PRACTICE EXAM 6: ASE T6 SIMULATION

1. A technician measures voltage at both sides of a fuse in a marker light circuit with the circuit energized. The battery side of the fuse reads 12.4 volts and the load side reads 0 volts. What does this indicate?

A. The circuit downstream of the fuse has an open preventing current from flowing

B. The fuse is good but the load is shorted to ground, pulling all voltage to zero

C. The voltmeter leads are reversed, producing an inverted reading on the load side

D. The fuse element has blown, creating an open that prevents voltage from reaching the load side

2. A heavy-duty truck's three parallel-connected batteries are being replaced as a set. The technician installs two new batteries and one reconditioned battery of the same group size and CCA rating. Is this acceptable practice?

A. Yes, as long as all three batteries pass a load test before being placed in service

B. No, all batteries in a parallel bank should be new and from the same manufacturer and production lot to ensure matched internal resistance and capacity

C. Yes, as long as the reconditioned battery's open circuit voltage matches the two new batteries

D. No, but only because reconditioned batteries cannot be used in parallel — they can be used as single installations

3. A commercial vehicle's scan tool retrieves a DTC from the body controller module indicating a short-to-ground on the left rear marker light output. The technician clears the code and activates the marker lights. The left rear marker illuminates normally and the code does not return during a 10-minute test. What should the technician do next?

A. Inspect the left rear marker wiring harness for intermittent contact with sharp edges or moving components that could cause the short under driving conditions

B. Replace the BCM because it generated a false code that does not correspond to an actual circuit fault

C. Replace the left rear marker light assembly as a preventive measure since the BCM detected a fault in that circuit

D. Close the repair order as no fault found since the circuit is currently operating correctly

4. A technician is testing a five-pin relay with a DMM. With the relay de-energized, resistance between terminals 30 and 87a reads near zero, and resistance between terminals 30 and 87 reads OL. When 12 volts is applied to terminals 85 and 86, resistance between 30 and 87 drops to near zero while 30 to 87a reads OL. What do these results indicate?

A. The relay contacts are welded on terminal 87 and the relay must be replaced

B. The relay coil is open and cannot generate the electromagnetic force to switch the contacts

C. The relay is functioning correctly — the normally closed contact (87a) switches to the normally open contact (87) when the coil is energized

D. The relay has reversed polarity on the coil circuit and will not function correctly in the vehicle

5. A fleet technician notices that several trucks returning from winter routes have corrosion concentrated specifically on the battery negative cable terminals, while the positive terminals are relatively clean. What explains this pattern?

A. The negative terminal is closer to the electrolyte vent caps on top-post batteries, exposing it to more acid vapor during charging and outgassing

B. The positive terminal is protected by a factory-installed rubber boot while the negative terminal is typically left exposed

C. Road salt spray specifically attacks the copper alloy used in negative terminals more aggressively than the lead alloy used in positive terminals

D. Negative terminals generate more hydrogen gas during charging due to the electrochemical reaction at the negative plate

6. A technician performs a voltage drop test on the positive side of a headlight circuit while the headlights are energized. The reading is 0.08 volts. The technician then performs the same test on the ground side and reads 0.06 volts. What do these combined readings indicate?

A. The circuit has excessive total voltage drop that requires repair on both the power and ground sides

B. The headlight bulbs are nearing end of life because the low voltage drop means they have high internal resistance

C. The test results are invalid because both readings should be measured simultaneously with two meters

D. Both the power side and ground side are well within acceptable limits, confirming the circuit wiring and connections are in good condition

7. A heavy-duty truck's engine cranks at normal speed and sounds healthy, but the truck will not start. The technician notices the charge indicator light did not illuminate during the key-on prove-out sequence. The bulb is confirmed burned out. Could the burned-out bulb be related to the no-start condition?

A. No, the charge indicator has no connection to the starting or fuel system circuits and cannot cause a no-start

B. Yes, on some alternator designs the indicator bulb provides initial field excitation current, and without it the alternator may not begin charging, which can affect ECM voltage stability during cranking attempts

C. No, the charge indicator bulb is powered by the instrument cluster and has no physical connection to the alternator circuit

D. Yes, the burned-out bulb creates an open in the ignition circuit that prevents the ECM from receiving run power

8. A commercial vehicle driver reports that the power locks cycle repeatedly — locking and unlocking on their own approximately once every two seconds. The driver is not touching the lock switch. What is the most likely cause?

A. A faulty lock actuator in one door sending a feedback signal that triggers the other doors to cycle

B. A body controller module software corruption causing unintended lock/unlock commands

C. A short-to-ground in one of the lock switch signal wires, causing the BCM or lock relay to cycle as the short intermittently makes and breaks contact

D. Water intrusion into the door lock actuator motor causing the motor to run continuously in both directions

9. A technician is diagnosing a truck where the battery charge indicator light stays on dimly with the engine running at idle, but goes out completely when the engine speed is increased above 1,500 RPM. What is the most likely cause?

A. A faulty voltage regulator that undercharges at idle but functions correctly at higher RPM

B. Alternator output at idle is marginally below the voltage needed to fully extinguish the indicator, but output at higher RPM meets the threshold — likely caused by worn brushes, a slipping belt, or high electrical demand at idle

C. A ground fault in the indicator light circuit that allows a small amount of current to flow through the bulb at low RPM

D. Normal operation for heavy-duty alternators that require above-idle speed to produce full charging voltage

10. A truck's right front clearance light works normally on its own, but when the right turn signal is activated, the clearance light flashes in sync with the turn signal. With the turn signal off, the clearance light returns to steady illumination. What circuit condition causes this behavior?

A. A faulty body controller module that is incorrectly linking the clearance light output to the turn signal command

B. A defective turn signal flasher module that is bleeding voltage into the clearance light circuit

C. A shared ground connection between the clearance light and the turn signal on the right side, with high resistance in that ground causing current from one circuit to path through the other

D. A short-to-power between the turn signal wire and the clearance light wire inside the right front harness

11. A heavy-duty truck has a 24-volt starting system that uses two 12-volt batteries in series for cranking. The electrical accessories operate on 12 volts. The technician measures 24 volts at the starter but only 12 volts at the headlights. How does the system provide both voltages?

A. The accessory circuits tap their 12-volt supply from a connection point between the two series-connected batteries, using only one battery's voltage while the full series voltage is available for cranking

B. A voltage divider resistor network in the main fuse panel reduces the 24-volt supply to 12 volts for accessories

C. A DC-to-DC converter steps the 24-volt bus down to 12 volts for all accessory circuits

D. The accessories use a separate 12-volt battery that is isolated from the series starting circuit

12. A technician is diagnosing a truck with an intermittent SRS warning light. The light illuminates when the steering wheel is turned to full lock in either direction but goes out when the wheel is returned to center. What is the most likely cause?

A. A faulty airbag module that loses power when the steering column angle sensor changes position

B. A crash sensor mounted on the steering column that is misinterpreting steering input as impact data

C. An intermittent open in the SRS wiring harness near the steering column pivot point

D. A deteriorating clock spring that loses continuity at the extremes of its rotational range but maintains contact near center

13. A commercial vehicle's scan tool shows that the ECM is broadcasting engine coolant temperature of 195°F on the J1939 bus. The transmission control module reports receiving a coolant temperature of 195°F. However, the instrument cluster displays 140°F on the temperature gauge. What does this diagnostic pattern indicate?

A. The data bus is delivering the correct temperature value to all modules — the fault is internal to the instrument cluster

B. A gateway module between the engine bus and the body bus is corrupting the temperature data during translation

C. The instrument cluster is receiving the value correctly but its temperature gauge is miscalibrated or has a faulty stepper motor, causing it to display a lower reading than the data it receives

D. The ECM's temperature sensor is faulty and broadcasting an inflated value that the cluster is correctly rejecting

14. All of the following are reasons to use adhesive-lined heat shrink tubing instead of standard heat shrink when making wiring repairs on a commercial vehicle EXCEPT:

A. Adhesive-lined heat shrink creates a watertight environmental seal around the connection

B. Adhesive-lined heat shrink increases the tensile strength of the crimped connection by 50% or more compared to standard heat shrink

C. Adhesive-lined heat shrink prevents moisture and road salt from reaching the crimp joint

D. Adhesive-lined heat shrink resists wicking of water along the wire strands into the connection

15. A truck's starter motor makes a rapid clicking sound when the key is turned to the start position, but the engine does not crank. The headlights dim significantly with each click. What is the most likely cause?

A. Weak or discharged batteries that cannot sustain the voltage needed to hold the solenoid engaged — each engagement attempt draws the voltage below the solenoid holding threshold, causing it to release and re-engage rapidly

B. A faulty starter relay with burned contacts that repeatedly make and break connection

C. An intermittent neutral safety switch that rapidly opens and closes the control circuit

D. A defective solenoid with a weak pull-in winding that cannot maintain plunger engagement

16. A technician measures voltage drop across a trailer's SAE J560 ground pin connection while the marker lights are energized. The reading is 1.4 volts. What is the consequence of this reading?

A. The trailer lights will operate at increased brightness due to the elevated ground-side voltage

B. The trailer ABS module will shut down to protect itself from the voltage imbalance

C. All trailer lighting circuits will be affected with reduced brightness because the shared ground connection is reducing the effective voltage available to every light on the trailer

D. Only the marker lights closest to the ground connection will be affected while more distant lights operate normally

17. A driver reports that the truck's instrument cluster displays fluctuate erratically — gauges bounce, warning lights flicker randomly, and the odometer display briefly scrambles before returning to normal. These episodes last approximately five seconds and occur several times per hour. What is the most likely cause?

A. A failing alternator producing voltage spikes that disrupt the cluster's internal processor

B. An instrument cluster module with a failing internal power supply capacitor

C. A data bus interference pattern caused by a module with a malfunctioning bus transceiver

D. An intermittent power supply or ground connection to the instrument cluster that causes brief power interruptions, resetting the module momentarily before power is restored

18. A heavy-duty truck's alternator has been replaced due to bearing failure. The replacement alternator is the correct part number. After installation, the charging system produces 14.2 volts with no loads, but only 13.0 volts with all loads activated at 2,000 RPM. The original alternator maintained 14.0 volts under the same conditions before it failed. What should the technician check?

A. The replacement alternator's voltage regulator calibration against the original unit's specifications

B. The alternator output cable connection and the charging circuit wiring to ensure the replacement unit's terminals are fully tightened and making clean contact

C. The drive belt tension and routing to ensure the replacement alternator's pulley alignment matches the original

D. The battery state of charge because partially discharged batteries draw more current from a new alternator

19. A commercial vehicle's wiper motor has been replaced. The new motor operates correctly on all speeds, but the wipers now sweep approximately two inches beyond the normal arc at the top of the windshield before reversing. What is the most likely cause?

A. The wiper arm spline position on the motor output shaft is set one or two positions off from the correct mounting position

B. The replacement motor has a longer crank arm throw that increases the wiper arc distance

C. The wiper transmission linkage was not reconnected to the exact same mounting hole as the original

D. The replacement motor spins at a faster RPM than the original, causing the arms to overshoot their intended stop point

20. A truck's hazard flashers work normally, flashing all four turn signal lights at the correct rate. When the hazards are turned off and the left turn signal is selected, the left turn signal flashes but at approximately double the normal rate. The right turn signal flashes at the correct rate. What is the most likely cause?

A. A defective multifunction switch that has different internal resistance on the left and right turn contacts

B. A failing turn signal flasher module that cannot regulate the left-side flash rate independently

C. An incorrect flasher module that is compatible with the hazard circuit but not calibrated for the turn signal circuit

D. A burned-out bulb on the left side of the vehicle — the flasher detects reduced current and increases the flash rate to alert the driver

21. A technician is diagnosing a commercial vehicle where the scan tool communicates with the engine module through the nine-pin diagnostic connector but cannot communicate with any body electrical modules. The truck uses separate J1939 bus segments for powertrain and body systems connected through a gateway module. What is the most likely cause?

A. A failed diagnostic connector that has lost contact on the body bus communication pins

B. A gateway module fault or a break in the body bus segment that prevents communication between the powertrain bus and the body modules

C. A scan tool software limitation that cannot access body module protocols on this vehicle platform

D. A blown fuse in the body electrical system that has de-powered all body modules simultaneously

22. Technician A says that a battery cable's current-carrying capacity is determined by the conductor gauge and the total cable length. Technician B says that using a cable that is too long for the application increases resistance and voltage drop even if the gauge is adequate for the current. Who is correct?

A. Technician A only

B. Technician B only

C. Both Technician A and Technician B

D. Neither Technician A nor Technician B

23. A heavy-duty truck's charging system maintains 14.3 volts during the day with all normal loads. At night with headlights, marker lights, interior lights, and the blower on high, the voltage drops to 13.2 volts. The alternator is rated at 130 amps. An amp clamp on the alternator output wire shows 125 amps at night. What does this information tell the technician?

A. The alternator is operating near its maximum capacity and the nighttime loads are consuming nearly all available output, leaving minimal reserve for battery charging — a higher-output alternator may be needed for this application

B. The voltage regulator is failing under sustained heavy load conditions and should be replaced

C. The charging circuit has excessive voltage drop that only appears under heavy current flow

D. The battery bank is undersized and cannot absorb enough charging current at 13.2 volts

24. A truck's electronic throttle pedal has no response — the engine idles normally but does not respond to pedal movement. The scan tool shows the throttle position sensor reading a constant 0% at all pedal positions. What should the technician check first?

A. The engine ECM for an active derate or limp-mode condition that overrides the throttle input

B. The electronic throttle actuator at the engine for a mechanical binding condition

C. The throttle pedal wiring harness for signs of physical damage or rodent intrusion

D. The throttle position sensor connector for a disconnected plug, an open signal wire, or a missing reference voltage

25. A truck equipped with LED headlights has one headlight that intermittently shuts off during driving, then returns to normal after a few minutes. The other LED headlight operates continuously without issue. What is the most likely cause?

A. A failing alternator that intermittently drops voltage below the LED driver circuit's minimum input threshold

B. An internal thermal protection circuit in the affected LED assembly that shuts down the LEDs when the driver circuit overheats due to a poor heat sink connection or cooling obstruction

C. A loose battery terminal connection that causes voltage fluctuations affecting only the LED headlight circuit

D. A data bus command error from the body controller module intermittently disabling one headlight output

26. A medium/heavy truck driver reports a strong burning smell from the battery box area. Upon inspection, the technician finds the battery inter-connect cables are extremely hot to the touch. Battery voltage reads 12.5 volts and the charging system is producing 14.2 volts. What is the most likely cause?

A. The alternator is overcharging the batteries, causing excessive current flow through the inter-connect cables

B. The batteries are shorted internally, drawing massive current through the inter-connect cables continuously

C. The inter-connect cable terminals are corroded or loose, creating high-resistance connections that generate heat as normal charging and discharge current flows through them

D. The battery box ventilation is blocked, trapping heat generated during normal battery operation

27. A technician is testing a truck's horn circuit. With the horn button released, the technician measures 12.4 volts at the horn relay coil's power terminal and 12.4 volts at the coil's control terminal. When the horn button is pressed, the control terminal voltage drops to 0.1 volts. What does this sequence of measurements tell the technician?

A. The horn button is providing a proper ground path to the relay coil when pressed, allowing current to flow through the coil — the control circuit is functioning correctly

B. The horn relay coil has an internal short that drops the control voltage to near zero

C. The horn button has excessive internal resistance that prevents adequate current flow to the coil

D. The relay coil is receiving power but the control circuit voltage drop indicates a problem with the horn button ground

28. A truck's trailer ABS warning light on the dash illuminates intermittently while driving. The light comes on during rough road conditions and goes out on smooth roads. The trailer ABS module shows intermittent communication fault codes. What is the most likely cause?

A. A trailer ABS module that overheats during rough road conditions due to poor mounting ventilation

B. Loose wheel speed sensor wiring on the trailer that loses connection during vibration

C. A failing trailer ABS module processor that resets during high-vibration conditions

D. A loose or damaged blue wire connection in the SAE J560 trailer connector or the trailer cord that intermittently loses power or communication signal to the trailer ABS module during vehicle movement

29. A technician is performing a parasitic draw test. The DMM reads 48 milliamps with all modules in sleep mode. The manufacturer's maximum specification is 50 milliamps. The truck's batteries are going dead every four days when parked. The battery bank has a total capacity of 400 amp-hours. At 48 milliamps continuous draw, approximately how many days could the batteries theoretically sustain this draw before reaching a fully discharged state?

A. Approximately 15 days, but real-world factors like temperature and battery age will reduce this significantly

B. Approximately 347 days — the math shows the parasitic draw alone cannot explain the four-day battery drain, so another cause exists

C. Approximately 50 days, indicating the parasitic draw is the sole cause of the battery drain

D. Approximately 4 days, confirming the parasitic draw as the direct cause of the dead batteries

30. A truck's left headlight housing has a cracked lens that allows moisture inside. The technician notices that the headlight appears to work intermittently — it functions when first turned on but dims and eventually goes out after approximately 20 minutes. When it cools, it works again. What is the most likely cause?

A. Moisture on the bulb or socket contacts is being heated by the bulb's operation, creating steam that expands and forces the bulb slightly out of the socket, increasing contact resistance until the circuit opens — when cooled, the moisture condenses and the bulb reseats

B. The moisture is causing a partial short inside the housing that progressively increases as the water heats

C. The cracked lens allows cold air to cool the bulb filament faster than designed, causing thermal stress fractures

D. Water is collecting in the reflector bowl and gradually rising to contact the hot bulb, cracking the glass capsule

31. A commercial vehicle's ABS module, engine brake module, and cruise control all malfunction simultaneously. The technician discovers a U-code from each module indicating lost communication with the vehicle speed signal source. All three systems require vehicle speed data to operate. What single component failure could cause all three symptoms?

A. A faulty instrument cluster that is not relaying speed data to the other modules

B. A failed engine control module that has stopped broadcasting data entirely

C. A damaged CAN bus backbone wire at the point where the speed data source module connects to the network

D. A failed vehicle speed sensor or its circuit that prevents the speed data from being generated and broadcast on the data bus in the first place

32. A fleet technician is inspecting battery boxes on a group of trucks. One truck has a battery box that shows signs of acid spray on the inside surfaces and on the adjacent frame rail. The batteries are two years old and have not been overcharged. What is the most likely cause of the acid spray?

A. Normal outgassing from flooded lead-acid batteries during high-temperature summer operation

B. Excessive charging current from a dual-alternator system that forces electrolyte out of the cell vents during heavy charging cycles

C. Physical damage to one or more battery cases that is allowing electrolyte to leak and spray during vehicle movement

D. Incorrect electrolyte concentration from a previous top-off using tap water instead of distilled water

33. Technician A says that a truck's charging system should be tested with the engine at idle and all loads off. Technician B says the charging system should also be tested at 2,000 RPM with maximum electrical load applied. Who is correct?

A. Both Technician A and Technician B — a complete charging system evaluation requires testing under both conditions to assess low-speed output and full-load capacity

B. Technician A only

C. Technician B only

D. Neither Technician A nor Technician B

34. A commercial vehicle's electronic instrument cluster shows a constant message "NO BUS" on the driver information display. All gauges read zero and no warning lights are illuminated except the check engine light, which is on steady. What does the "NO BUS" message indicate?

A. The instrument cluster module has failed internally and needs replacement

B. The vehicle's J1939 bus backbone has been severed and no data is reaching the cluster

C. The cluster has lost communication with the data bus and is not receiving any broadcast messages from other modules

D. The scan tool has lost connection with the cluster during a reprogramming attempt

35. A driver complains that the truck's auxiliary power outlet in the sleeper cab does not work. The technician tests the outlet and finds 0 volts with the ignition in both the on and off positions. The outlet worked previously. What should the technician check first?

A. The cab fuse panel fuse designation chart to determine which circuit the outlet is on

B. The body controller module for a stored fault code disabling the sleeper power circuit

C. The wiring between the cab and the sleeper for physical damage at the cab-to-sleeper pass-through

D. The fuse for the sleeper auxiliary outlet circuit, as a blown fuse is the most common cause of a completely dead outlet

36. Technician A says that when a truck has a completely dead electrical system — no lights, no cranking, no dash illumination — the first thing to check is the battery connections and main fusible links. Technician B says the first thing to check is the ignition switch and the main power relay. Who is correct?

A. Technician A only — a completely dead system indicates no power is reaching any circuit, pointing to the primary power feed from the batteries

B. Technician A only

C. Technician B only

D. Both Technician A and Technician B

37. A medium/heavy truck's wiper system has been diagnosed with a failed wiper motor park switch. The technician orders a replacement park switch assembly. Before installing the new part, what must the technician verify?

A. That the replacement park switch cam profile and contact alignment match the original unit's specifications for the correct park position at the base of the windshield

B. That the wiper arms have been removed and repositioned to match the new switch timing

C. That the blower motor resistor block is also replaced since it shares a common ground with the park switch

D. That the wiper switch has been reprogrammed to communicate with the new park switch contact pattern

38. A truck's clearance lights on the left side of the cab are all inoperative. The right-side clearance lights work normally. All marker lights on both sides work normally. The fuse for the left clearance lights is good. What does this pattern indicate about the fault location?

A. A faulty headlight switch that has failed on the left clearance output contact only

B. A body controller module output driver failure affecting only the left clearance channel

C. An open in the power feed or ground path specific to the left-side clearance lights, downstream of the point where the left clearance circuit separates from the shared marker circuit

D. A ground fault on the left side of the cab that affects clearance lights but not marker lights

39. A technician discovers that a truck's alternator output cable is routed directly across the top of the exhaust manifold heat shield. The cable insulation shows signs of heat damage and discoloration but the conductor appears intact. What action should the technician take?

A. Clean the discolored insulation with solvent and apply heat-resistant electrical tape to reinforce the damaged section

B. Test the cable for resistance and if within specification, reroute it away from the heat source and secure with clamps

C. Replace only the damaged section of the cable using a splice and properly rated replacement wire

D. Replace the entire cable with a new one of the correct gauge and route it away from the exhaust manifold, securing it with appropriate high-temperature rated clamps

40. A truck's scan tool retrieves a DTC from the ABS module indicating the right rear wheel speed sensor circuit has high resistance. The sensor has been replaced and the code returns. What should the technician investigate next?

A. The wheel speed sensor reluctor ring for damage or excessive runout that could affect signal quality

B. The ABS module's internal processor for a fault in the right rear channel's signal conditioning circuit

C. The wiring and connector between the ABS module and the right rear sensor location for corrosion, damaged wire insulation, or a high-resistance connector pin

D. The hub bearing assembly for excessive play that could move the sensor away from the reluctor ring

41. A fleet of trucks has been experiencing CAN bus communication faults that correlate with wet weather. The faults clear when the vehicles dry out. What is the most likely common cause?

A. Water intrusion into a CAN bus connector or splice location that introduces resistance or creates partial shorts between the CAN_H and CAN_L wires when wet

B. Humidity affecting the CAN bus termination resistors inside the modules, temporarily changing their resistance values

C. Rain water shorting the diagnostic connector pins at the cab under-dash location

D. Wet road conditions causing the alternator belt to slip, reducing voltage to the CAN bus modules below operating threshold

42. A driver reports that the truck's dash voltmeter reads 15.2 volts while driving at highway speed. The technician confirms the reading by measuring 15.1 volts at the battery terminals with a DMM. What action should be taken?

A. No action is needed as this is within the acceptable range for a heavy-duty truck charging system under highway driving conditions

B. Replace the batteries immediately because they are being damaged by the elevated voltage

C. Diagnose the charging system for an overcharging condition — the voltage exceeds the normal 13.5 to 14.5 volt range and indicates a voltage regulator fault or full-field condition

D. Check the battery temperature because cold batteries accept higher charging voltages that raise the system voltage above normal

43. A technician needs to verify whether a truck's starter solenoid is mechanically engaging the starter drive by listening for the distinctive engagement sound. The technician has an assistant turn the key to start while the technician places a hand on the starter housing. The technician feels the solenoid plunger move and hears the engagement, but the starter motor does not spin. What does this confirm?

A. The solenoid hold-in winding is defective, releasing the plunger before the main contacts close

B. The batteries cannot deliver sufficient current to spin the starter motor at the required speed

C. The starter drive mechanism has engaged the flywheel but the engine is hydrolocked and cannot rotate

D. The solenoid is mechanically engaging the drive but failing to close the main electrical contacts, or the main contacts are too worn to pass cranking current to the motor windings

44. A truck's heated mirrors both work correctly when tested with the engine running, but the driver reports they do not warm up when the truck sits idling for extended periods in cold weather. The mirror switch is in the on position. What could explain the driver's report?

A. The heated mirrors have a thermostat or timer circuit that cycles the heating element off periodically to prevent the mirror glass from overheating

B. Some heated mirror circuits are wired through the low voltage disconnect system, which may cut power to the mirror heaters during extended idling if battery voltage drops below the LVD threshold

C. The mirror heating elements lose efficiency at temperatures below 20°F and cannot maintain temperature at idle

D. The alternator output at idle is insufficient to power the heated mirrors and other accessory loads simultaneously

45. A technician installs a new electronic instrument cluster in a truck. After installation, all gauges and warning lights appear to function, but the ABS warning light remains illuminated even though the ABS system has no active faults. What is the most likely cause?

A. The replacement cluster has not been programmed to recognize the ABS module on the data bus, or the cluster requires a configuration parameter that links it to the specific ABS system installed on this vehicle

B. The ABS module has detected a new cluster serial number and has locked out communication as a security precaution

C. The ABS module requires a separate recalibration after any cluster replacement to re-establish baseline sensor values

D. The ABS warning light bulb test routine in the new cluster runs for an extended period compared to the original unit

46. A commercial vehicle's right turn signal works normally on the tractor. When a trailer is connected, the right turn signal on both the tractor and trailer flash normally, but the left marker lights on the trailer also flash dimly in sync with the right turn signal. What is the most likely cause?

A. A faulty trailer light cord with an internal break in the ground wire forcing return current through the marker circuit

B. A defective body controller module that incorrectly routes the right turn signal to the marker output when trailer load is detected

C. An oversized fuse on the marker circuit allowing bleed-through current from the turn signal

D. A high-resistance ground in the trailer connector or trailer wiring causing the right turn signal current to seek alternate return paths through the marker light filaments

47. A truck battery has been slow-charged overnight and now reads 12.68 volts. The technician waits two minutes and retests. The voltage has dropped to 12.22 volts. What does this rapid voltage decline indicate?

A. Normal surface charge dissipation that will stabilize within 10 minutes at the battery's true state of charge

B. The charging cable was not fully disconnected and is draining the battery through the charger's internal resistance

C. The battery has a defective cell or internal fault that cannot sustain a charge — the voltage drops rapidly because stored energy is being consumed by the internal defect

D. The battery was not charged long enough and needs an additional eight hours on the charger

48. A medium/heavy truck's body controller module is being replaced. After installation, the new BCM does not control any lighting outputs even though it communicates on the data bus and receives commands from the scan tool. What is the most likely cause?

A. The new BCM has a defective internal output driver board that passed quality control but fails under actual vehicle load

B. The replacement BCM has not been configured with the vehicle's specific option codes and lighting circuit assignments, so it does not know which outputs correspond to which lighting functions

C. The replacement BCM requires a 24-hour initialization period to learn the vehicle's lighting load profiles

D. The data bus baud rate on the new BCM does not match the vehicle's J1939 communication speed

49. A truck's right rear combination light assembly has been replaced after collision damage. After installation, the right turn signal works but the right brake light does not — even though both functions use the same dual-filament bulb. What is the most likely cause?

A. The replacement light assembly's connector has a different pin orientation than the original, and the brake light wire is not making contact with the correct socket terminal

B. The dual-filament bulb was installed with the indexing pins misaligned, connecting only the turn signal filament to the circuit

C. The brake light switch has failed simultaneously with the collision repair

D. The replacement assembly has a defective internal ground path that only affects the high-current brake filament

50. A driver reports that the truck's engine fan clutch engages immediately at key-on and runs continuously regardless of engine temperature. The coolant temperature is confirmed normal at 190°F. The fan clutch solenoid circuit is controlled by the ECM based on coolant temperature data. What should the technician check first?

A. The coolant level and thermostat for a restriction that is causing the ECM to read false temperatures

B. The fan clutch solenoid resistance to determine if it has shorted internally

C. The radiator cap pressure rating to verify it is maintaining proper cooling system pressure

D. The ECM's fan control strategy and sensor inputs using the scan tool to determine whether the ECM is commanding the fan on or whether the fan clutch solenoid circuit has a fault causing default-on operation

PRACTICE EXAM 6: ANSWER KEY

1. D — Voltage present on the battery side of the fuse but zero volts on the load side confirms the fuse element has melted and created an open. The fuse is acting as a break in the circuit — power reaches the fuse but cannot pass through the blown element to the load side. Replacing the fuse restores the circuit, but the technician must investigate why the fuse blew before simply replacing it.

2. B — Batteries in a parallel bank must be matched in age, manufacture, and internal condition to share current equally. A reconditioned battery has different internal resistance and capacity characteristics than new batteries, causing unequal current distribution during both charging and discharging. The mismatched battery will either be overworked or will drag down the performance of the new units, shortening the life of the entire bank.

3. A — A fault code that indicates a real circuit condition but does not reproduce during a static bench test is the classic signature of an intermittent fault. Under driving conditions, vibration, heat cycling, and vehicle movement can cause a wire to contact a sharp edge or a connector to shift, momentarily creating the short-to-ground the BCM detected. Physical inspection of the harness routing and connector condition identifies the intermittent contact point.

4. C — A five-pin relay has a normally closed contact (87a) and a normally open contact (87). With the coil de-energized, terminal 30 connects to 87a — confirmed by the near-zero resistance reading. When the coil is energized, the contact arm switches from 87a to 87 — confirmed by 30-to-87 reading near-zero and 30-to-87a reading OL. This is correct operation of a single-pole double-throw changeover relay.

5. A — On top-post batteries, the vent caps are positioned between or near the terminal posts. During charging and outgassing, acid vapor escapes through these vents and settles on the nearest surfaces. The negative terminal is often closer to the vent openings on common battery case designs, exposing it to more concentrated acid vapor and accelerating corrosion compared to the positive terminal.

6. D — The power-side voltage drop of 0.08 volts is well below the 0.5-volt maximum, and the ground-side voltage drop of 0.06 volts is well below the 0.3-volt maximum. Both measurements confirm that the wiring, connections, and ground path for this headlight circuit have very low resistance and are delivering current to the bulb efficiently. No repair is needed.

7. B — On certain alternator designs, the charge indicator bulb serves as the initial excitation current path to the rotor field winding at startup. Without this small current flow through the bulb, the rotor has no magnetic field to initiate alternator output. The loss of alternator excitation can affect

voltage stability at the ECM during extended cranking, preventing the engine management system from functioning properly during start attempts.

8. C — A short-to-ground on a lock switch signal wire mimics the switch being pressed — each time the short makes contact, the BCM or relay receives a lock or unlock command. If the short is intermittent — making and breaking contact every two seconds due to vibration or a loose wire touching the chassis — the system cycles between lock and unlock continuously. Locating and repairing the short-to-ground stops the cycling.

9. B — The charge indicator is designed to extinguish when alternator output voltage equals or exceeds the battery-side voltage. At idle, a marginally performing alternator — due to worn brushes reducing field current, a slightly slipping belt, or heavy electrical loads — produces just enough voltage to nearly match but not fully exceed battery voltage. The small remaining voltage difference keeps the bulb dimly lit. Higher RPM increases output enough to fully extinguish the light.

10. C — When two circuits share a high-resistance ground connection, current from one circuit creates a voltage drop across the shared ground that affects the other circuit. When the turn signal pulses current through the shared ground, the voltage drop modulates the clearance light's ground reference, causing it to flash in sync. With the turn signal off, the clearance light's ground returns to a stable state and it illuminates steadily.

11. A — In a 24-volt series starting system with 12-volt accessories, the electrical system taps the junction point between the two series-connected batteries. This center tap provides 12 volts (one battery's potential) for accessory circuits while the full 24 volts (both batteries in series) is available at the outer terminals for the starter circuit. This is the most common method used in 24-volt commercial vehicle systems.

12. D — The clock spring is a coiled ribbon cable that maintains electrical continuity between the vehicle harness and the steering wheel as it rotates. At full lock in either direction, the ribbon is at maximum extension or compression. A deteriorating clock spring develops conductor cracks or breaks at the extremes of rotation that open the SRS circuit, triggering the warning light. At center position, the ribbon is relaxed and maintains contact.

13. C — The ECM broadcasts 195°F, the transmission module confirms receiving 195°F, proving the data bus is delivering the correct value to all modules including the cluster. If the cluster receives 195°F but displays 140°F, the fault is internal to the cluster — either the temperature gauge stepper motor is miscalibrated, the internal conversion from bus data to needle position is faulty, or the gauge driver circuit has a calibration error.

14. B — Adhesive-lined heat shrink provides environmental sealing, moisture protection, and resistance to wicking — all critical for commercial vehicle wiring repairs exposed to harsh conditions. However, it does not increase the tensile or mechanical strength of the crimped connection by any significant amount. The mechanical strength of the connection depends entirely

on the quality of the crimp itself. The heat shrink protects the crimp from environmental degradation, not from mechanical failure.

15. A — Rapid repetitive clicking with headlights dimming on each click is the signature symptom of batteries that cannot sustain solenoid engagement. Each time the solenoid pulls in, the massive current demand drops battery voltage below the solenoid's holding threshold, causing the plunger to release. The voltage briefly recovers, the solenoid re-engages, and the cycle repeats rapidly. Charging or replacing the batteries resolves the condition.

16. C — The SAE J560 ground pin is the common return path for every lighting circuit on the trailer. A 1.4-volt drop at this single connection means every trailer light receives 1.4 volts less than it should, regardless of which circuit it is on. Marker lights, tail lights, turn signals, and brake lights are all affected equally because they all share this ground. Cleaning and securing the ground connection restores full voltage to all circuits.

17. D — Brief episodes of erratic cluster behavior — bouncing gauges, flickering lights, and scrambled displays that self-correct — are consistent with momentary power loss to the cluster module. When power is interrupted for a fraction of a second, the module's processor resets, producing the erratic display as it loses and regains its operating state. An intermittent power feed connection or ground connection to the cluster is the most probable cause.

18. B — The replacement alternator is the correct part and produces proper voltage with no loads, confirming its internal components are functional. The voltage drop under load — from 14.2 to 13.0 volts — suggests the output cable connections may not be fully tightened or may have contamination on the contact surfaces from the installation process. A loose or dirty B+ terminal connection creates resistance that becomes apparent only under the high-current conditions of full electrical load.

19. A — The wiper motor output shaft has splines that determine the angular position of the crank arm. If the arm is installed one or two spline positions off from the correct orientation, the entire wiper sweep pattern shifts — the wipers over-travel at one end and under-travel at the other. Repositioning the arm on the correct spline aligns the sweep pattern with the designed windshield coverage area.

20. D — A fast flash rate on one side with a normal rate on the other side is the classic indicator of a burned-out bulb. The turn signal flasher module monitors current draw — when a bulb on the left side is missing, the reduced current draw triggers the module to increase the flash rate as a driver alert. The hazard flashers use a separate circuit or module that does not exhibit the same rate change, which is why the hazards flash normally.

21. B — The scan tool communicating successfully with the engine module proves the powertrain bus segment and the diagnostic connector are functional. The inability to reach any body modules indicates the entire body bus segment is inaccessible. In a dual-bus architecture connected by a

gateway, a failed gateway module or a break in the body bus segment isolates all body modules from the diagnostic tool while leaving powertrain communication unaffected.

22. C — Both technicians are correct. A cable's current capacity depends on both the conductor cross-section (gauge) and the total length of the run — longer conductors have more resistance than shorter ones of the same gauge. A cable that is adequate in gauge for the expected current may still produce excessive voltage drop if the total length exceeds the design parameters, because resistance increases linearly with length.

23. A — The alternator producing 125 amps against its 130-amp rating means the unit is operating at 96% of maximum capacity. The 13.2-volt output is below the ideal 13.5–14.5 volt range because the alternator has almost no reserve capacity to maintain voltage while powering the heavy nighttime loads. The batteries receive minimal charging current under these conditions. A higher-output alternator provides the necessary reserve.

24. D — A throttle position sensor reading constant 0% at all positions indicates the signal is not changing with pedal movement. The most common cause is a disconnected sensor connector, an open signal wire between the sensor and the ECM, or a missing reference voltage that prevents the sensor from generating a varying output. Checking the connector and its three wires — reference voltage, signal, and ground — at the sensor is the logical first step.

25. B — LED headlight assemblies generate significant heat at the LED junction and rely on heat sinks and sometimes active cooling fans to dissipate that heat. If the heat sink connection is compromised or the cooling path is obstructed, the internal junction temperature rises until the built-in thermal protection circuit shuts down the LEDs to prevent permanent damage. After cooling, the LEDs restart normally until the cycle repeats.

26. C — Battery voltage and charging system output are within normal ranges, eliminating overcharging as the cause. The inter-connect cables becoming extremely hot indicates excessive heat generation at the cable connections. Corroded or loose terminals introduce resistance at the connection points, and the normal charging and discharging current flowing through this resistance produces heat according to $P = I^2R$. Cleaning and tightening the terminals eliminates the resistance and stops the heat generation.

27. A — With the horn button released, both coil terminals read the same voltage (12.4V), meaning no potential difference exists across the coil and no current flows — the relay is de-energized. When the button is pressed, the control terminal drops to 0.1 volts because the button provides a ground path, creating a 12.3-volt difference across the coil that drives current through it. This confirms the horn button and control circuit are functioning correctly.

28. D — The symptoms correlating directly with road surface conditions point to a physical connection that moves under vibration. The blue wire in the SAE J560 connector carries both power and the communication signal to the trailer ABS module. A loose pin in the connector, a damaged cord

conductor, or a corroded connection at either end of the blue wire circuit intermittently loses contact during rough road vibration, causing the module to lose power or communication briefly.

29. B — At 48 milliamps (0.048 amps) continuous draw from a 400 amp-hour battery bank, the theoretical discharge time is 400 ÷ 0.048 = approximately 8,333 hours, or approximately 347 days. Since the batteries are dying in only four days, the 48-milliamp parasitic draw is clearly not the cause. Another factor — a battery with a high internal self-discharge rate, an intermittent draw that was not present during the test, or a charging system deficiency — is responsible.

30. A — Moisture inside the headlight housing creates a destructive cycle when the bulb heats up. Water on or near the socket contacts heats and expands as steam, which can physically push the bulb slightly out of full contact with the socket, gradually increasing resistance at the connection. As resistance increases, the circuit eventually opens and the light goes out. When the assembly cools, moisture condenses, the bulb reseats, and the cycle can begin again.

31. D — ABS, engine brake, and cruise control all require vehicle speed data to function. If the vehicle speed sensor itself has failed or its wiring has an open or short, no speed data is generated for broadcast on the data bus. Every module that depends on speed data — and there can be many — loses that input simultaneously and sets a communication or data-not-available fault code. Replacing the sensor or repairing its circuit restores data to all affected systems at once.

32. B — Acid spray patterns inside the battery box that do not correspond to overcharging suggest excessive electrolyte displacement during high-rate charging events. A dual-alternator system can produce very high charging current, particularly after the batteries have been partially discharged during extended idle or hotel load usage. This high-rate charging causes vigorous gas generation and electrolyte bubbling that forces acid out through the cell vents.

33. A — Both technicians describe necessary components of a complete charging system evaluation. Testing at idle with no loads verifies the regulator maintains proper voltage at minimum alternator speed. Testing at 2,000 RPM under maximum load verifies the alternator can produce its rated amperage and maintain voltage when demand is highest. Skipping either condition provides an incomplete picture of charging system health.

34. C — The "NO BUS" message is a specific diagnostic indication that the instrument cluster has lost all communication with the J1939 data bus. Without bus data, the cluster cannot display speed, RPM, temperature, or any other parameter received from other modules. All gauges default to zero and warning lights controlled by bus data go inactive. The check engine light may remain illuminated because it defaults to on when communication is lost as a safety precaution.

35. D — A completely dead auxiliary outlet with 0 volts present at all times is most commonly caused by a blown fuse. Fuses are the most frequent failure point in simple accessory circuits and the easiest to check. The fuse designation chart identifies which fuse protects the sleeper outlet circuit, and a visual inspection or test light check confirms whether the fuse element is intact. If the fuse is blown, the underlying cause of the overcurrent must also be investigated.

36. B — A completely dead electrical system — nothing works at all — means no power is reaching any circuit on the vehicle. The most upstream components in the power distribution system are the battery connections and the main fusible links that connect the battery bank to the vehicle's electrical system. A disconnected battery cable, a severely corroded battery terminal, or a blown main fusible link cuts power to the entire vehicle before it reaches any fuse panel, relay, or switch.

37. A — The park switch cam profile determines at which point in the motor's rotation the park switch opens and stops the motor. If the replacement switch has a different cam profile or contact alignment than the original, the wipers will park at an incorrect position on the windshield. Verifying the replacement part matches the original's specifications ensures the wipers return to the correct rest position at the base of the windshield.

38. C — The right-side clearance lights working normally eliminates the headlight switch, the main fuse, and the common power feed as causes — these are shared by both sides. All marker lights working on both sides confirms the marker circuit is healthy. The fault is isolated to the left clearance circuit specifically — an open in the dedicated power feed wire, a disconnected connector, or a failed ground connection that serves only the left-side clearance lights.

39. D — Heat-damaged insulation, even if the conductor appears intact, is compromised and will continue to deteriorate. The insulation has lost its protective properties and may crack, split, or crumble under continued heat exposure, eventually exposing the conductor and creating a short-to-ground risk. The entire cable must be replaced with the correct gauge, and the new cable must be routed away from the heat source with proper high-temperature clamps.

40. C — The sensor has already been replaced and the code returns, eliminating the sensor itself as the cause. The DTC specifically indicates high resistance, which points to the wiring path between the module and the sensor. Corrosion on connector pins, a damaged wire with broken strands, or a high-resistance splice in the sensor circuit creates the elevated resistance the module detects. Inspecting the entire wire path from module to sensor locates the resistance source.

41. A — Communication faults that correlate directly with wet weather and resolve when the vehicle dries indicate water is reaching a bus wiring connection and affecting signal integrity. Water bridging the CAN_H and CAN_L pins in a connector creates a low-resistance path between the two wires that corrupts the differential signal. When the water evaporates, the connection returns to normal and communication is restored. Sealing the affected connector prevents recurrence.

42. C — A system voltage of 15.1 to 15.2 volts exceeds the normal 13.5 to 14.5 volt range by a significant margin. This overcharging condition will boil battery electrolyte, accelerate plate degradation, and damage electronic modules if sustained. The voltage regulator has likely failed in a full-field or near-full-field condition, allowing the alternator to produce uncontrolled high voltage. The charging system must be diagnosed and repaired immediately.

43. D — The solenoid plunger physically engaging confirms the control circuit and the mechanical drive mechanism are working. The motor not spinning despite engagement means the main

electrical contacts inside the solenoid are not completing the high-current circuit to the motor windings. The contact disc may be too worn, pitted, or burned to bridge the main terminals, or the contacts may close but with such high resistance that negligible current reaches the motor.

44. B — Heated mirrors typically draw 3 to 5 amps each. During extended idling in cold weather, battery voltage can gradually decline if the alternator's idle output does not meet the combined electrical demand. If the heated mirrors are wired through the low voltage disconnect system, the LVD may cut power to the mirror circuit when voltage drops below its threshold, even though the ignition is on and other systems continue to operate.

45. A — A replacement instrument cluster must be configured with vehicle-specific parameters to properly communicate with and display data from all modules on the bus. If the cluster has not been programmed to recognize the ABS module's message identifiers or does not have the correct ABS system configuration parameter set, it may default the ABS warning light to the on state because it cannot verify the ABS system's operational status.

46. D — A high-resistance ground in the trailer wiring forces the right turn signal's return current to seek alternate paths back to ground. The easiest alternate path is through the marker light filaments — which are connected to the same ground bus — creating a dim flash in the marker lights as the turn signal current passes through them. The tractor lights are unaffected because they use separate ground paths on the tractor chassis.

47. C — A battery that reads 12.68 volts immediately after charging but drops to 12.22 volts within two minutes has a severe internal defect. A healthy battery holds its voltage for hours after charging. Rapid voltage decline indicates the battery cannot sustain stored energy — the internal defect creates a discharge path within the battery that quickly dissipates the charge. The battery must be replaced regardless of other test results.

48. B — A body controller module must be configured with the specific vehicle's option codes and wiring assignments before it can control lighting outputs. Different trucks of the same model may have different lighting configurations — additional clearance lights, auxiliary work lights, or optional marker packages. Without the correct configuration, the BCM communicates on the bus but does not activate any outputs because it has no instructions mapping switch inputs to specific lighting circuits.

49. A — A dual-filament combination light assembly has specific terminal positions for the brake filament and the turn signal filament. If the replacement assembly's connector has a different internal pin orientation than the original, the brake light wire may be aligned with an unused or incorrect terminal position. The turn signal filament connects properly by chance, but the brake filament wire does not make contact with its intended terminal.

50. D — The fan clutch engaging at key-on regardless of temperature indicates either the ECM is commanding it on or the solenoid circuit has a fault causing default-on operation. Many heavy-duty fan clutch systems default to the engaged position for safety — if the solenoid loses power or

the control circuit opens, the fan runs continuously to prevent engine overheating. The scan tool reveals whether the ECM is intentionally commanding the fan or whether the control circuit has a fault.