitigation module for an internal processor fault causing false blocked-radar alerts

B. The radar unit's mounting bracket alignment, the sensor face for mud, ice, or film buildup, and the sensor's electrical connections for proper signal transmission

C. The CAN bus for a communication fault between the radar module and the instrument cluster

D. The vehicle speed sensor signal, since radar blockage alerts require a minimum speed threshold

11. A truck's ignition switch is turned to the run position. All dash warning lights illuminate during prove-out except the oil pressure warning light. What is the most likely concern with this observation?

A. The oil pressure is normal and the light correctly stays off during key-on engine-off

B. The engine has developed dangerously high oil pressure that is holding the warning switch open even with the engine off

C. The instrument cluster module has disabled the oil pressure warning output due to a stored BCM fault code

D. The oil pressure warning light bulb may be burned out, which means the driver will have no visual alert if actual low oil pressure occurs during operation

12. A heavy-duty truck's starter cranks the engine at normal speed, but the technician hears a metallic rattling noise from the starter area during cranking. The noise stops as soon as the key is released. The engine starts normally. What is the most likely cause?

A. Loose starter mounting bolts that allow the starter to vibrate against the bell housing during the high-torque cranking event

B. A cracked flywheel that flexes during cranking and contacts the bell housing

C. Internal starter planetary gear teeth that are worn and producing gear lash noise

D. A loose heat shield near the starter that resonates at the vibration frequency of cranking

13. A truck's scan tool retrieves a U-code from the body controller module indicating lost communication with the instrument cluster. However, the instrument cluster appears to be functioning normally — all gauges read correctly and warning lights operate. What should the technician do?

A. Clear the code and disregard it since the cluster is visually functioning correctly

B. Replace the body controller module because it is generating false communication codes

C. Investigate the specific communication path between the BCM and the cluster, as the cluster may be receiving data from other modules while the BCM-to-cluster message exchange is impaired

D. Reprogram the instrument cluster to establish a new communication handshake with the BCM

14. A medium/heavy truck's batteries are being tested. Battery 1 specific gravity readings across all six cells are: 1.265, 1.260, 1.260, 1.265, 1.110, 1.260. What does this pattern indicate?

A. The battery is uniformly discharged and requires slow charging before retesting

B. Cell 5 is defective — the 0.150 variation between the highest and lowest cells far exceeds the 0.050 maximum, indicating an irreparable cell fault regardless of the other five cells testing healthy

C. Normal cell variation that falls within the acceptable range for a battery under heavy cycling conditions

D. The hydrometer is producing inaccurate readings due to temperature variation between cells

15. A truck's alternator produces 14.2 volts and full rated amperage during output testing. However, the truck's batteries are chronically undercharged. Charging circuit voltage drop tests show 0.3 volts on the output side and 0.15 volts on the ground side. What should the technician investigate next?

A. The alternator's internal voltage regulator for an intermittent fault that only appears during extended operation

B. The drive belt for glazing or contamination that may cause slipping under sustained high-load conditions

C. The rectifier bridge for a diode fault that may allow reverse current flow when the engine is off

D. Whether the vehicle's total electrical load exceeds the alternator's capacity during normal operating conditions, leaving insufficient reserve to fully charge the batteries

16. A commercial vehicle's scan tool retrieves a DTC with SPN 168 and FMI 18 indicating battery voltage is below the normal operating range as reported by the ECM. The batteries test at 12.6 volts at the terminals. What does this code tell the technician?

A. The ECM is seeing lower voltage at its power input than what exists at the battery terminals, indicating voltage drop in the power feed wiring between the battery and the ECM

B. The ECM has a faulty internal voltage monitoring circuit that produces false low-voltage readings

C. The batteries have passed their useful life and cannot maintain voltage under the ECM's internal load

D. The alternator's charging voltage is below the ECM's minimum threshold during engine operation

17. A technician is diagnosing a truck where the left rear tail light works on the tractor but when the trailer is plugged in, the left rear tail light on the tractor goes out while the trailer tail lights illuminate normally. What is the most likely cause?

A. The trailer lights are drawing all available current from the circuit, starving the tractor light

B. A high-resistance connection on the tractor's left rear tail light ground that cannot support the combined tractor and trailer current draw, causing the tractor-side voltage drop to extinguish its bulb while the trailer operates on a separate ground

C. A trailer cord with reversed polarity on the brown wire feeding power from the trailer back to the tractor

D. An undersized fuse that can only support either the tractor or the trailer tail lights but not both simultaneously

18. A heavy-duty truck's electronic cruise control system disengages every time the driver activates the windshield wipers. This behavior is consistent and repeatable. No DTCs are stored. What is the most likely cause?

A. A software configuration error in the ECM that links wiper activation to cruise disengage

B. A shared ground between the wiper motor and the cruise control module that introduces noise when the wiper is activated

C. A faulty body controller module that sends a cancel command to the cruise system when the wiper relay energizes

D. A voltage drop caused by the wiper motor's current draw that momentarily pulls the cruise control module's supply voltage below its minimum operating threshold, causing a reset

19. A truck driver reports that the backup camera display shows a clear image when the transmission is in reverse, but the image has a strong blue tint and occasional horizontal lines that scroll through the display. What is the most likely cause?

A. A faulty backup camera lens that has been damaged by road debris, creating a color distortion

B. A failing display monitor that has lost its color calibration settings

C. A damaged or corroded video signal cable between the camera and the display, introducing signal degradation and interference

D. Electromagnetic interference from the reverse warning buzzer affecting the camera's image sensor

20. Technician A says that measuring total CAN bus resistance of 60 ohms at the diagnostic connector confirms both termination resistors are properly connected. Technician B says that a reading of 120 ohms indicates only one termination resistor is connected to the bus. 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

21. A heavy-duty truck's starter makes a single loud click followed by silence when the key is turned to start. The headlights are bright and do not dim during the click. Battery voltage is 12.6 volts. What does the combination of a single click with no headlight dimming indicate?

A. The starter motor has failed internally because the solenoid can be heard clicking but no significant current flows through the cranking circuit

B. The batteries have surface charge that makes them appear fully charged but they cannot deliver cranking current

C. The starter relay is clicking but the solenoid is not receiving the signal due to an open between the relay and solenoid

D. The solenoid is engaging mechanically but the internal contact disc is not closing to connect battery power to the starter motor — confirmed by the headlights not dimming, which means no heavy current draw occurred

22. A commercial vehicle's power lock actuator on the driver's door makes a buzzing sound when the lock button is pressed but does not lock the door. All other doors lock normally. What is the most likely cause?

A. A faulty lock switch that is sending a rapid pulsed signal instead of a steady lock command

B. The driver's door lock actuator motor is energizing but cannot move the lock linkage — likely due to a stripped gear, a disconnected linkage rod, or a binding lock mechanism

C. A blown fuse for the driver's door lock circuit that is allowing partial current through a damaged fuse element

D. A body controller module output driver that has failed and is sending reduced voltage to the driver's door actuator

23. A truck equipped with a 12-volt system has a main fusible link between the battery positive terminal and the main fuse panel. The fusible link appears intact externally but the entire vehicle is electrically dead. How should the technician verify whether the fusible link has failed?

A. Measure voltage on both sides of the fusible link — battery voltage present on the battery side but zero volts on the fuse panel side confirms the link has opened internally

B. Remove the fusible link and perform a load test to determine if it can carry rated current

C. Replace the fusible link with a standard fuse of the same amperage as a temporary diagnostic measure

D. Visually inspect the wire insulation for discoloration or bulging that confirms internal conductor failure

24. A truck's headlights are on steady, but the driver reports that on rough roads, both headlights occasionally go dark simultaneously for a fraction of a second before coming back on. The bulbs, sockets, and individual ground connections have been inspected and test good. What should the technician investigate?

A. The headlight relay for intermittent contact bounce that opens the circuit under vibration

B. The alternator for voltage drops that coincide with rough road engine vibration patterns

C. The headlight circuit fuse and fuse holder for intermittent contact between the fuse blade and the holder terminals

D. The multifunction switch for a worn detent that allows the switch to momentarily leave the headlight position under vibration

25. A technician measures voltage at a trailer's right rear stop/turn light socket. With the brakes applied, the reading is 11.8 volts. With the right turn signal activated, the reading is 8.4 volts. Both measurements are taken at the same socket. What does the voltage difference between brake and turn signal operation indicate?

A. The turn signal flasher module produces lower peak voltage than the brake switch circuit

B. The right turn signal circuit has more resistance than the brake light circuit between the tractor power source and the trailer light

C. The brake light switch provides a more direct power path with less circuit resistance than the turn signal circuit path through the flasher and multifunction switch

D. Higher resistance in the turn signal circuit path — through the flasher module, multifunction switch, and additional wiring — produces a greater voltage drop than the more direct brake light switch path

26. A fleet of trucks experiences a pattern where the right front headlight connector melts on multiple vehicles of the same model. The headlight bulbs, wiring, and fuses are all correct for the application. What design or installation issue should the technician investigate?

A. An alternator producing voltage spikes that concentrate in the right-side headlight circuit

B. A factory wiring routing issue where the right front headlight harness passes too close to an exhaust component, causing heat damage that increases connector resistance over time

C. Headlight relay contacts that are undersized for the headlight circuit's continuous current requirement

D. An incorrect headlight aiming adjustment that causes the right headlight bulb to overheat inside the housing

27. A heavy-duty truck battery displays a green indicator in the built-in hydrometer eye. The technician tests the battery with a DMM and reads 12.25 volts. What should the technician conclude?

A. The built-in hydrometer only samples one cell, and while that cell may be adequately charged, the overall battery voltage indicates an approximately 50% state of charge — the battery needs charging and further testing

B. The green indicator confirms the battery is fully charged and the DMM reading is inaccurate

C. The battery is in good condition because the built-in hydrometer is more accurate than an external voltage measurement

D. The green indicator and low voltage together indicate a shorted cell that is holding one cell at a higher specific gravity

28. A truck's washer fluid sprays onto the windshield unevenly — strong on the driver's side but weak on the passenger side. The washer pump sounds normal. What is the most likely cause?

A. A failing washer pump that has lost internal pressure capacity on the passenger-side output port

B. A cracked washer fluid reservoir that is losing pressure before the fluid reaches the passenger nozzle

C. A partially clogged passenger-side washer nozzle or a kinked, cracked, or partially disconnected hose on the passenger-side delivery line

D. A faulty washer switch that sends reduced voltage to the pump during the passenger-side spray cycle

29. A technician performs an alternator full-load output test on a 200-amp rated alternator. With the engine at 2,000 RPM and all loads on, the maximum output is 195 amps. Is this output acceptable?

A. Yes — 195 amps represents 97.5% of rated capacity, which is well within the acceptable range of 80 to 90% minimum output

B. No — the alternator must produce exactly its rated 200 amps to be considered functional

C. No — the 5-amp shortfall indicates a developing stator winding fault that will worsen progressively

D. Yes — but only if the AC ripple test at the B+ terminal also reads below 0.5 volts

30. A commercial vehicle's scan tool retrieves a DTC from the transmission control module indicating "Vehicle Speed Sensor Signal Erratic." The speedometer works but occasionally jumps erratically. What should the technician check first?

A. The transmission output shaft for excessive play that could cause the speed sensor to lose proximity to the reluctor

B. The vehicle speed sensor connector, wiring, and mounting for a loose connection, damaged wire, or improper sensor air gap that could produce an inconsistent signal

C. The instrument cluster for a faulty stepper motor that occasionally overshoots the correct speed reading

D. The transmission control module for an internal processing fault that intermittently misreads the speed sensor input

31. A truck has a 12-volt circuit with two loads wired in parallel. Load A has 4 ohms of resistance and Load B has 12 ohms of resistance. What is the total circuit resistance?

A. 16 ohms

B. 8 ohms

C. 3 ohms

D. 48 ohms

32. A technician replaces a truck's alternator. After installation, the charge indicator light stays on dimly with the engine running. The alternator output tests at 14.1 volts and full rated amperage. All connections are tight. What is the most likely cause of the dim indicator light?

A. A defective replacement alternator with a marginal internal voltage regulator

B. A failing battery that is pulling down the charging voltage below the indicator extinguish threshold

C. An alternator sense wire that monitors voltage at the wrong location, causing the regulator to slightly undershoot

D. A slight voltage difference between the ignition feed and the alternator output at the indicator light — likely caused by a sense wire not being connected or being connected to the wrong terminal on the replacement alternator

33. A commercial vehicle driver reports that the electric seat adjustment works for forward and backward movement but not for the seat height adjustment. Both functions share the same fuse and power feed. The fuse is good. What is the most likely cause?

A. A failed seat height adjustment motor, its switch, or the wiring between the switch and motor — the shared fuse and power feed are proven functional by the forward/backward movement working correctly

B. A partially blown fuse that passes enough current for the horizontal motor but not the vertical motor

C. A body controller module output limit that restricts seat functions to one axis of movement at a time

D. A ground fault on the seat frame that affects only the height adjustment motor mounting point

34. A truck's engine starts and runs, but the charging system warning light remains illuminated. The technician measures 12.4 volts at the battery with the engine running. The alternator drive belt is intact and the pulley is spinning. What should the technician check first?

A. The battery state of charge since 12.4 volts with the engine running suggests the alternator is producing no output

B. The alternator field circuit — including the sense wire, field connector, and regulator — since the alternator is spinning but not producing output above battery rest voltage

C. The engine idle speed since low RPM reduces alternator output below the charging threshold

D. The fusible link in the alternator output circuit for an open that prevents charging current from reaching the battery

35. A medium/heavy truck's tractor protection valve closes unexpectedly, cutting air supply to the trailer while driving. The dash air pressure gauge shows adequate system air pressure. No air leaks are detected. What should the technician investigate related to the electrical system?

A. The air compressor governor electrical circuit for a fault causing premature compressor cutoff

B. The instrument cluster for a false air pressure reading that does not reflect actual system pressure

C. The J1939 data bus for a communication error between the air system module and the tractor protection valve controller

D. The tractor protection valve solenoid and its electrical control circuit for a wiring fault, a failed solenoid, or a loss of power that causes the valve to default to the closed position

36. A technician discovers that a truck's aftermarket fog lights are wired directly to the headlight circuit without a separate relay. The headlight fuse has been upgraded from 20 amps to 30 amps to prevent blowing. What problems does this installation create?

A. The fog lights will overdrive the alternator because they are connected in series with the headlights

B. The headlight dimmer switch will not properly control the fog lights since they bypass the switch logic

C. The headlight circuit wiring is only rated for the original 20-amp fuse protection, and the 30-amp fuse allows the wire to overheat before the fuse blows — additionally, the fog lights add load that the headlight switch contacts were not designed to carry

D. The fog lights will flicker because the headlight circuit uses pulse-width modulation that is incompatible with halogen fog bulbs

37. A heavy-duty truck's engine idles roughly and the scan tool shows multiple misfires. The technician notices that the tachometer reads 0 RPM while the engine is running. The speedometer and all other gauges function correctly. What relationship might exist between the tachometer fault and the rough idle?

A. The tachometer is displaying an informational error that is unrelated to the engine performance issue

B. Both symptoms may share a common cause — a failing crankshaft position sensor or its circuit provides RPM data to both the ECM for fuel injection timing and to the instrument cluster for the tachometer display

C. The rough idle is causing the crankshaft position sensor to produce an erratic signal that the tachometer cannot interpret

D. A data bus communication fault is preventing the ECM from receiving RPM data and is simultaneously blocking the tachometer display

38. A truck driver complains that the cab overhead console lights randomly turn on during nighttime driving. The lights are controlled by a door jamb switch and a manual dash switch. The dash switch is in the door-activated position. All doors are confirmed closed. What should the technician check?

A. The door jamb switch wiring for a chafed section that intermittently contacts ground, mimicking a door-open signal to the light circuit

B. The body controller module for a firmware update that corrects a known false-trigger issue on this model year

C. The cab overhead console light assembly for an internal short that bypasses the switch circuit

D. The alternator for voltage spikes that momentarily activate the overhead light relay circuit

39. A commercial vehicle's ABS module sets a DTC for "right front wheel speed sensor circuit — signal missing." The technician replaces the sensor and clears the code. During a road test, the code returns. What should the technician check next?

A. The wiring, connector, and the ABS module connector pin for the right front sensor circuit

B. The new sensor for a manufacturing defect since replacement parts can occasionally be faulty

C. The wiring harness between the ABS module and the right front wheel, focusing on connectors, splices, and areas where the harness may be damaged or chafed

D. The reluctor ring for contamination or physical damage that prevents the new sensor from generating a valid signal

40. A technician is testing a relay-controlled fuel pump circuit. The relay clicks when the ignition is turned on, but the fuel pump does not operate. Applying 12 volts directly to the fuel pump causes it to run normally. What does this test sequence indicate?

A. The relay coil is functioning but its contacts are not closing to deliver power to the fuel pump

B. The fuel pump relay is functioning correctly but there is a wiring fault between the relay and the pump

C. The fuel pump requires more voltage than the relay circuit provides and needs a higher-rated relay

D. The relay is clicking and its contacts may or may not be closing — the technician should next check for voltage at the relay's load output terminal to determine whether the contacts are passing power

41. A truck's electronic instrument cluster displays an engine coolant temperature of 210°F. The driver states the engine has been sitting overnight and was just started cold. The scan tool shows the ECM reporting coolant temperature at 65°F. What is the most likely cause?

A. A failed engine thermostat that is stuck closed and causing rapid overheating immediately after cold start

B. The instrument cluster is receiving its temperature display data from a source other than the J1939 bus — likely a direct analog input from a separate dash gauge sending unit that has failed with low resistance, driving the gauge to a high reading

C. A CAN bus data corruption event that is altering the temperature value between the ECM broadcast and the cluster reception

D. The ECM coolant temperature sensor is faulty and reporting 65°F while the engine is actually at 210°F

42. A heavy-duty truck has a dual-alternator system. Alternator 1 output cable shows heat discoloration at the terminal, but Alternator 2 output cable shows no signs of heat. Both alternators produce similar voltage and amperage output during testing. What does this asymmetric heat damage indicate?

A. Alternator 1 has a higher internal operating temperature that transfers heat to the output terminal through conduction

B. Alternator 1 is mounted in a location with less airflow than Alternator 2, causing localized overheating

C. The two alternators have different internal voltage regulator calibrations causing unequal current sharing

D. Alternator 1's output cable terminal connection has higher resistance than Alternator 2's, generating heat at the connection point under the same current load

43. A truck's trailer ABS is inoperative. The trailer ABS warning light on the tractor dash is illuminated. The technician checks the SAE J560 connector and finds that the blue wire pin has 0 volts with the ignition on. What does the 0-volt reading on the blue pin indicate?

A. The trailer ABS module has shorted internally and is pulling the blue wire voltage to ground

B. The tractor's ABS system has detected a fault and is intentionally withholding power from the trailer ABS circuit

C. The tractor-side blue wire circuit has an open — a blown fuse, a disconnected relay, or a broken wire — preventing power from reaching the trailer connector

D. The trailer cord has an internal open on the blue wire conductor between the tractor and trailer connectors

44. A technician is diagnosing a truck where the right rear marker light flickers rapidly when the right turn signal is activated but stays steady when the turn signal is off. The left side does not exhibit this behavior. What is the most likely cause?

A. A shared ground connection between the right rear marker light and the right rear turn signal that has high resistance, causing current interaction between the two circuits when the turn signal pulses

B. A failing right rear turn signal bulb with a deteriorating filament that creates resistance fluctuations

C. A body controller module software fault that links the marker output to the turn signal timing on the right side only

D. An incorrect dual-filament bulb installed in the right rear socket with the turn signal filament contacting the marker circuit

45. A commercial vehicle's electronic throttle position sensor produces a smooth, linear voltage change from 0.5 volts at idle to 4.5 volts at full throttle when tested slowly. However, during actual driving, the ECM intermittently sets a "TPS signal erratic" code. What diagnostic tool would most likely reveal the intermittent fault?

A. A higher-resolution DMM with faster sampling rate to capture micro-voltage changes during driving

B. An oscilloscope connected to the TPS signal wire to display the voltage waveform in real time and capture brief signal dropouts or spikes that occur during vehicle vibration and movement

C. A scan tool recording the TPS voltage parameter at maximum sample rate during a road test

D. A breakout box inserted between the TPS connector and the harness to monitor all three wires simultaneously

46. A heavy-duty truck's alternator has been replaced due to bearing noise. The new alternator charges at 14.3 volts with loads off but produces a noticeable high-pitched squeal from the belt area. The belt is new and properly tensioned. The old alternator did not produce this noise. What is the most likely cause?

A. The replacement alternator has defective internal bearings that were present from the factory

B. The belt tensioner spring has weakened and cannot maintain adequate tension at the new alternator's higher drag torque

C. The old belt was stretched and conformed to the old alternator's worn pulley, while the new alternator's pulley has a slightly different groove profile

D. The replacement alternator's pulley is slightly misaligned with the serpentine belt path, causing the belt to track off-center and generate noise

47. A truck has a circuit with a relay controlling a 25-amp load. The relay is rated for 30 amps. The relay has been replaced four times in one year due to contact welding. All replacement relays are the correct part number. What is the most likely cause of the repeated failures?

A. Inductive load kickback from the 25-amp device is generating voltage spikes each time the relay opens, causing arcing across the contacts that progressively welds them together — a suppression diode or snubber circuit is needed across the load

B. The relay socket has corroded contacts that cause the relay to overheat at the connection points

C. The relay's 30-amp rating is insufficient for a 25-amp load because continuous current should not exceed 60% of the relay rating

D. A faulty control switch that bounces when released, rapidly cycling the relay contacts multiple times per operation

48. A commercial vehicle's driver information display shows "SERVICE BRAKE SYSTEM" and the red brake warning light illuminates while driving. Air pressure gauge readings are normal. The brakes feel normal to the driver. What should the technician check?

A. The brake chambers for an internal leak that does not affect pressure but triggers the warning sensor

B. The foundation brake lining thickness sensors for a failed or disconnected sensor circuit

C. The brake system pressure switch and sensor circuits, the brake fluid level sensor (if hydraulic over air), and the parking brake switch for a fault that is triggering the warning — the electrical circuit inputs to the warning system rather than the pneumatic system itself

D. The ABS module for a communication fault that is generating a false brake system warning on the cluster

49. A truck's instrument cluster voltmeter gauge reads 14.8 volts during daytime driving with minimal loads. The technician confirms 14.2 volts at the battery terminals with a DMM. What is the most likely explanation for the cluster reading higher than the actual battery voltage?

A. The cluster voltmeter is sampling voltage from the alternator output sense wire rather than from the battery terminals

B. The cluster's internal voltage sensing circuit has a calibration error that reads approximately 0.6 volts higher than actual system voltage

C. Normal variation between analog gauge displays and precise digital DMM measurements that falls within acceptable instrument tolerance

D. The charging circuit has reverse voltage drop that causes higher voltage at the cluster's sense point than at the battery terminals

50. A fleet technician has diagnosed a truck with a data bus fault causing multiple U-codes. CAN bus resistance measures 42 ohms — significantly below the expected 60 ohms. The technician begins disconnecting modules one at a time to isolate the fault. After disconnecting the fifth module, resistance jumps to 58 ohms. What does this indicate?

A. The first four modules disconnected were all contributing equally to the low resistance reading

B. All five disconnected modules had marginally low internal termination resistance that combined to pull the total below specification

C. The fifth module is likely the source of the low resistance due to a bus fault in that module or its connection

D. The disconnected module contained one of the two termination resistors, and removing it shifted the reading from the shorted value toward the single-resistor value of 120 ohms

PRACTICE EXAM 8: ANSWER KEY

1. A — The 16-gauge wire is rated for approximately 10 to 13 amps of continuous current, but the headlight circuit draws 15 amps. The 20-amp fuse will not blow because the current is below its rating, but the undersized wire section will overheat as it carries current beyond its capacity. This creates a fire hazard because the wire insulation melts before any protective device interrupts the circuit.

2. C — A voltage decline from 12.65 to 12.58 volts over two hours is normal post-charge stabilization as the surface charge dissipates and the battery chemistry reaches equilibrium. The stabilized reading of 12.58 volts indicates the battery is at approximately 95% state of charge — well above the 75% minimum (12.4 volts) required for load testing. The batteries are ready for further performance evaluation.

3. B — Hazard flashers and turn signals use separate flasher modules or separate circuits within a combined electronic module. The hazards working proves only that the hazard flasher, bulbs, and wiring are functional — it does not verify the turn signal flasher or its power supply. A failed turn signal flasher module or a blown fuse that feeds only the turn signal flasher prevents both left and right turn signal operation while leaving the hazards unaffected.

4. D — The scan tool confirms the BCM is commanding all three outputs on, which verifies the data bus communication, the switch input, and the module's processing logic are all correct. The marker lights illuminating proves the BCM's power supply and ground are adequate. The clearance and tail light outputs being dark despite being commanded on indicates the BCM's internal output driver transistors for those two channels have failed while the marker driver remains functional.

5. C — Power dissipated as heat is calculated using Watt's Law: $P = E \times I$. The voltage drop across the resistance is 0.7 volts, and the current flowing through that resistance is 120 amps. Therefore $P = 0.7 \times 120 = 84$ watts of power being wasted as heat in the charging circuit. This excessive heat can damage cable insulation and terminal connections over time.

6. A — Both technicians are correct. Conventional current flow theory — used as the standard by ASE and most automotive training — describes current flowing from positive through the external circuit to negative. Electron flow theory describes the actual physical movement of electrons, which is from negative to positive. Both theories describe the same phenomenon from different reference points, and both are technically valid.

7. D — All other trucks on the same routes maintain GPS coverage, which eliminates geographic or satellite availability issues. A telematics module with no stored DTCs suggests the module itself is functioning but receiving a degraded signal. The GPS antenna system — including the antenna

element, its cable, connectors, and mounting location — is the most likely point of failure for reception problems specific to one vehicle.

8. B — Turn signal flasher modules regulate flash rate based on circuit current draw. A standard bulb load produces the designed flash rate. A higher-wattage replacement draws more current than the standard bulb, and the flasher interprets this increased draw as the normal full complement of functioning bulbs, producing a slightly slower flash rate. Conversely, a burned-out bulb reduces current and produces a faster rate.

9. C — Battery voltage during cranking is 9.6 volts and motor voltage is 8.2 volts — a 1.4-volt difference. This missing 1.4 volts is being consumed by resistance in the cables, connections, and solenoid contacts between the battery and the motor terminals. While some voltage drop is normal in the high-current cranking circuit, the technician should compare this 1.4-volt total against the specification to determine if it exceeds the acceptable 0.5-volt power-side and 0.3-volt ground-side limits.

10. B — A "forward radar blocked" message with no visible obstruction in front of the vehicle suggests the sensor face or its signal path is compromised. Mud, ice, road film, or a damaged plastic sensor cover on the radar unit can absorb or scatter the radar signal enough to trigger a blockage alert. Additionally, a misaligned mounting bracket or loose electrical connector can affect the radar unit's ability to transmit and receive signals properly.

11. D — During key-on prove-out, the oil pressure warning light should illuminate because the engine is not running and no oil pressure exists — the normally closed pressure switch provides a ground path to the bulb. If the light does not illuminate during prove-out, the bulb may be burned out. Without a functioning warning light, the driver has no visual indication if dangerous low oil pressure develops during operation.

12. A — A metallic rattling noise from the starter area during cranking that stops when the key is released suggests the starter housing is moving under the high-torque reaction of cranking. Loose mounting bolts allow the starter to vibrate against the bell housing or engine block. The noise occurs only during cranking because that is the only time the starter develops high torque. Tightening the mounting bolts to specification eliminates the vibration.

13. C — The instrument cluster appearing to function normally does not mean all communication paths are healthy. The cluster receives data from multiple modules on the bus — the ECM provides RPM and temperature, the transmission module provides speed, and others contribute their parameters. The BCM-to-cluster communication path may be impaired for specific messages while the cluster continues receiving data from other modules through the shared bus.

14. B — Five cells reading between 1.260 and 1.265 confirm those cells are fully charged and healthy. Cell 5 reading 1.110 is dramatically lower — the variation of 0.150 to 0.155 between the highest and lowest cells far exceeds the 0.050 maximum threshold. This single defective cell represents an

irreparable internal failure that compromises the entire battery. The battery must be replaced regardless of the five healthy cells.

15. D — The alternator output and charging circuit voltage drops are all within specification, confirming the charging system is delivering its rated capacity efficiently to the battery terminals. If the batteries remain chronically undercharged despite a healthy charging system, the vehicle's total electrical load during normal operation likely exceeds the alternator's capacity to both power loads and recharge the batteries simultaneously.

16. A — The batteries testing at 12.6 volts at the terminals confirms adequate battery charge. The ECM reporting low voltage at its own power input means voltage is being lost in the wiring between the battery and the ECM. The DTC is alerting the technician that the ECM is not receiving adequate voltage — which can cause driveability issues, false sensor readings, and additional fault codes if the voltage drop is not corrected.

17. B — When the trailer is connected, the combined tractor and trailer tail lights draw more current through the tractor's left rear ground connection. A high-resistance ground that was adequate for the tractor-only current cannot handle the increased combined draw. The voltage drop across the ground connection increases enough to extinguish the tractor's bulb, while the trailer operates normally because it uses a separate ground path through the J560 connector.

18. D — The wiper motor draws significant current — particularly on high speed — which creates a momentary voltage drop across the cab's power distribution system when it activates. If the cruise control module's supply voltage drops below its minimum operating threshold during this transient, the module resets and disengages the cruise. The consistent, repeatable nature of the symptom correlates directly with the wiper motor's current demand affecting the shared power supply.

19. C — A clear image with a blue color shift and scrolling horizontal lines is characteristic of video signal degradation in the cable connecting the camera to the display. A damaged, corroded, or poorly shielded signal cable introduces impedance changes and allows electromagnetic noise into the signal path, distorting color balance and producing visible interference patterns. Replacing or repairing the video cable resolves the image quality issues.

20. A — Both technicians are correct. Two 120-ohm termination resistors connected in parallel at opposite ends of the CAN bus produce a combined resistance of 60 ohms — confirmed by Technician A's statement. If one termination resistor is disconnected or missing, only the single 120-ohm resistor remains, producing a total bus resistance of 120 ohms — confirmed by Technician B's statement. Both measurements are standard CAN bus diagnostic values.

21. D — The single click confirms the solenoid plunger is moving mechanically. The headlights not dimming is the critical observation — it proves that no significant current flowed through the cranking circuit during the engagement attempt. If the solenoid had closed the main contacts and

connected battery power to the starter, hundreds of amps would flow and the headlights would dim noticeably. No dimming means the contact disc is not bridging the main terminals.

22. B — The buzzing sound confirms the lock actuator motor is receiving power and energizing. However, the inability to move the lock mechanism indicates a mechanical disconnect between the motor and the linkage — a stripped internal gear, a disconnected actuator rod, or a binding door lock mechanism that prevents the motor's output from reaching the lock. All other doors working normally eliminates the fuse, switch, and common power feed.

23. A — A fusible link that has opened internally while maintaining intact external insulation is common — the conductor melts inside while the outer covering remains undamaged. Measuring voltage on both sides of the link quickly confirms the diagnosis: battery voltage on the battery side with zero volts on the fuse panel side proves the internal conductor has opened, creating a complete break in the power feed path to the entire vehicle.

24. C — Both headlights going dark simultaneously and briefly during rough road conditions points to a single common component that affects both lights at the same time. The headlight circuit fuse or fuse holder with intermittent contact between the blade terminals and the holder is the most likely common failure point. Vibration momentarily breaks the contact, killing both headlights, and the fuse reseats within a fraction of a second.

25. D — The same socket receiving different voltages depending on which circuit is energized reveals that the two circuits have different total resistance paths. The brake light circuit runs from the brake switch directly to the light — a relatively simple path. The turn signal circuit runs from the battery through the flasher module, multifunction switch, and additional wiring — a longer path with more connections and higher total resistance, producing the greater voltage drop.

26. B — A pattern of melted connectors on the same location across multiple trucks of the same model indicates a design or routing issue rather than random failure. A factory harness routing that positions the right front headlight connector too close to an exhaust manifold, turbocharger, or other heat source progressively degrades the connector housing and terminal contact surfaces, increasing resistance and generating heat under the normal headlight current load.

27. A — The built-in hydrometer samples only one cell — typically the center cell. That cell may have adequate specific gravity to show green while the overall battery voltage of 12.25 volts indicates only approximately 50% state of charge across all six cells. One or more of the other five cells may be significantly discharged. The battery needs charging and then full testing — open circuit voltage, specific gravity of all cells, and a load or capacitance test.

28. C — The washer pump producing a normal sound confirms it is building adequate pressure. The driver-side spray being strong proves the pump output, reservoir, and main delivery hose are functional. The weak passenger-side spray indicates a restriction or leak specific to that delivery branch. A partially clogged nozzle, a kinked hose, or a cracked/disconnected fitting on the passenger side reduces fluid delivery without affecting the driver side.

29. A — An alternator producing 195 amps out of its 200-amp rating is operating at 97.5% of rated capacity. The minimum acceptable output threshold is typically 80 to 90% of the rated value — 160 to 180 amps for a 200-amp alternator. At 97.5%, this alternator is well above that minimum and is performing within normal specification. The 5-amp difference from the nameplate rating is well within manufacturing tolerances.

30. B — A DTC indicating an erratic speed sensor signal combined with a speedometer that occasionally jumps points to a signal quality issue at the sensor's physical installation. A loose connector, a damaged wire that intermittently opens or shorts, or an improper air gap between the sensor and the reluctor ring produces an inconsistent signal that the module flags as erratic. Inspecting the physical sensor installation and wiring is the logical first step.

31. C — Parallel resistance is calculated using the product-over-sum formula: R(total) = (R1 × R2) ÷ (R1 + R2) = (4 × 12) ÷ (4 + 12) = 48 ÷ 16 = 3 ohms. Total resistance in a parallel circuit is always less than the smallest individual branch resistance. This lower total resistance means the circuit draws more total current from the source than either branch would draw individually.

32. D — The alternator producing 14.1 volts and full amperage confirms the internal components are healthy. A dim charge indicator light with a functioning alternator typically indicates a voltage sense issue. If the sense wire was not connected or was connected to the wrong terminal on the replacement alternator, the indicator circuit sees a slight voltage difference that keeps the bulb dimly lit. Verifying the sense wire connection to the correct B+ terminal resolves the issue.

33. A — The forward/backward seat adjustment working correctly proves the shared fuse, power feed, and main seat connector are delivering power to the seat assembly. The height adjustment using a separate motor, switch, and dedicated wiring within the seat means the fault is isolated to one of these individual components. The motor may have failed, the height switch may have a bad contact, or the wiring between them may be open.

34. B — Battery terminal voltage of 12.4 volts with the engine running is essentially resting battery voltage — the alternator is producing no measurable output above what the batteries already have. The belt is intact and the pulley spins, confirming mechanical drive is present. The alternator's field circuit — the sense wire, field connector, voltage regulator, and brushes — is not providing the field current needed for the rotor to generate a magnetic field and produce output.

35. D — Normal air pressure readings and normal brake feel eliminate pneumatic system faults. The tractor protection valve defaults to the closed position when it loses its electrical control signal — a safety design that protects the tractor air supply if the trailer separates. A wiring fault, a blown fuse, a failed solenoid, or a disconnected connector in the valve's electrical control circuit causes the valve to close unexpectedly despite adequate air pressure.

36. C — The original headlight circuit wiring was designed for the current draw of the headlights alone, and the 20-amp fuse was sized to protect that specific wire gauge. Adding fog lights increases the total current draw beyond the original design, and upgrading to a 30-amp fuse to

prevent blowing removes the overcurrent protection for the original wiring. The wire can now overheat and melt before the 30-amp fuse blows, creating a fire hazard.

37. B — The crankshaft position sensor serves two critical functions: it provides RPM and timing data to the ECM for fuel injection control, and it provides RPM data to the instrument cluster for the tachometer display. A failing crankshaft position sensor or its circuit can produce erratic signals that cause both misfire events from incorrect injection timing and a zero or erratic tachometer reading from corrupted RPM data — all from a single sensor fault.

38. A — The dome light is in door-activated mode with all doors confirmed closed, yet the lights activate randomly. A chafed section of the door jamb switch wiring that intermittently contacts a grounded metal surface mimics the door-open signal. Each time the bare wire touches ground — from vibration, movement, or temperature-related expansion — the light circuit sees a ground path identical to what the door switch would provide, activating the dome light.

39. C — The sensor has already been replaced and the code returns, eliminating the sensor itself as the cause. The DTC indicates a signal-missing condition, which means the ABS module is not receiving any signal from the right front location. The wiring between the module and the sensor — including all connectors, splices, and sections exposed to road debris, heat, and vibration — is the most likely location for a fault that persists through a sensor replacement.

40. D — The relay clicking only confirms the coil is energizing — it does not confirm the contacts are closing and passing current. The fuel pump running with direct battery power confirms the pump and its ground are functional. The missing piece of information is whether the relay's contacts are actually delivering power to the pump. Checking for voltage at the relay's load output terminal while the relay is clicking determines if the contacts are passing power or failing.

41. B — The scan tool shows the ECM reporting 65°F — consistent with an engine that has been sitting overnight. The instrument cluster displaying 210°F contradicts both the ECM data and the physical reality of a cold engine. On some trucks, the temperature gauge receives data from both the J1939 bus (ECM data) and a separate direct analog input from a dedicated dash gauge sending unit. A failed sending unit with low resistance drives the analog gauge to a high reading independent of the bus data.

42. D — Both alternators produce similar voltage and amperage, confirming their internal components are equally healthy. Heat discoloration at only one terminal means that specific connection has higher resistance than the other. Under the same current flow, higher resistance generates more heat according to $P = I^2R$. The Alternator 1 B+ terminal connection needs to be cleaned, tightened, or replaced to match the low-resistance connection on Alternator 2.

43. C — The blue wire pin reading 0 volts at the tractor-side J560 connector means no power is reaching the connector from the tractor's electrical system. The fault is upstream of the connector — a blown fuse in the tractor's trailer ABS circuit, a failed or disconnected relay that controls

power to the blue wire, or a broken wire between the tractor's fuse panel and the connector. The trailer cord and trailer ABS module are innocent because they never receive power to begin with.

44. A — The right rear marker light flickering only when the right turn signal pulses — and being steady when the turn signal is off — indicates current interaction between the two circuits. A high-resistance shared ground forces the turn signal's pulsing return current through the marker light filament as an alternate path, causing the marker to flicker in sync. The left side not exhibiting this behavior confirms the left-side ground is healthy.

45. B — The TPS produces a smooth, linear signal during slow bench testing, which eliminates a permanent sensor defect. The intermittent fault occurs only during driving, suggesting vibration or movement causes brief signal disruption. An oscilloscope displaying the signal waveform in real time captures momentary dropouts or spikes lasting only milliseconds — events far too brief for a DMM to detect but clearly visible on a waveform display.

46. D — The new alternator charging correctly eliminates internal electrical faults. A new belt properly tensioned eliminates belt condition as the cause. The squeal originating from the belt area with a new alternator and new belt most likely indicates pulley misalignment. The replacement alternator's pulley may sit slightly differently than the original, causing the belt to track at an angle that generates noise as it enters and exits the pulley grooves.

47. A — A 25-amp inductive load — such as a motor or solenoid — generates a significant reverse voltage spike when the relay opens and the magnetic field in the load collapses. This spike arcs across the relay contacts as they separate, eroding the contact surfaces progressively until they weld together. Installing a suppression diode across the load absorbs the voltage spike and prevents the arcing that destroys the contacts.

48. C — Normal air pressure and normal brake feel eliminate mechanical brake system faults. The red brake warning light and service message are triggered by electrical inputs to the warning system — pressure switches, fluid level sensors, lining wear sensors, and the parking brake switch. A failed sensor, a disconnected sensor connector, or a wiring fault in any of these input circuits can trigger the warning even though the actual brake system is functioning correctly.

49. B — The cluster reads 14.8 volts while the DMM at the battery terminals reads 14.2 volts. The cluster's internal voltage sensing circuit has a calibration error that adds approximately 0.6 volts to the actual reading. While some variation between a gauge display and a precision DMM is expected, a consistent 0.6-volt offset exceeds normal instrument tolerance and should be noted — though it does not indicate a charging system fault.

50. D — The first four modules disconnected had minimal effect on the resistance reading, but disconnecting the fifth module caused resistance to jump from 42 ohms to 58 ohms — near the normal 60-ohm specification. This significant change identifies the fifth module or its bus connection as the source of the abnormally low resistance. The module may have a shorted internal bus transceiver, or its connector wiring may have a fault that bridges CAN_H and CAN_L.