

PRACTICE EXAM 9: ASE T6

SIMULATION

1. A technician is testing a circuit where the specified resistance of a component is 150 ohms. The DMM reads 148 ohms. The technician then shakes the wiring harness while monitoring the reading, and the display briefly jumps to OL before returning to 148 ohms. What do these observations indicate?

- A. The component has normal resistance and the OL spike was caused by the DMM auto-ranging during the harness movement
- B. The component resistance is within specification, but there is an intermittent open in the wiring that briefly breaks continuity during movement
- C. The 148-ohm reading indicates the component is borderline out of specification and the OL jump confirms impending failure
- D. The DMM is malfunctioning and should be recalibrated before further testing

2. A heavy-duty truck's two parallel-connected batteries are replaced with new units. After installation, the technician measures 12.72 volts across the bank. The truck starts and runs normally for one week, then the driver reports slow cranking. The technician retests and finds Battery 1 at 12.62 volts and Battery 2 at 11.90 volts. What is the most likely cause?

- A. The alternator is undercharging because the new batteries have higher capacity than the originals
- B. The inter-connect cable between the batteries has developed high resistance from improper initial installation
- C. Both batteries are defective from the factory and should be returned under warranty as a pair
- D. Battery 2 has a defective cell that was not detected during initial installation testing and has progressively failed over the first week of service

3. A technician probes the power input terminal of a relay with a test light while the relay coil circuit is activated. The test light illuminates. The technician then probes the output terminal on the load side. The test light does not illuminate. The relay clicks audibly when the coil is energized. What is the most likely cause?

- A. The relay coil has insufficient magnetic force to fully pull the contact arm into engagement with the load terminal
- B. The test light is incompatible with the relay output circuit voltage and cannot illuminate at that level
- C. The relay's internal load contacts are not closing properly despite the coil energizing — either burned, pitted, or mechanically stuck in the open position
- D. The load connected to the relay output is drawing all available current, leaving none for the test light to illuminate

4. A commercial vehicle's battery cable terminal is being replaced. The technician selects a terminal clamp that fits snugly on the battery post but notices the cable conductor barely fills the crimp barrel — several strands are missing from the cable end. What should the technician do?

- A. Cut the cable back to a section where all conductor strands are intact and crimp the terminal to the full conductor cross-section
- B. Fill the empty space in the crimp barrel with solder to ensure a solid electrical connection around the remaining strands
- C. Wrap the conductor end with copper foil to build up the diameter before inserting it into the crimp barrel
- D. Proceed with the crimp since the remaining strands are sufficient for the current the cable carries

5. A truck is equipped with an aftermarket backup camera that displays normally in reverse. However, the driver reports that the camera image occasionally freezes for several seconds before resuming. The display unit and camera are both less than six months old. What is the most likely cause?

- A. The backup camera's image sensor is overheating due to poor ventilation in the mounting location
- B. The display unit's internal processor has a memory fault that causes periodic display refresh failures

C. The reverse gear signal wire to the camera system has an intermittent connection that briefly powers off the camera

D. A loose or corroded video signal connection between the camera and the display that causes data interruption during vehicle vibration

6. Technician A says that measuring voltage drop across a battery cable requires the circuit to be carrying current during the measurement. Technician B says that measuring voltage drop across a battery cable can be performed accurately with the circuit de-energized by using a high-resolution DMM. Who is correct?

A. Technician B only

B. Technician A only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

7. A heavy-duty truck has a 12-volt circuit with a total resistance of 6 ohms. Using Ohm's Law, what is the current draw of this circuit, and what is the power consumed?

A. 2 amps of current and 24 watts of power

B. 72 amps of current and 864 watts of power

C. 0.5 amps of current and 6 watts of power

D. 6 amps of current and 72 watts of power

8. A fleet of trucks is experiencing a pattern of premature alternator bearing failure. All trucks are the same model with identical alternator installations. Investigation reveals that the replacement drive belts being used are consistently one size shorter than the original specification. How does an undersized belt contribute to premature bearing failure?

A. The shorter belt runs at a higher linear speed than designed, increasing friction on the bearing surfaces

B. The shorter belt requires the tensioner to operate at the extreme end of its range, causing belt flutter that shock-loads the bearings

C. The shorter belt increases the tension beyond the designed load, placing excessive side-force on the alternator front bearing

D. The shorter belt causes misalignment with the alternator pulley, creating an angular load on the bearings

9. A truck's instrument cluster shows all gauges reading at their maximum positions — temperature pegged hot, oil pressure pegged high, fuel pegged full, voltmeter pegged at 18+ volts — simultaneously. No warning lights are illuminated. What is the most likely cause?

A. An overcharging alternator sending excessive voltage to the instrument cluster and driving all gauge circuits to maximum

B. Multiple simultaneous sending unit failures causing all gauges to receive short-to-ground signals

C. A data bus communication fault broadcasting maximum values for all parameters to the cluster

D. An internal instrument cluster power supply fault or ground fault that is driving all stepper motors or gauge mechanisms to their full-scale positions

10. A commercial vehicle's marker lights operate normally from the headlight switch during the day. At night, the driver notices that the marker lights dim slightly when the headlights are turned on but return to normal brightness when the headlights are turned off while leaving the markers on. What is the most likely cause?

A. A failing headlight switch that cannot supply full current to both the headlight and marker circuits simultaneously

B. A weak alternator that cannot maintain voltage when both headlights and markers are drawing current

C. A shared power feed or fuse that supplies both the headlight and marker circuits, with marginal capacity that allows a slight voltage drop when both loads are active

D. A body controller module that intentionally reduces marker light voltage when headlights are activated

11. A technician is performing a parasitic draw test and discovers that the draw increases by 30 milliamps every time the cab door is opened and closed during the test, even after the dome light timer has expired. The draw does not return to the original level after each door cycle. What is the most likely cause?

A. Each door opening wakes one or more electronic modules that do not return to sleep mode because the test setup — with a DMM in series — has slightly altered the electrical characteristics the modules use to detect key-off conditions

B. The door jamb switch has an internal short that adds 30 milliamps of leakage current each time it is actuated

C. The body controller module adds the door event to a memory log that draws increasing current as the log file grows

D. The dome light timer relay has a cumulative fault that increases hold-in current with each activation cycle

12. A heavy-duty truck's starter cranks the engine at normal speed, but a rhythmic thumping noise is heard once per engine revolution during cranking. The noise stops when the engine starts and the key is released. What is the most likely cause?

A. A broken engine mount allowing the engine to shift during cranking and contact the frame

B. A starter drive gear with a cracked tooth that impacts the flywheel ring gear once per revolution

C. A damaged or cracked flywheel ring gear with one or more missing teeth that cause the starter pinion to skip and re-engage each revolution

D. A loose torque converter bolt that contacts the bell housing inspection cover once per revolution during cranking

13. A truck driver reports that the cruise control holds speed perfectly on flat terrain but overshoots the set speed by 5 to 8 MPH on downhill grades before gradually returning to the set speed. The truck has no engine brake. What explains this behavior?

A. The cruise control module has a defective speed sensor input that introduces a delay in detecting speed increases

- B. The cruise control system can only reduce speed by backing off the throttle — it cannot apply brakes — so on a downhill grade, gravity accelerates the truck faster than the throttle reduction can compensate, causing the temporary overshoot
- C. The electronic throttle actuator has a slow return spring that delays throttle closure when the cruise module commands reduced fuel
- D. The transmission is downshifting too late on downhill grades, failing to provide engine braking at the correct speed

14. A technician measures the voltage at a truck's alternator B+ terminal with the engine off and reads 12.55 volts. With the engine running at 2,000 RPM, the reading at the same terminal is 12.58 volts. What does this minimal voltage increase indicate?

- A. The alternator's voltage regulator is maintaining a correct voltage within normal tolerance
- B. The drive belt is slipping and the alternator rotor is not spinning at the expected speed
- C. The batteries are fully charged and rejecting additional current, limiting the voltage rise
- D. The alternator is producing little to no charging output, and the reading is essentially resting battery voltage with negligible alternator contribution

15. A commercial vehicle's trailer clearance lights on the left side are inoperative while the right side clearance lights work normally. All marker lights on both sides work correctly. The trailer cord and J560 connector ground pin have been tested and are good. What is the most likely cause?

- A. An open in the wire feeding the left-side clearance lights on the trailer — either a broken wire, a disconnected splice, or a corroded connector specific to the left clearance circuit
- B. A faulty body controller module output that has disabled the left clearance channel while maintaining the right
- C. A blown fuse on the trailer that protects only the left-side clearance circuit
- D. A ground fault on the trailer frame at the left-side clearance light mounting locations

16. A truck's power window motor has been bench-tested and functions in both directions. When reinstalled, the window moves down but stops halfway when the up switch is pressed. The motor draws normal current in both directions when tested at the connector with a jumper wire. What is the most likely cause?

- A. A failing window regulator with worn scissor joints that bind under the weight of the glass during upward travel
- B. A faulty master switch that drops voltage on the up-direction contact under load conditions
- C. An undersized replacement regulator motor that cannot develop enough torque to lift the glass against gravity
- D. A window channel or weatherstrip that creates excessive friction against the glass, preventing the motor from completing the upward travel

17. A truck's scan tool shows the ECM broadcasting a barometric pressure reading that is significantly lower than actual atmospheric pressure at the vehicle's current elevation. The truck runs slightly rich and fuel economy has decreased. What sensor or circuit is most likely at fault?

- A. The exhaust backpressure sensor that is influencing the ECM's calculated barometric correction
- B. The intake manifold absolute pressure sensor that is misreading atmospheric pressure during key-on engine-off calibration
- C. The barometric pressure sensor or its circuit — either the sensor itself is reading incorrectly, or its signal wire has excessive resistance reducing the voltage the ECM receives
- D. The mass airflow sensor that is providing an inflated air density reading to the ECM

18. Technician A says that when replacing a heavy-duty truck's battery cables, the negative cable should always be disconnected first and reconnected last. Technician B says that this procedure prevents accidental short circuits from a wrench contacting the vehicle frame while working on the positive terminal. 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

19. A commercial vehicle's right turn signal works correctly, but when the left turn signal is activated, both the left turn signal lights and the reverse lights flash simultaneously. Activating the reverse gear without the turn signal produces normal steady reverse light operation. What is the most likely cause?

A. A faulty multifunction switch that internally bridges the left turn output to the reverse light feed

B. A short between the left turn signal wire and the reverse light wire in the wiring harness, allowing the pulsed turn signal voltage to feed into the reverse circuit

C. A body controller module error that links the left turn output with the reverse light output

D. A ground fault on the left rear combination light housing causing current to path through the reverse filament

20. A technician measures the voltage at a blower motor connector while the motor is running on medium speed. The reading is 7.8 volts. System voltage at the battery is 12.5 volts. Is this reading normal?

A. No — the motor should receive full system voltage on all speed settings to function correctly

B. No — the 4.7-volt difference indicates excessive voltage drop in the blower circuit wiring

C. Yes — on medium speed, the blower motor resistor block drops a portion of the source voltage, reducing the voltage reaching the motor to control its speed

D. Yes — the blower motor's internal resistance naturally limits the voltage across its terminals to approximately 8 volts on all settings

21. A heavy-duty truck's engine starts and runs, but the driver notices that all electrical accessories — headlights, blower, radio — are running on battery power only. The dash charge indicator is illuminated. A DMM at the battery terminals reads 12.3 volts with the engine running at 2,000 RPM. The alternator belt is intact and turning the alternator pulley. What should the technician check first?

A. The battery state of charge to determine if a deeply discharged battery is pulling the alternator voltage below the charge indicator threshold

- B. The alternator output cable for an open fusible link between the alternator and the battery
- C. The engine speed sensor signal to confirm the ECM is commanding proper alternator field current
- D. The alternator field circuit — the field connector, the sense wire, and the regulator — since the alternator is being mechanically driven but producing no output above battery voltage

22. A truck driver reports that the passenger-side heated mirror warms up and then cycles off after approximately 15 minutes, even in freezing conditions. The driver-side heated mirror stays warm continuously. Both mirrors are the same part number and were installed at the same time. What is the most likely cause?

- A. A voltage regulation fault in the mirror heating circuit that reduces voltage to the passenger side after a warmup period
- B. A built-in thermostat or thermal cutoff in the passenger-side mirror that is activating prematurely due to a sensor fault or incorrect thermal calibration
- C. A body controller module timer that limits passenger-side mirror heating duration as an energy conservation feature
- D. A power feed wire to the passenger mirror that increases in resistance as it heats up, eventually dropping voltage below the element's operating threshold

23. A fleet maintenance supervisor asks why a truck's batteries should be tested individually rather than as a connected parallel bank. What is the correct explanation?

- A. Individual testing is only necessary when the batteries are different ages or brands
- B. Connected parallel battery testing provides more accurate CCA measurements than individual testing
- C. A defective battery in the bank can be masked by the healthy batteries — testing individually ensures each battery's capacity is verified independently without the others compensating for a weak unit
- D. Individual testing is preferred only for warranty documentation purposes and provides no diagnostic advantage

24. A commercial vehicle's transmission range sensor provides a variable voltage signal to the transmission control module indicating the gear selector position. The scan tool shows the TCM reading "invalid range" regardless of selector position. The technician measures 0 volts on the signal wire at the sensor connector with the key on. What should the technician check?

- A. The sensor's power supply (reference voltage) and ground circuit at the connector to determine if the sensor is receiving the inputs it needs to generate an output signal
- B. The transmission control module for an internal fault that has disabled the range sensor input circuit
- C. The shift linkage adjustment to verify the sensor is physically positioned at the correct detent for each gear
- D. The J1939 data bus for a communication fault between the TCM and the sensor that prevents signal transmission

25. A truck's headlights dim momentarily each time the air conditioning compressor clutch engages. The dimming lasts approximately one second and then the headlights return to full brightness. What is the most likely cause?

- A. A failing A/C compressor clutch coil that draws excessive current during engagement
- B. A weak battery that cannot sustain voltage during the momentary current spike of clutch engagement
- C. A headlight relay with contact resistance that worsens under the voltage dip caused by the compressor engagement
- D. A momentary voltage drop caused by the high inrush current of the compressor clutch coil, which briefly reduces the voltage available to the headlight circuit before the alternator compensates

26. A truck's wiper motor runs at only one speed regardless of switch position — the speed appears to be between the normal low and high speeds. The park function works correctly. What is the most likely cause?

- A. A failed wiper switch that has developed an internal short between the low-speed and high-speed contacts, causing current to flow through both paths simultaneously and producing an intermediate speed
- B. A blower motor resistor that has been accidentally connected to the wiper circuit during a previous repair

- C. A worn wiper motor armature that has lost field strength and can only achieve a single speed
- D. A body controller module fault that overrides the wiper switch and commands a fixed duty cycle to the motor

27. A commercial vehicle's alternator produces 14.2 volts during a standard output test. The technician then loads the system to maximum demand and the voltage drops to 13.4 volts. The alternator amperage output reads 155 amps against its 160-amp rating. What does the voltage drop to 13.4 volts under full load indicate?

- A. The batteries are pulling the voltage down because they are partially discharged and demanding charging current in addition to the accessory loads
- B. The alternator is operating at its maximum capacity and the voltage drop represents the regulator allowing the output to sag as the alternator reaches its current limit
- C. The voltage regulator has failed and cannot maintain the set point under heavy load
- D. The charging circuit has excessive voltage drop in the cables that becomes apparent only at high current

28. A heavy-duty truck's scan tool retrieves a DTC from the ABS module indicating "system voltage low." The battery terminals measure 14.1 volts with the engine running. What does this code mean?

- A. The ABS module is malfunctioning and reporting false voltage data
- B. The alternator is not producing adequate voltage to support the ABS module's minimum operating requirements
- C. The batteries have internal damage that is invisible to external voltage measurements but detectable by the ABS module
- D. The voltage at the ABS module's power input is lower than at the battery terminals, indicating excessive voltage drop in the power supply wiring to the module

29. A truck's left headlight flickers when the right turn signal is activated but remains steady when the right turn signal is off. The left headlight also remains steady when the left turn signal is activated. What is the most likely cause?

- A. A faulty multifunction switch with an internal crossover between the right turn output and the left headlight feed
- B. A body controller module fault that modulates the left headlight output in response to right turn signal activation
- C. A shared ground connection between the right turn signal and the left headlight that has high resistance, causing current interaction when the right turn pulses
- D. A short-to-power between the right turn signal wire and the left headlight wire inside the harness

30. A driver reports that the truck's engine will not crank when the key is turned to start, but all electrical accessories — lights, radio, blower — operate normally. There is no click from the solenoid. Battery voltage is 12.6 volts. What should the technician check first?

- A. The starter control circuit — ignition switch, neutral safety or clutch interlock switch, starter relay, and the wiring between them — since the absence of a solenoid click with good batteries indicates no signal is reaching the solenoid coil
- B. The starter motor brushes for excessive wear preventing armature rotation
- C. The battery cable connections for high resistance that limits cranking current but allows accessory operation
- D. The starter drive mechanism for a jammed pinion gear preventing solenoid engagement

31. A commercial vehicle's scan tool reads freeze frame data from a stored DTC. The freeze frame shows the fault occurred at 65 MPH, engine RPM 1,800, coolant temperature 195°F, and ambient temperature 32°F. How should the technician use this information?

- A. The freeze frame data confirms the exact failed component and no further testing is needed
- B. The freeze frame data identifies the operating conditions present when the fault occurred, helping the technician reproduce those conditions during diagnosis to trigger the fault again

- C. The freeze frame data is only useful for warranty claim documentation and has no diagnostic value
- D. The freeze frame data identifies the ambient temperature as the primary cause of the fault

32. A truck has dual alternators. During a routine check, Alternator 1 produces 14.2 volts and Alternator 2 produces 13.8 volts. Both alternators are the same model with internal regulators. Both drive belts are properly tensioned. What is the most likely explanation for the 0.4-volt difference?

- A. Normal voltage regulator manufacturing tolerance between two units of the same model
- B. A failing voltage regulator in Alternator 2 that needs immediate replacement
- C. Different battery states of charge on the two halves of a split charging system causing different demand signals to each regulator
- D. Alternator 2 has a failing stator winding that reduces its output voltage below the regulator's set point

33. A truck's headlights have been upgraded from halogen to LED assemblies. The LED headlights produce superior illumination, but the body controller module now sets "open circuit" DTCs for both headlight outputs. The headlights function normally. What is causing the codes?

- A. The LED driver circuits produce electromagnetic interference that the BCM interprets as a circuit fault
- B. The LED assemblies have incompatible ground connections that prevent the BCM from detecting return current
- C. The LED headlights generate heat signatures that differ from halogen bulbs, triggering the BCM's thermal monitoring system
- D. The LED assemblies draw significantly less current than the halogen bulbs the BCM was calibrated to detect, causing the module to interpret the low current as an open circuit

34. A medium/heavy truck's wiper system is diagnosed with a faulty park switch. The technician replaces the park switch assembly. After replacement, the wipers park correctly but a faint clicking noise is heard from the wiper motor area when the wipers are in the parked position with the switch off. What is the most likely cause?

- A. The new park switch has a manufacturing defect causing its contacts to chatter

- B. The park switch cam is slightly misaligned, causing the switch contacts to open and close rapidly at the boundary of the park position — the motor receives intermittent pulses but not enough sustained current to move the arms
- C. The wiper motor relay is receiving a feedback signal from the new park switch that causes it to cycle rapidly
- D. Electromagnetic interference from the ignition system is inducing voltage into the park switch wiring

35. A fleet technician discovers that a group of trucks parked in the same yard all have slightly elevated parasitic draws — 65 to 80 milliamps against a 50-milliamp specification. All trucks are the same model with the same equipment. What common factor should the technician investigate first?

- A. Whether a recently installed fleet-wide aftermarket system — such as a GPS tracker, a telematics module, or a security system — is drawing more current in sleep mode than the vehicle's electrical system was designed to accommodate
- B. Whether the trucks' batteries are all from the same defective production lot causing internal leakage
- C. Whether the alternators in these trucks are producing reverse current through shorted diodes
- D. Whether the ambient temperature in the parking yard is causing temperature-sensitive modules to remain in a semi-active state

36. A commercial vehicle's electronic speedometer reads zero while the vehicle is moving at highway speed. The cruise control and ABS systems are both functioning normally. What does the fact that cruise control and ABS work correctly tell the technician?

- A. The vehicle speed sensor and the J1939 bus are delivering valid speed data to the cruise and ABS modules
- B. The cruise control and ABS systems use separate speed sensors from the speedometer
- C. The speed data on the bus is valid, but the instrument cluster is displaying a different parameter as speed
- D. The ABS and cruise control modules have internal speed calculation algorithms that do not rely on the vehicle speed sensor

37. A truck's alternator output cable has been rerouted during an engine repair. The cable now runs directly alongside the CAN bus backbone wiring for approximately 18 inches. Since the rerouting, the truck has experienced intermittent CAN bus communication faults. What is the connection?

- A. The rerouted cable is physically compressing the CAN bus wiring against a frame member, causing intermittent conductor damage
- B. The alternator output cable's weight is pulling the CAN bus connector loose at one end
- C. The high-frequency switching of the voltage regulator is creating electromagnetic interference that radiates from the output cable
- D. The alternator output cable carrying high, fluctuating charging current generates electromagnetic interference that induces noise into the adjacent CAN bus wires, corrupting data signals

38. A heavy-duty truck's starter engages and cranks the engine, but the technician hears the starter continue to spin for approximately three seconds after the engine fires and the key is released. What is the most likely cause?

- A. A worn overrunning clutch that keeps the pinion partially meshed with the spinning flywheel
- B. A starter solenoid with a delayed plunger return caused by a weak return spring or a sticking plunger, keeping the drive engaged and the motor circuit closed after the key is released
- C. An ignition switch that is mechanically sticking in the start position for a few seconds before springing back to run
- D. A starter relay with welded contacts that maintain the solenoid coil circuit after the ignition switch leaves the start position

39. A truck's scan tool shows the instrument cluster receiving an engine oil pressure value of 55 PSI from the J1939 bus. The dash oil pressure gauge displays approximately 35 PSI. The engine is at operating temperature and 1,500 RPM. What is the most likely cause of the discrepancy?

- A. The instrument cluster's oil pressure gauge stepper motor or internal calibration is faulty, displaying a lower reading than the data it receives from the bus
- B. The ECM's oil pressure sensor is overstating the actual pressure and the gauge is correctly compensating

C. A gateway module between the engine bus and the body bus is applying a correction factor to the oil pressure data

D. The J1939 bus data is being corrupted between the ECM broadcast and the cluster reception

40. A driver reports that the truck's high-beam headlights work, but the low-beam headlights are completely inoperative on both sides. The headlight fuse is good and the high-beam indicator illuminates correctly when selected. What should the technician check first?

A. Both low-beam bulbs simultaneously, since dual-filament bulbs can have the low-beam filament burn out independently of the high-beam filament

B. The headlight dimmer circuit for an open in the low-beam power path — the multifunction switch low-beam contact, the low-beam relay, or the wiring dedicated to the low-beam circuit

C. The alternator output for voltage instability that prevents low-beam filaments from sustaining illumination

D. The body controller module for a software fault that has disabled the low-beam output while maintaining the high-beam channel

41. A commercial vehicle's electronic parking brake system engages correctly when the switch is pressed. However, the yellow parking brake warning light on the dash does not illuminate even though the brake is confirmed applied. All other warning lights function correctly during prove-out. What is the most likely cause?

A. A failed instrument cluster output driver affecting only the yellow parking brake indicator

B. A faulty parking brake apply switch that operates the brake but does not trigger the warning light circuit

C. A burned-out parking brake warning light bulb in the instrument cluster, or a faulty warning light input circuit that does not detect the applied-brake signal

D. A body controller module fault preventing the parking brake status from reaching the cluster

42. A technician measures the voltage at a diesel engine's intake air heater relay with the key on and the engine cold. The relay coil has 12.3 volts on the control side but 0 volts on the ground side. The relay does not click and the air heater does not activate. What does the ground-side 0-volt reading indicate?

- A. The ground circuit for the relay coil is complete and functioning — 0 volts on the ground side means the ground path has negligible resistance and the coil should be energized, suggesting the relay itself is faulty
- B. The ECM is not providing the ground command to the relay because the coolant temperature does not meet the air heater activation threshold
- C. The relay ground wire is open, preventing current from flowing through the coil
- D. The relay coil has an internal short that drops all voltage before reaching the ground terminal

43. A heavy-duty truck's ABS system activates unexpectedly during normal braking at low speed on dry pavement. The dash ABS warning light is not illuminated and no DTCs are stored. What is the most likely cause?

- A. An ABS module calibration error that sets the intervention threshold too low for the vehicle's weight
- B. Worn brake linings causing inconsistent friction that the ABS interprets as wheel lockup
- C. A data bus communication error that provides incorrect vehicle speed data to the ABS module
- D. A faulty wheel speed sensor or its reluctor ring producing an erratic signal that the ABS module interprets as impending wheel lockup, triggering unnecessary intervention

44. A truck's scan tool shows the transmission control module receiving a valid throttle position signal, but the transmission will not shift out of first gear. The scan tool also shows the TCM is not receiving a valid vehicle speed signal. What is the most likely reason the transmission stays in first gear?

- A. The throttle position signal is interfering with the TCM's shift calculation algorithm
- B. A faulty transmission control module that cannot process multiple input signals simultaneously
- C. Without a valid vehicle speed signal, the TCM cannot calculate when shift points have been reached and defaults to first gear as a protective strategy
- D. The transmission's internal hydraulic system has a mechanical fault unrelated to the speed signal

45. A technician is diagnosing a commercial vehicle where the left rear combination light assembly has been replaced after a collision. After installation, the left rear turn signal illuminates steadily instead of flashing when the turn signal is activated. The right rear turn signal flashes normally. What is the most likely cause?

- A. A faulty replacement light assembly with an internal wiring defect that bypasses the flasher circuit
- B. The replacement assembly's connector has been wired directly to a constant power source instead of to the pulsed turn signal feed from the flasher, providing steady voltage rather than the flashed signal
- C. The turn signal flasher module has failed on the left-side output, providing constant voltage instead of pulsed
- D. A short between the left turn signal wire and the tail light wire inside the replacement harness

46. A heavy-duty truck has been returned to service after an alternator replacement. Three days later, the truck returns with a dead battery complaint. The alternator output tests at 14.2 volts and full rated amperage. The charging circuit voltage drop is within specification. Parasitic draw is 40 milliamps — within the 50-milliamp specification. What should the technician investigate next?

- A. The battery condition, including a load test and capacitance test, to determine if the batteries have internal defects that prevent them from holding a charge despite receiving adequate charging voltage
- B. The alternator sense wire routing to verify it was reconnected to the correct terminal during the previous repair
- C. The drive belt tensioner for a failing spring that allows intermittent belt slip during high-demand periods
- D. The data bus for communication errors that may have started after the alternator replacement

47. A commercial vehicle's electronic engine brake system operates correctly at highway speeds but does not activate at lower speeds. The scan tool shows the engine brake module receiving valid engine RPM and vehicle speed data. No DTCs are stored. What is the most likely explanation?

- A. The engine brake solenoid valve has weak spring pressure that only allows activation at higher exhaust backpressures
- B. The engine brake module has a failing output driver that can only energize the solenoid at higher system voltages present at highway RPM

C. A wiring fault between the engine brake switch and the module that reduces signal voltage below the activation threshold at lower speeds

D. The engine brake system is programmed with a minimum activation speed threshold, and the vehicle speed is below that threshold at lower speeds — this is normal operation by design

48. A technician is testing a truck's horn circuit. Pressing the horn button produces no sound. The technician jumps 12 volts to the horn relay coil and the relay clicks but the horn still does not sound. The technician then jumps 12 volts directly to the horn's power terminal and the horn sounds loudly. What does this diagnostic sequence reveal?

A. The horn relay coil circuit has an open that prevents the horn button from energizing the relay

B. The relay clicks when externally powered, but its load contacts are not closing to deliver power from the relay output to the horn — confirmed by the horn sounding when powered directly

C. The horn button has excessive resistance that prevents adequate current from reaching the relay coil

D. The horn relay is the correct component to replace because the coil energizes but the contacts fail

49. A truck's power door locks work normally from the driver's master switch, but the key fob remote does not lock or unlock the doors. The key fob battery was recently replaced. What should the technician check first?

A. The door lock actuators for a fault that prevents them from responding to the remote signal

B. The body controller module for a stored fault code related to the remote keyless entry receiver

C. Whether the key fob needs to be reprogrammed or re-paired to the vehicle's receiver module after the battery replacement

D. The remote receiver antenna mounted in the cab for a broken wire or corroded connector

50. A fleet of trucks experiences a common issue where the instrument cluster displays briefly go blank — approximately one second — and then recover during the first five minutes of driving after a cold start. The displays function normally after the warm-up period. What is the most likely cause?

A. A thermal expansion issue at a cluster connector or internal solder joint that momentarily loses contact during the initial warm-up phase, then makes solid contact as the components reach operating temperature

B. A body controller module firmware issue that causes a display refresh error during the cold-start initialization sequence

C. Cold-temperature voltage instability from the batteries during the initial charging phase after engine start

D. A data bus timing error that occurs during the first five minutes while all modules complete their cold-start initialization routines

PRACTICE EXAM 9: ANSWER KEY

1. B — The component's resistance of 148 ohms is within acceptable range of the 150-ohm specification. The brief OL spike during harness movement reveals an intermittent open in the wiring — a broken conductor or loose connection that momentarily loses continuity when physically disturbed. This is exactly the type of fault that causes intermittent symptoms during driving but tests normal on the bench.
2. D — Both batteries were installed at the same time and started at the same voltage. Battery 2 dropping to 11.90 volts while Battery 1 holds at 12.62 volts after one week indicates Battery 2 has a progressive internal defect — most likely a failing cell that was marginal at installation but has deteriorated under the demands of daily operation. The healthy Battery 1 has been continuously trying to equalize voltage with the weak unit, stressing both.
3. C — The relay clicking confirms the coil is energizing and the control circuit is complete. Power present on the input terminal confirms the load side has battery voltage available. No power on the output terminal despite the relay clicking means the internal contacts are not making connection — burned, pitted, or mechanically stuck contacts prevent the input voltage from passing through to the output. The relay must be replaced.
4. A — Missing conductor strands reduce the cable's current-carrying capacity and create a high-resistance connection at the crimp point. A battery cable carrying hundreds of amps during cranking requires the full conductor cross-section to maintain low resistance. The technician must cut the cable back to a section with all strands intact before crimping the terminal, ensuring the full conductor fills the crimp barrel for a solid, low-resistance connection.
5. D — The camera and display being relatively new eliminates age-related component failure. A frozen image that resumes after several seconds is characteristic of a video signal interruption — not a complete power loss, which would produce a blank screen. A loose or corroded connection in the video cable between the camera and display intermittently breaks the signal path during vehicle vibration, causing the display to hold the last received frame until the signal reconnects.
6. B — Technician A is correct. Voltage drop measures the voltage consumed by resistance as current flows through it — without current flow, there is no voltage drop regardless of how much resistance exists. A corroded battery cable terminal reads 0.0 volts across it when no current is flowing, completely masking the fault. The circuit must be carrying its operational current during the measurement for the voltage drop to be detectable.
7. A — Using Ohm's Law: $I = E \div R = 12 \div 6 = 2$ amps. Using Watt's Law: $P = E \times I = 12 \times 2 = 24$ watts. Alternatively, $P = I^2 \times R = 4 \times 6 = 24$ watts confirms the same result. These calculations are

fundamental for determining fuse sizing, wire gauge requirements, and total electrical load on the charging system.

8. C — A drive belt shorter than specification stretches the tensioner beyond its designed operating range, placing excessive static tension on the belt. This increased tension translates directly into higher side-load force on the alternator's front bearing, which is the bearing closest to the pulley. The constant excessive load accelerates bearing wear and causes premature failure across the entire fleet using the same undersized belt.
9. D — All gauges simultaneously pegged at maximum with no warning lights illuminated points to an internal cluster fault rather than individual sensor or data issues. An internal power supply failure or ground fault within the cluster can drive all stepper motors or gauge mechanisms to their full-scale positions by providing an uncontrolled voltage or current to the gauge driver circuits. Individual sending unit failures would affect only one gauge at a time.
10. C — The marker lights and headlights sharing a common power feed or fuse means both circuits draw from the same source. When both are active, the total current draw increases and the shared feed experiences a slightly higher voltage drop than when only the markers are drawing current. This marginal voltage reduction dims the markers slightly. A dedicated power feed for each circuit or a relay to separate the loads eliminates the interaction.
11. A — Each door opening wakes electronic modules — the BCM, the security module, and potentially others — that draw current during their active state. Normally, these modules return to sleep mode after a timeout period following the last bus activity. However, the DMM inserted in series for the parasitic draw test may slightly alter the circuit conditions that the modules use to detect a true key-off state, preventing them from completing their sleep cycle after each door event.
12. C — A rhythmic thumping once per engine revolution during cranking indicates the starter pinion encounters a physical irregularity at the same location on the flywheel ring gear each revolution. A missing or damaged tooth creates a gap where the pinion momentarily loses mesh, then re-engages with the next intact tooth, producing the thump. The noise stops when the engine starts because the overrunning clutch disengages the pinion from the flywheel.
13. B — Standard cruise control systems can only reduce vehicle speed by decreasing throttle — they have no ability to apply the service brakes or engage an engine brake on trucks not equipped with one. On a downhill grade, gravitational acceleration pushes the vehicle faster than the throttle reduction can compensate. The speed overshoots until the grade levels out or decreases enough for the reduced throttle to bring speed back to the set point.
14. D — A properly charging alternator at 2,000 RPM should produce 13.5 to 14.5 volts at the B+ terminal. A reading of 12.58 volts — only 0.03 volts above the engine-off reading — means the alternator is contributing virtually nothing to the electrical system. The truck is running on stored battery energy. The field circuit, voltage regulator, brushes, or an internal alternator fault is preventing the alternator from generating meaningful output.

15. A — Right-side clearance lights working eliminates the fuse, headlight switch, main power feed, and trailer cord as causes. Marker lights working on both sides further confirms the shared infrastructure is healthy. The left-side clearance circuit branches from the common feed at some point, and an open in this dedicated branch — a broken wire, a disconnected splice, or a corroded connector — prevents power from reaching the left clearance lights specifically.
16. D — The motor draws normal current in both directions when tested at the connector with a jumper wire, which confirms the motor itself and the regulator mechanism are capable of lifting the glass. The window stopping halfway during upward travel indicates an obstruction — a binding window channel, a deteriorated weatherstrip creating excessive friction, or a damaged window guide — that prevents the glass from completing its upward travel against the combined resistance of gravity and friction.
17. C — The barometric pressure sensor provides the ECM with atmospheric pressure data used to calculate air density and adjust fuel delivery for altitude. A sensor reading lower than actual atmospheric pressure tells the ECM the air is thinner than it actually is, causing the module to inject more fuel than needed — producing a rich condition and reduced fuel economy. The sensor itself or its signal circuit is the most direct cause.
18. A — Both technicians are correct. Disconnecting the negative cable first removes the ground connection from the vehicle frame, so if a wrench accidentally touches the frame while disconnecting the positive cable, no circuit is completed because the ground path is already broken. Reconnecting the negative last ensures the ground path is the final connection made, maintaining this safety margin throughout the entire procedure.
19. B — The left turn signal wire and the reverse light wire running through the same harness section have developed a short-to-power between them due to insulation damage. When the turn signal is activated, its pulsed voltage feeds through the damaged insulation into the reverse light wire, causing the reverse lights to flash in sync. With the turn signal off, no voltage is present on the turn signal wire, so the reverse lights operate normally from their own switch when reverse gear is selected.
20. C — On medium speed, the blower motor receives reduced voltage intentionally. The blower motor resistor block drops a portion of the source voltage — in this case approximately 4.7 volts — before the remaining 7.8 volts reaches the motor. This controlled voltage reduction is exactly how the speed control circuit works: higher resistance settings produce lower motor voltage and slower fan speed, while high speed bypasses the resistors entirely.
21. D — The alternator belt is intact and turning the pulley, confirming mechanical drive is present. Battery voltage of 12.3 volts with the engine running means the alternator is producing no output above resting battery voltage. Since the alternator is spinning, the problem is electrical — the field circuit is not providing current to the rotor to create the magnetic field needed for voltage generation. The field connector, sense wire, brushes, and regulator must be checked.
22. B — Both mirrors are the same part number installed at the same time, and the driver-side mirror stays warm continuously. The passenger mirror cycling off after 15 minutes indicates its internal thermal

protection or thermostat is activating prematurely. A faulty temperature sensor or thermal cutoff inside the passenger mirror assembly is reading higher-than-actual temperatures and shutting down the heater element to prevent perceived overheating.

23. C — When batteries are connected in parallel, a healthy battery compensates for a weak battery by sharing its voltage and current capacity. A defective battery that would fail a standalone load test may appear adequate when the healthy batteries in the bank prop up its performance during the test. Individual testing isolates each battery's performance independently, ensuring a weak unit cannot hide behind its stronger partners.
24. A — A transmission range sensor generates an output signal based on its reference voltage input and ground circuit. With 0 volts on the signal wire, the sensor is not producing any output. Before condemning the sensor, the technician must verify the sensor is receiving what it needs to function — the reference voltage from the TCM and a clean ground path. A missing reference voltage or open ground prevents the sensor from generating any signal regardless of selector position.
25. D — The A/C compressor clutch coil draws significant inrush current during the moment of engagement — often 30 to 50 amps momentarily. This brief current spike creates a corresponding voltage dip across the electrical system before the alternator's voltage regulator compensates by increasing field current. The headlights dim momentarily because their voltage drops during the spike, then return to full brightness within approximately one second as the alternator restores system voltage.
26. A — A short between the low-speed and high-speed contacts inside the wiper switch creates a parallel path that splits current between both speed circuits simultaneously. Current flowing through both the resistor path and the direct path produces an intermediate motor voltage — higher than low speed but lower than high speed. The result is a single intermediate wiper speed regardless of switch position, because both paths are always active.
27. B — The alternator producing 155 amps against its 160-amp rating means it is operating at 97% of maximum capacity. At this near-maximum output, the voltage regulator allows a controlled voltage sag because the alternator physically cannot produce more current at the present field excitation and speed. The 13.4-volt reading under full load is the alternator's natural output level when it has reached its current capacity ceiling.
28. D — Battery terminal voltage of 14.1 volts confirms the charging system is producing adequate voltage at the source. The ABS module reporting low system voltage means the voltage reaching the module's power input pins is lower than what exists at the battery. Resistance in the power supply wiring, a corroded connector, or a high-resistance fuse contact between the battery and the ABS module is dropping voltage below the module's minimum threshold.
29. C — The right turn signal and left headlight sharing a high-resistance ground connection causes current interaction between the two circuits. When the right turn signal pulses current through the shared ground, the voltage drop across the resistance modulates the left headlight's ground reference,

causing it to flicker. With the right turn signal off, no pulsing current flows through the shared ground and the left headlight operates steadily.

30. A — No solenoid click with good batteries is the definitive indicator of a control circuit fault. The solenoid needs a control signal — routed through the ignition switch, safety switch, and starter relay — to energize its coil. If any component in this control path has an open, no signal reaches the solenoid and it cannot engage. All accessories working confirms the batteries and main power distribution are healthy, isolating the fault to the starter control path.
31. B — Freeze frame data captures the exact operating conditions at the moment the DTC was set. Knowing that the fault occurred at 65 MPH, 1,800 RPM, 195°F coolant temperature, and 32°F ambient gives the technician specific parameters to replicate during diagnosis. Driving the truck under these same conditions maximizes the chance of triggering the fault again, allowing live diagnostic testing during the active fault.
32. C — A 0.4-volt difference between two alternators of the same model with properly tensioned belts falls within normal manufacturing tolerance for internal voltage regulator set points. Voltage regulators are calibrated to a target range, not an exact voltage, and individual units may vary by 0.3 to 0.5 volts while still operating within specification. Both readings — 14.2 and 13.8 — fall within the acceptable 13.5 to 14.5 volt charging range.
33. D — LED headlights draw 60 to 80% less current than the halogen bulbs they replace. The BCM monitors each headlight output for expected current draw based on the original halogen calibration. The dramatically lower LED current falls below the BCM's minimum detection threshold, causing the module to interpret each headlight circuit as open. Reprogramming the BCM for LED-compatible current thresholds or adding load resistors resolves the false codes.
34. B — A park switch cam that is slightly misaligned positions the contact point at the exact boundary of the park position rather than solidly within it. The contacts repeatedly open and close at this boundary — closed sends current to the motor, open stops it, then the slight motor movement shifts the cam enough to close the contacts again. This rapid cycling produces the clicking noise but does not generate enough sustained current to actually move the wiper arms.
35. A — A fleet-wide pattern of elevated parasitic draw on trucks of the same model strongly suggests a common aftermarket addition. A recently installed fleet-wide system — GPS tracker, telematics unit, security device, or electronic logging device — that draws 15 to 30 milliamps more than anticipated in sleep mode would account for the consistent elevation across all affected trucks. Identifying and addressing the aftermarket device resolves the fleet-wide issue.
36. C — The vehicle speed sensor and J1939 bus are delivering valid speed data because the cruise control maintains set speed (it needs accurate speed input) and the ABS operates correctly (it needs wheel speed data). The speedometer reading zero despite valid bus data isolates the fault to the instrument cluster itself — either its internal speedometer stepper motor, the cluster's speed data processing, or the cluster's connection to the specific speed message on the bus.

37. D — The alternator output cable carries the full charging current, which fluctuates as the voltage regulator cycles field current and as electrical loads change. This high, varying current generates a proportionally strong electromagnetic field around the cable. Running this cable alongside the CAN bus wires for 18 inches allows this field to induce voltage into the bus conductors, corrupting the differential signals and causing communication faults.
38. B — The engine starting confirms the solenoid engaged and closed the main contacts successfully. The starter continuing to spin after the key is released means the solenoid plunger is not returning to its rest position promptly — a weak return spring or a mechanically sticking plunger keeps the main contacts closed and the drive engaged after the coil is de-energized. The motor continues running until the plunger finally releases.
39. A — The scan tool confirms the cluster is receiving 55 PSI from the J1939 bus, but the gauge displays only 35 PSI. The data path is delivering correct information — the ECM sensor, the bus broadcast, and the cluster reception are all verified. The fault is internal to the cluster — the oil pressure gauge stepper motor is miscalibrated, has a faulty driver, or has developed a mechanical offset that causes it to display a lower reading than the data it receives.
40. B — High-beam headlights working correctly proves the headlight fuse, main power feed, and the dimmer switch's high-beam contact are all functional. Both low beams being inoperative simultaneously — while possible with dual filament burnout — is less likely than a fault in the low-beam circuit path that is common to both sides. The multifunction switch's low-beam contact, a low-beam relay, or the dedicated low-beam power feed wire should be checked first.
41. C — The parking brake engaging correctly confirms the mechanical system and the electrical apply circuit are functional. All other warning lights working during prove-out confirms the cluster's power supply, ground, and general indicator functions are healthy. The yellow parking brake warning light not illuminating despite a confirmed brake application points to the indicator bulb itself or the specific input circuit that triggers that particular warning light.
42. A — This is a critical diagnostic distinction. The relay coil has 12.3 volts on the power side and 0 volts on the ground side, which means the ground path is complete — 0 volts on the ground terminal means it is at ground potential. With power on one side and ground on the other, current should be flowing through the coil and the relay should energize. Since it does not click, the coil winding itself is open internally despite having the correct voltages at its terminals.
43. D — ABS activating unnecessarily on dry pavement at low speed without any DTCs suggests the module is receiving input data that meets its intervention criteria — specifically, a wheel speed signal that indicates impending lockup when no actual lockup is occurring. A faulty wheel speed sensor or a damaged reluctor ring producing erratic signal spikes mimics the rapid deceleration pattern that triggers ABS intervention.
44. C — The transmission control module uses vehicle speed data as a primary input for determining when to command upshifts and downshifts. Without a valid speed signal, the TCM cannot calculate whether

the vehicle has reached the speed threshold for the next gear. As a protective strategy, the module defaults to first gear to prevent damage from inappropriate shifts. Restoring a valid speed signal allows normal shift operation to resume.

45. B — The turn signal illuminating steadily instead of flashing means the bulb is receiving constant voltage rather than the pulsed signal from the flasher module. During the replacement installation, the turn signal wire was likely connected to a constant power source — such as the tail light feed — instead of the pulsed turn signal feed. Correcting the wire connection at the replacement assembly's connector restores the flashing function.
46. A — The alternator, charging circuit, and parasitic draw have all been verified as within specification. The batteries are receiving adequate charging voltage and are not being excessively drained when the truck is parked. If the batteries still go dead despite a healthy charging and electrical system, the batteries themselves have internal defects — excessive self-discharge, a weak cell, or plate degradation — that prevent them from retaining the charge they receive.
47. D — Many engine brake systems are programmed with a minimum vehicle speed and/or minimum engine RPM threshold below which the brake will not activate. This is a design feature that prevents engine brake engagement at low speeds where it could cause driveline shock, tire chirp, or uncomfortable vehicle deceleration. The system receiving valid speed and RPM data and having no DTCs confirms it is operating as programmed.
48. B — The diagnostic sequence isolates the fault precisely. The horn sounds when powered directly, proving the horn is good. The relay clicks when the coil is externally powered, proving the coil energizes. But the horn does not sound through the relay circuit, proving the relay's load contacts are not delivering power from the input terminal to the output terminal. The contacts have failed — burned, pitted, or stuck open — and the relay must be replaced.
49. C — Many remote keyless entry systems require the key fob to be reprogrammed or re-paired with the vehicle's receiver module after a battery replacement. Removing the fob battery erases the synchronization between the fob's rolling code transmitter and the vehicle's receiver. Without re-pairing, the fob transmits codes that the receiver does not recognize. The reprogramming procedure — typically a specific sequence of key turns and button presses — restores the fob-to-vehicle communication.
50. A — The brief display blanking occurring only during the first five minutes of cold start — then resolving permanently once the cab warms — is a classic thermal expansion symptom. A marginal solder joint or connector contact inside the cluster that has developed a hairline crack contracts in cold temperatures, momentarily breaking the circuit. As the cluster warms from its own heat generation and cab warming, thermal expansion closes the gap and restores solid contact.