PRACTICE EXAM 11: ASE T6 SIMULATION

1. A technician is diagnosing a circuit fault on a heavy-duty truck. With the circuit energized, the technician measures 12.4 volts at the fuse output terminal and 12.4 volts at the switch input terminal. At the switch output terminal, the reading is 0 volts. What component has failed?

A. The switch is open and not passing voltage to the downstream circuit

B. The fuse has a hidden internal open that appears intact but blocks voltage after the switch loads the circuit

C. A short-to-ground between the switch output and the load is pulling all voltage to zero

D. The DMM ground lead has lost contact, producing a false zero reading at the switch output

2. A heavy-duty truck's three batteries are connected in parallel. The technician measures the open circuit voltage of the bank and reads 12.35 volts. The technician then disconnects each battery and measures individually: Battery 1 reads 12.60 volts, Battery 2 reads 12.58 volts, and Battery 3 reads 10.48 volts. What does Battery 3's reading indicate?

A. Battery 3 is deeply discharged but structurally sound and needs slow charging before retesting

B. Battery 3 has a loose terminal connection that produces an artificially low voltage reading

C. Battery 3 has a dead cell — the reading of approximately 10.5 volts represents five functional cells with one producing no voltage

D. The battery bank's combined reading of 12.35 volts proves all three batteries are within acceptable range

3. A commercial vehicle's alternator output measures 14.3 volts at the B+ terminal with the engine running at 2,000 RPM. The technician then turns on headlights, blower on high, heated mirrors, and all marker lights. The voltage drops to 14.0 volts and the amperage output increases from 45 amps to 120 amps. What do these readings indicate?

A. The voltage regulator is failing because it cannot maintain the original 14.3-volt output under load

B. The alternator stator has a developing fault that reduces output under heavy electrical demand

C. The alternator's drive belt is beginning to slip under the increased load, reducing effective output

D. The alternator and voltage regulator are functioning normally — the slight voltage decrease with increased amperage output is a normal regulator response to higher electrical demand

4. A truck driver reports that the right rear turn signal on the trailer does not flash but instead glows dimly and steadily when the right turn is activated. The left trailer turn signal and all tractor lights work correctly. What is the most likely cause?

A. A failed turn signal flasher that cannot pulse the right-side output to the trailer

B. A high-resistance connection in the trailer's right turn signal circuit — either in the green wire at the J560 connector, the trailer cord, or the trailer wiring — reducing current below the level needed for full-brightness flashing but allowing enough for a dim steady glow

C. A shorted right rear bulb on the trailer drawing all available current and preventing other right-side bulbs from illuminating

D. An incorrect bulb type installed in the trailer's right rear socket producing dim illumination

5. A technician connects a DMM between the positive terminal of Battery 1 and the positive terminal of Battery 2 in a parallel-connected battery bank. The reading is 0.35 volts. What does this measurement indicate?

A. Excessive resistance in the inter-connect cable or its terminal connections between the two batteries, creating a 0.35-volt drop across the link

B. Normal voltage variation between two batteries in a parallel bank that will self-equalize over time

C. Battery 2 has a weak cell producing 0.35 volts less than Battery 1

D. The inter-connect cable polarity is reversed, creating a 0.35-volt opposing potential

6. A heavy-duty truck's scan tool retrieves a DTC from the ECM indicating "Injector Circuit #3 — Open." The technician measures the resistance of the #3 injector and reads 12.2 ohms — within the 11 to 14 ohm specification. What should the technician check next?

A. Replace the injector because the code indicates an internal intermittent open that only appears under operating temperature and pressure

B. Replace the ECM driver circuit because the injector tested good and the module must be at fault

C. The wiring and connectors between the ECM and the #3 injector for an open or high-resistance connection that prevents the ECM from seeing the injector's correct resistance

D. The fuel rail pressure sensor because low fuel pressure can trigger injector circuit codes

7. A truck's dome light illuminates normally when the door is opened, dims over five seconds after the door is closed, and then turns off. The driver reports this is a new behavior — previously the light went off immediately when the door closed. What is the most likely cause?

A. A failing dome light bulb with increasing filament resistance that causes a slow fade instead of an instant shutoff

B. A corroded door jamb switch that provides diminishing ground signal as it slowly opens

C. A body controller module that has developed an internal capacitor fault extending the timer beyond its designed cycle

D. The vehicle may have had a software update, module reset, or BCM replacement that activated the factory-programmed courtesy light delay feature that was not previously enabled

8. A technician is performing a voltage drop test on a truck's starter circuit positive cable during cranking. The reading is 0.2 volts. The technician then tests the ground cable and reads 0.15 volts. What do these combined readings tell the technician?

A. The total cable voltage drop of 0.35 volts is excessive and both cables should be replaced

B. Both the positive and ground cables are within specification — 0.2 volts is below the 0.5-volt positive-side maximum and 0.15 volts is below the 0.3-volt ground-side maximum

C. The positive cable is within specification but the ground cable reading is borderline and should be monitored

D. The readings are only valid if the battery voltage during cranking was simultaneously recorded

9. A commercial vehicle's wiper motor runs normally on all speeds but produces a loud grinding noise during operation that was not present before. The wiper arms sweep correctly and the park function works. What is the most likely cause?

A. A worn wiper transmission linkage pivot ball that produces noise as the arms travel through their arc

B. A loose wiper arm nut allowing the arm to slip on the output shaft during each sweep

C. Worn internal gears in the wiper motor's gear reduction mechanism producing mechanical noise during rotation

D. A misaligned wiper motor mounting that allows the output shaft to contact the cowl panel

10. A heavy-duty truck is equipped with a low voltage disconnect system. The LVD activates and disconnects hotel loads when battery voltage reaches 12.0 volts. The driver reports the LVD activated after only two hours of sleeper use without engine idle. The batteries were tested and hold a full charge. The charging system tests normal. What should the technician investigate?

A. The total current draw of all hotel loads to determine if the combined draw exceeds what the battery bank can sustain for two hours without the engine running

B. The LVD module's voltage threshold calibration, as it may be set incorrectly and activating at a higher voltage than 12.0

C. The alternator for an intermittent undercharging condition that left the batteries only partially charged before shutdown

D. The battery bank's amp-hour capacity rating to determine if the batteries are undersized for the sleeper cab accessories installed

11. A truck's electronic instrument cluster displays "CHECK ENGINE" and the yellow engine warning light illuminates. The scan tool retrieves a DTC indicating high exhaust backpressure. The driver reports no driveability concerns. What does this code indicate from an electrical system diagnostic perspective?

A. An exhaust system restriction has caused physical damage to the backpressure sensor wiring harness

B. The check engine light circuit has a wiring fault that causes it to illuminate with false codes

C. The instrument cluster is misinterpreting a data bus message and displaying an incorrect warning

D. The ECM received a signal from the exhaust backpressure sensor indicating higher-than-normal pressure — the sensor circuit, the data bus, and the cluster warning light system are all functioning correctly by detecting and reporting an exhaust system condition

12. A commercial vehicle's left turn signal flashes normally on the tractor. When the trailer is connected, the left turn signal on the tractor flashes normally but the trailer's left turn does not flash — however, the trailer's left marker lights glow dimly in sync with the tractor's turn signal flash rate. What is the most likely cause?

A. The trailer's left turn signal bulbs have all burned out, and the turn signal current is finding an alternate path through the marker filaments via a shared ground

B. An open in the trailer's yellow wire between the J560 connector and the left turn signal bulbs, forcing the turn signal current to path through the marker light circuit via a cross-connection or shared wiring point, producing the dim glow

C. A faulty turn signal flasher module that is sending a reduced-voltage signal on the left output

D. A corroded J560 ground pin that is limiting current to the trailer and preventing full turn signal brightness

13. A technician is diagnosing a truck where the driver complaints that electrical accessories occasionally lose power for a split second while driving over railroad tracks or severe bumps. The problem affects the radio, power outlets, and dome light but not the headlights or engine operation. What should the technician investigate?

A. A loose fuse panel mounting or intermittent fuse/fuse holder contact on the accessory circuit bus bar that momentarily loses connection under severe vibration impact

B. A failing alternator that drops voltage during impact events due to internal brush bounce

C. A body controller module that resets during severe vertical impacts

D. The battery hold-down bracket, as a loose battery can shift during impacts and momentarily disconnect

14. A heavy-duty truck's starter motor was recently rebuilt. After installation, the starter cranks the engine but a high-pitched whining noise is heard during cranking that was not present before the rebuild. The noise stops when the engine starts. What is the most likely cause?

A. The rebuilt starter has reversed field winding polarity causing the armature to spin against the intended rotation

B. The replacement brushes are harder than the originals and produce noise against the resurfaced commutator

C. The starter drive pinion gear is not meshing fully with the flywheel ring gear — possibly due to an incorrect shim thickness, a worn nose housing bushing, or a shift fork that does not push the drive into full engagement

D. The planetary gear reduction lubricant was not replaced during the rebuild, causing dry gear contact noise

15. Technician A says that a truck's CAN bus can continue to function if one of the two termination resistors fails open. Technician B says that a single missing termination resistor will cause signal reflections that may produce intermittent communication errors. Who is correct?

A. Technician A only

B. Technician B only

C. Neither Technician A nor Technician B

D. Both Technician A and Technician B — the bus may continue to function with degraded performance, but the missing termination allows signal reflections that can cause intermittent errors

16. A truck's power window operates normally in one direction but moves very slowly in the other direction. The window switch has been tested and functions correctly. What is the most likely cause?

A. A failing window regulator spring that assists movement in one direction but cannot compensate for friction in the other

B. A binding window channel or weatherstrip that creates excessive friction against the glass in one direction of travel, forcing the motor to work harder and move slower

C. A partially shorted motor winding that only affects the motor's torque in one rotational direction

D. A voltage drop in one of the two motor feed wires that reduces current for one direction but not the other

17. A commercial vehicle's scan tool shows the ABS module broadcasting valid wheel speed data for all four wheels. However, the speedometer reads zero while driving. The cruise control functions correctly. How can the cruise control work if the speedometer reads zero?

A. The cruise control module receives its speed data directly from the ABS module's wheel speed broadcasts on the J1939 bus, which are valid — the speedometer fault is internal to the instrument cluster's speed display function

B. The cruise control uses a separate dedicated speed sensor that is independent of the speedometer circuit

C. The cruise control operates based on throttle position rather than vehicle speed and does not require a speed input

D. The ABS module converts its wheel speed data to vehicle speed and sends it directly to the cruise module through a hardwired signal, bypassing the data bus

18. A heavy-duty truck's batteries are being replaced. The technician notices that the battery box has significant acid residue and the metal tray has corroded through in one corner. After installing new batteries, what additional action should the technician take?

A. Apply a coat of battery terminal protectant spray to the entire tray surface to prevent future corrosion

B. Fill the corroded hole with automotive body filler and paint the tray with rust-preventive coating

C. Replace or repair the corroded battery tray, neutralize the acid residue with a baking soda solution, and investigate the cause of the excessive acid accumulation — such as a previous overcharging condition or cracked battery case

D. Install the new batteries and monitor the tray condition at the next scheduled service interval

19. A truck's right headlight has a visibly different color temperature than the left headlight — the right appears bluish-white while the left appears normal yellowish-white. Both bulbs are the same manufacturer and part number. What is the most likely cause?

A. A voltage regulation fault delivering different voltages to the left and right headlight circuits

B. The right bulb is a newer replacement that has not yet reached its break-in color temperature, or it is from a different production lot with a slightly different gas fill or filament specification

C. The right headlight housing has a blue-tinted lens insert that shifts the apparent color of the bulb output

D. An incorrect alternator producing a frequency harmonic that affects bulb color temperature

20. A fleet technician notices that several trucks have CAN bus fault codes that appear only during the winter months and clear on their own during spring. No permanent communication faults are found during diagnosis. What seasonal condition is most likely responsible?

A. Cold ambient temperatures causing increased CAN bus wire resistance that degrades signal quality

B. Winter road salt spray contaminating exposed bus connectors or splices, introducing intermittent resistance between CAN_H and CAN_L when wet with salt water

C. Engine coolant temperature being lower in winter, causing the ECM to broadcast data at a different rate

D. Moisture from winter condensation forming inside connector housings and creating temporary low-resistance paths between bus wires

21. A truck's engine cranks at normal speed and the fuel system is confirmed operational. The engine fires briefly and then dies immediately when the key is returned from the start to the run position. What does this pattern suggest?

A. A faulty alternator that cannot support the ECM's power requirements once the starter stops providing cranking voltage

B. A fuel system fault where the fuel pump primes during the start position but shuts off in the run position

C. An ignition switch or power relay that delivers voltage to the ECM and fuel system during the start position but has a failed contact on the run position, cutting power to critical circuits when the key is released

D. An engine with low compression that requires continuous starter motor assistance to maintain running speed

22. A commercial vehicle's right rear tail light has a dual-filament bulb. The brake/turn filament works correctly, but the tail light filament is inoperative. The left rear tail light works on both filaments. The fuse is good. What is the most likely cause?

A. A faulty headlight switch that does not send power to the right rear tail light wire

B. A ground fault at the right rear light housing that affects only the lower-current tail light filament

C. A short between the tail light wire and the brake/turn wire inside the right rear harness

D. A burned-out tail light filament in the right rear bulb, a faulty socket contact for that filament, or an open in the wire feeding the right rear tail light circuit specifically

23. A heavy-duty truck has a recurring issue where the check engine light illuminates after extended highway driving but clears itself after the truck sits overnight. The DTC indicates intake manifold temperature above threshold. The cooling system tests normal. What electrical component should the technician investigate?

A. The ECM's internal temperature sensor that may be reading engine compartment heat as intake temperature

B. The intake manifold temperature sensor or its wiring for a fault that produces an artificially high reading when heat-soaked during extended driving

C. The data bus for a message corruption that replaces the intake temperature value with the coolant temperature during highway operation

D. The turbocharger wastegate solenoid, as excessive boost heat could elevate intake manifold temperature

24. Technician A says that when measuring parasitic draw, opening a door during the test invalidates the reading because it wakes modules. Technician B says that after closing the door, the technician must wait for all modules to return to sleep before taking a new reading. 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

25. A truck's alternator charges correctly at 14.2 volts, but the charge indicator light on the dash glows very dimly during normal operation. All other warning lights function correctly. What is the most likely cause?

A. A failing indicator bulb with increased filament resistance that does not fully extinguish when both sides of the bulb equalize

B. The alternator output exceeds 14.5 volts intermittently, creating a slight reverse voltage across the indicator

C. A body controller module PWM output that reduces indicator brightness when the charging system is functioning

D. A small voltage difference between the ignition feed side and the alternator output side of the indicator circuit — likely caused by a sense wire fault or a marginal connection that prevents the alternator-side voltage from fully matching the ignition-side voltage

26. A commercial vehicle's fuel gauge works correctly in the upper half of the range but reads empty when the tank is below half full, even when fuel is still present. What is the most likely cause?

A. A failing instrument cluster stepper motor that cannot accurately position the needle in the lower range

B. A cracked fuel gauge circuit board inside the cluster that opens when the stepper motor reaches the lower-range position

C. A fuel level sending unit with a worn or contaminated resistor element that produces an open circuit in the lower portion of the float travel, causing the gauge to default to empty

D. A fuel tank with an internal baffle that prevents the float from following the fuel level accurately below half tank

27. A truck's horn works when tested directly at the horn connector with a jumper wire but does not work when the horn button is pressed. The horn relay clicks when the button is pressed. What is the most likely cause?

A. The relay contacts are not closing properly or have excessive resistance, preventing adequate current from flowing through the relay to the horn despite the coil energizing

B. The horn button has excessive internal resistance limiting the relay coil current below the minimum engagement threshold

C. The clock spring has a partial open that allows enough current for the relay coil but not enough for the horn to operate

D. The horn relay is clicking but the load-side fuse has blown, preventing current from reaching the relay output terminal

28. A fleet of trucks equipped with electronic logging devices (ELDs) experiences a pattern where the ELD loses connection to the vehicle data port intermittently. The ELDs are connected to the nine-pin diagnostic connector. What should the technician investigate?

A. The ELD firmware version for a known bug that causes intermittent disconnection from the J1939 bus

B. The nine-pin diagnostic connector for loose, corroded, or damaged pins that create intermittent contact with the ELD plug, particularly under vehicle vibration

C. The CAN bus backbone for intermittent shorts caused by the additional load of the ELD on the bus

D. The engine ECM for a software conflict between the ELD data requests and the module's normal operating priority

29. A heavy-duty truck's starter motor turns the engine very slowly on the first crank attempt of the day but cranks normally on subsequent attempts within a few minutes. Batteries test good and cables pass voltage drop tests. What is the most likely cause?

A. An alternator diode that leaks current overnight, partially discharging the batteries by morning

B. Engine oil viscosity too high for overnight ambient temperatures, creating excessive resistance on the cold first crank that diminishes as the oil begins flowing

C. A starter solenoid contact disc that develops a surface oxide layer overnight that burns off during the first engagement

D. The starter motor brushes have developed flat spots from sitting in one position overnight, causing poor initial contact that improves once the commutator rotates and the brushes seat

30. A truck's electronic instrument cluster occasionally displays all zeros on the odometer for approximately two seconds before the correct mileage returns. No other cluster functions are affected. What is the most likely cause?

A. A data bus communication dropout that causes the cluster to lose its stored mileage data temporarily

B. An intermittent fault in the cluster's non-volatile memory circuit that briefly loses the stored odometer data before recovering from a backup memory location

C. A failing cluster power supply capacitor that causes a momentary voltage dip affecting only the odometer display circuit

D. Normal cluster behavior during a periodic memory verification cycle that refreshes the odometer display

31. A commercial vehicle's heated windshield system is inoperative. The system uses two relays — one for each heating zone. Neither zone activates. The fuse is good and the heated windshield switch sends the correct signal to the body controller module. The BCM scan data shows the module commanding both relay outputs on. What should the technician check next?

A. The wiring between the BCM output pins and the two relay coil terminals, and the relay coil ground circuits, to verify the BCM's commands are electrically reaching the relays

B. The heated windshield elements for open circuits that prevent current from flowing through the glass

C. The BCM for an internal fault that displays the correct command on the scan tool but does not actually deliver voltage at the output pins

D. The alternator output to confirm adequate voltage is available to power the high-current heating elements

32. A truck's left headlight beam aim appears lower than the right headlight, even though both have been recently adjusted. The left headlight housing shows no signs of damage or looseness. What should the technician consider?

A. A faulty headlight aiming tool that produced incorrect measurements on the left side

B. A burned-out low-beam filament on the left side that has been replaced with an incorrect bulb seating position

C. An asymmetric vehicle loading condition that tilts the cab and shifts the left headlight beam angle downward

D. The left headlight housing has warped internally from heat exposure, changing the reflector geometry and shifting the beam aim despite correct external adjustment

33. A heavy-duty truck's alternator produces a rhythmic clicking noise at idle that increases in frequency with RPM. The noise is coming from inside the alternator, not from the belt or pulleys. The charging output is within specification. What is the most likely cause?

A. A failing rectifier diode that arcs intermittently during each AC cycle, producing a click at the alternator's electrical frequency

B. A loose stator lamination that vibrates with each magnetic field reversal as the rotor poles pass

C. A worn alternator bearing that produces a rhythmic click as a damaged ball or roller contacts the race during each revolution

D. A loose rotor field winding connection that makes and breaks contact with each rotation

34. A technician is diagnosing a truck where the driver reports that the radio and CB system produce a rhythmic ticking noise that correlates with the turn signal flash rate, even when the CB is in receive-only mode. What is the most likely cause?

A. The turn signal flasher or relay producing electrical transients on the power supply bus that couple into the radio and CB power feeds, creating audible noise in the audio systems

B. The turn signal bulbs generating electromagnetic radiation that the CB antenna picks up during each flash

C. A faulty radio ground connection that allows turn signal current to path through the radio chassis

D. The turn signal wire routed too close to the radio antenna cable, inducing voltage with each flash

35. A commercial vehicle's power seat moves forward but does not move backward. The seat moves up and down normally. All functions share the same fuse and main connector. The fuse is good. What does the one-direction-only failure on a single axis indicate?

A. A seized seat track mechanism that binds in the rearward direction but slides freely forward

B. The forward/backward motor's switch contact for the rearward direction has failed, or the dedicated wire for that direction has an open, while the forward contact and the separate up/down circuits remain functional

C. The seat motor has a shorted winding that prevents rotation in the rearward direction

D. A body controller module output fault affecting the rearward motor command while all other seat commands function normally

36. A truck's headlight switch has three positions: off, parking lights, and headlights. In the headlights position, the headlights illuminate but the parking lights go out. In the parking lights position, the parking lights illuminate normally. What is the most likely cause?

A. A body controller module programming error that disables parking lights when headlights are commanded on

B. A faulty headlight relay that disconnects the parking light feed when it energizes the headlight circuit

C. A voltage overload on the lighting circuit that causes the parking light fuse to blow when headlights are added to the load

D. A headlight switch with a faulty internal contact arrangement that opens the parking light circuit when the switch is rotated to the headlight position

37. A fleet technician discovers that a truck's trailer ABS module repeatedly loses communication with the tractor ABS module during operation. The fault occurs more frequently when the truck is loaded than when empty. The trailer cord and connector have been replaced. What should the technician investigate?

A. The trailer ABS module mounting location for excessive vibration that worsens under loaded conditions

B. The tractor ABS module for a firmware fault that reduces communication priority when trailer weight data is present

C. The trailer chassis flex under load, which may be stressing the ABS wiring harness at a specific point, creating an intermittent open or short that becomes more frequent as the loaded trailer flexes more than when empty

D. The tractor-to-trailer air line connections for a pressure fault that affects the ABS module's power supply when the system is under load

38. A truck driver reports that the windshield washer pump runs when the wiper switch is turned on, even without pressing the washer button. The wipers operate normally. What is the most likely cause?

A. A faulty wiper/washer switch assembly that has an internal short between the wiper activation contacts and the washer pump contacts

B. A short between the wiper motor power feed wire and the washer pump power feed wire in the harness, causing both circuits to receive power simultaneously when the wiper switch is activated

C. A body controller module error that links the wiper command to the washer output

D. A washer pump relay with welded contacts that keeps the pump energized whenever power is available to the relay circuit

39. A heavy-duty truck's instrument cluster self-test during key-on shows all gauges sweeping correctly except the temperature gauge, which does not move at all during the sweep. After the engine starts, the temperature gauge reads correctly and tracks engine temperature normally. What is the most likely cause?

A. A faulty temperature gauge stepper motor that cannot perform the self-test sweep but functions correctly when receiving actual temperature data at a slower response rate

B. A data bus delay that prevents the temperature gauge from receiving the self-test command in time

C. Normal behavior on this vehicle model where the temperature gauge is excluded from the self-test sweep by design

D. The temperature gauge stepper motor or its driver circuit has a fault that prevents it from performing the rapid full-sweep self-test, although it can still respond to the slower, incremental position changes of normal temperature data during operation

40. A technician measures the current draw of each individual headlight on a truck. The left headlight draws 4.8 amps and the right headlight draws 5.1 amps. Both are 55-watt halogen bulbs on a 12-volt system. Using Watt's Law, what is the expected current draw for a 55-watt bulb at 12 volts, and are these readings acceptable?

A. Expected draw is approximately 4.6 amps ($I = 55 \div 12$), and both readings are slightly above calculated but within normal tolerance for the voltage variation and warm filament resistance of operating halogen bulbs

B. Expected draw is exactly 4.58 amps, and the right headlight at 5.1 amps is significantly out of specification and should be investigated

C. Expected draw is 6.6 amps per bulb, and both bulbs are significantly underpowered due to excessive voltage drop

D. Expected draw is 55 amps per bulb, and both readings indicate the bulbs are receiving only a fraction of their required current

41. A commercial vehicle's body controller module has been replaced. The new BCM communicates on the data bus and receives scan tool commands, but all lighting outputs remain inoperative. The old BCM controlled all lighting correctly before failure. What is the most likely cause?

A. A faulty replacement BCM with non-functional output driver circuits despite passing bus communication tests

B. The main lighting fuse has blown during the BCM replacement process and needs to be checked

C. A CAN bus configuration conflict between the new BCM and the existing modules preventing output activation

D. The replacement BCM has not been configured with the vehicle's specific option codes and lighting output assignments, so it cannot determine which outputs to activate for each switch input

42. A heavy-duty truck's starter engages and cranks the engine. During cranking, the technician measures battery voltage at 10.2 volts and starter motor terminal voltage at 8.8 volts. What is the total voltage drop in the cranking circuit, and what does it indicate?

A. Total drop is 1.4 volts, which is excessive — the combined positive and ground cable voltage drops exceed the 0.8-volt total (0.5V positive + 0.3V ground) maximum specification

B. Total drop is 1.4 volts, evenly split between the positive and ground cables at 0.7 volts each

C. Total drop is 1.4 volts, which is within acceptable limits for a heavy-duty diesel starter circuit during cold cranking

D. Total drop of 1.4 volts indicates the batteries are weak and unable to maintain voltage, not that the cables have excessive resistance

43. A truck's license plate lights are wired in parallel. Light A illuminates at normal brightness while Light B flickers intermittently. Both lights share the same fuse, power feed, and ground connection up to a splice point near the lights. What is the most likely cause of Light B's flickering?

A. A partially blown fuse that delivers inconsistent current to the parallel circuit

B. A corroded ground connection at the splice point affecting both lights but manifesting as flicker only in Light B

C. A loose bulb, corroded socket, or intermittent connection in Light B's individual circuit branch between the splice point and the light fixture

D. A body controller module output that pulses the license plate light circuit as a diagnostic indication of a detected fault

44. A driver reports that the truck's air horn and electric horn both sound weak. Battery voltage is 12.1 volts with the engine running at idle. What does the low system voltage with the engine running suggest?

A. The charging system is not producing adequate output, causing both horns to receive insufficient voltage and sound weak — the horn weakness is a symptom of the charging fault, not a horn circuit problem

B. The horn relay has excessive contact resistance that reduces voltage to both horn circuits equally

C. Both the air horn solenoid valve and the electric horn have simultaneously developed high internal resistance

D. The horn button has a partial ground fault that limits current flow to both horn relay circuits

45. A commercial vehicle's right front turn signal works correctly at the light housing, but the right turn indicator on the instrument cluster does not illuminate when the right turn is activated. The left turn indicator works normally for both the cluster indicator and the exterior light. What is the most likely cause?

A. A failed turn signal flasher module that does not send the right-side indicator signal to the cluster

B. A multifunction switch fault that activates the right exterior turn lights but does not close the right indicator circuit to the cluster

C. A body controller module output error that fails to relay the right turn status to the cluster display

D. A burned-out right turn indicator bulb or LED in the instrument cluster, or an open in the wire between the right turn circuit and the cluster's right indicator input

46. A heavy-duty truck's fuel gauge reads correctly at full and empty but reads higher than actual fuel level at mid-range — the gauge shows three-quarters when the tank is actually half full. What is the most likely cause?

A. A voltage regulation fault in the cluster that increases gauge drive current in the mid-range

B. A fuel level sending unit with a non-linear resistance curve — the resistor element produces correct resistance at the full and empty positions but incorrect resistance in the mid-range due to a worn or contaminated section of the resistor track

C. A data bus scaling error between the fuel level module and the instrument cluster that only affects mid-range values

D. An instrument cluster stepper motor calibration offset that is only apparent in the middle portion of the gauge arc

47. A technician is performing a CAN bus diagnostic on a truck with intermittent communication faults. The resistance between CAN_H and CAN_L at the diagnostic connector reads 60 ohms with the ignition off. The technician then turns the ignition on and measures again. The reading now shows 45 ohms. What does the change from 60 to 45 ohms with ignition on indicate?

A. Normal behavior because module transceivers add parallel resistance paths to the bus when powered up

B. A bus wiring fault that is activated by a switched power source that energizes with the ignition

C. A module with a failing bus transceiver that presents abnormally low resistance to the bus when powered, pulling the total resistance below the expected 60-ohm value

D. An expected reading because the 120-ohm termination resistors are powered by the ignition circuit and their resistance decreases when energized

48. A truck's electronic parking brake system applies correctly but releases slowly — taking approximately five seconds instead of the normal one-second release. The release solenoid valve clicks immediately when the release button is pressed. What is the most likely cause?

A. A restricted air line between the release solenoid valve and the spring brake chambers that limits the flow rate of air needed to compress the springs and release the brakes

B. A weak solenoid valve that opens partially, restricting airflow despite clicking to indicate engagement

C. A data bus communication delay between the parking brake switch and the release solenoid control module

D. Low system air pressure that requires additional time to build enough force to compress the brake springs

49. A fleet of trucks experiences a pattern where the dash voltmeter gauge reads 0.5 to 0.8 volts higher than the actual battery terminal voltage measured by a DMM on every truck. The trucks are different ages but all the same model. What is the most likely explanation?

A. Every truck in the fleet has a charging circuit voltage drop that inflates the cluster reading

B. A fleet-wide DMM calibration error that causes all handheld meters to read lower than actual

C. The trucks' dash voltmeter gauges have a known manufacturing tolerance that reads slightly above actual terminal voltage

D. The cluster voltmeter on this model reads voltage from a sense point closer to the alternator output than the battery terminals, and the charging circuit voltage drop between that point and the battery produces a consistently higher cluster reading

50. A medium/heavy truck's scan tool shows an active DTC from the transmission control module indicating "Output Speed Sensor — No Signal." The speedometer reads zero while driving. The technician replaces the output speed sensor. After replacement, the speedometer still reads zero and the code returns. What should the technician check next?

A. The transmission control module for an internal fault that cannot read the new sensor

B. The wiring between the TCM and the output speed sensor location — including the connector at the transmission, inline splices, and the TCM connector pin — for an open, short, or high-resistance fault that prevents the signal from reaching the module

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

D. The reluctor ring inside the transmission for damage that prevents the new sensor from generating a valid signal

PRACTICE EXAM 11: ANSWER KEY

1. A — Voltage is present at both the fuse output and the switch input, confirming the power feed up to the switch is intact. Zero volts at the switch output means the switch is not passing voltage to the downstream circuit — the switch contacts are open. The switch has failed internally and must be replaced to restore the circuit.

2. C — A battery reading approximately 10.5 volts has lost the output of one cell. Each cell in a six-cell battery produces approximately 2.1 volts — five functional cells produce 10.5 volts while the sixth contributes nothing. This dead cell was masked when the battery was connected in parallel with the two healthy batteries, which maintained the bank voltage at 12.35 volts by compensating for the weak unit.

3. D — The voltage dropping from 14.3 to 14.0 volts while amperage increases from 45 to 120 amps is the normal response of a properly regulated charging system to increased electrical demand. The regulator increases field current to produce more amperage, and the slight voltage decrease reflects the natural output characteristic of an alternator approaching a higher percentage of its capacity. Both readings remain within the normal 13.5 to 14.5 volt range.

4. B — A dim steady glow instead of a full-brightness flash indicates the circuit has enough continuity to pass a small amount of current but not enough for the bulb to illuminate fully. A high-resistance connection in the green wire path — at the J560 connector pin, within the trailer cord, or at a trailer-side connector — limits current flow to a fraction of what the bulb requires, producing the dim glow without enough current change for the flasher to produce a visible flash.

5. A — In a parallel battery bank, the positive terminals of both batteries should be at virtually identical voltage because they are directly connected by the inter-connect cable. A 0.35-volt reading between the two positive terminals means voltage is being dropped across the inter-connect cable or its terminal connections. This excessive resistance wastes energy as heat and prevents the batteries from sharing current efficiently.

6. C — The injector itself measures within specification, but the ECM detected an open in the circuit. The complete circuit includes the wiring from the ECM to the injector and back. A corroded connector pin, a damaged wire, or a high-resistance splice in the wiring between the module and the injector can produce an open-circuit or intermittent-open condition that the ECM detects even though the injector component tests good in isolation.

7. D — A dome light that illuminates on door opening, dims over five seconds, and then extinguishes is the behavior of a courtesy light delay feature. This is a standard programmable feature in many body controller modules. A software update, BCM replacement, or module reset may have activated a

factory delay setting that was previously disabled, causing the driver to perceive it as a new and unexpected behavior.

8. B — The positive cable voltage drop of 0.2 volts is well below the 0.5-volt maximum specification, and the ground cable voltage drop of 0.15 volts is well below the 0.3-volt maximum specification. Both cables are delivering cranking current with minimal resistance loss. The combined total of 0.35 volts confirms the cable infrastructure is in good condition and is not contributing to any cranking performance concerns.

9. C — The wiper motor's internal gear reduction mechanism converts high-speed armature rotation into low-speed, high-torque output. Worn gear teeth in the planetary set or worm gear produce a grinding noise during operation as the damaged teeth mesh improperly. The wipers sweeping correctly and parking properly confirm the gear train still functions but the worn teeth produce audible noise that will worsen progressively.

10. A — The batteries hold a full charge and the charging system is normal, eliminating those as causes. The LVD activating after only two hours means the hotel loads drained the batteries from full charge to 12.0 volts in that time. The technician must calculate the total current draw of all sleeper accessories — lights, heater, refrigerator, entertainment system — and compare it to the battery bank's capacity to determine if the drain rate exceeds what the batteries can sustain for the driver's expected usage period.

11. D — From an electrical system diagnostic perspective, every component in the chain is working correctly. The exhaust backpressure sensor detected an abnormal condition and sent a valid signal to the ECM. The ECM processed the data and generated a DTC. The warning message was broadcast on the J1939 bus to the instrument cluster, which displayed the alert. The electrical system successfully detected and communicated an exhaust system condition.

12. B — The trailer's left turn signal bulbs not flashing while the marker lights glow dimly in sync with the turn signal indicates the turn signal current is finding an alternate path through the marker circuit. An open in the yellow wire on the trailer side prevents the turn signal current from reaching its intended bulbs. The current instead paths through a cross-connection or shared wiring point into the marker filaments, producing the dim synchronized glow.

13. A — The affected circuits — radio, power outlets, and dome light — are typically powered through the same fuse panel section or accessory bus bar. The headlights and engine run on separate circuits from different power sources. A loose fuse panel mounting, a corroded bus bar connection, or intermittent fuse holder contacts on the accessory section would produce momentary power loss to all accessory circuits simultaneously during severe impact events while leaving other circuits unaffected.

14. C — A high-pitched whining noise during cranking that was not present before the rebuild suggests the starter pinion gear is not meshing fully with the flywheel ring gear. Incomplete mesh produces a high-pitched whine as the gear teeth skate against each other instead of fully engaging. An incorrect shim thickness, a worn nose housing bushing, or a shift fork that does not push the drive into full engagement prevents proper pinion-to-ring gear contact depth.

15. D — Both technicians are correct when combined. A CAN bus can sometimes continue to operate with a single termination resistor — the communication may still function at a reduced reliability level. However, the missing second termination allows signal reflections at the unterminated end that can interfere with new transmissions, producing intermittent data corruption and communication errors that may worsen under certain bus load conditions.

16. B — The switch has been verified functional, eliminating the control input as the cause. A window channel or weatherstrip that creates excessive friction in one direction of travel — typically upward, where the motor must also work against gravity — forces the motor to overcome both the weight of the glass and the friction simultaneously. In the opposite direction, gravity assists the motor and the friction is less significant, producing normal speed.

17. A — The ABS module broadcasts valid wheel speed data on the J1939 bus, and the cruise control module reads this data to maintain set speed — both are confirmed working. The speedometer's zero reading while bus data is valid means the instrument cluster's internal speed display function has failed — either its stepper motor, its data processing for the speed parameter, or its display driver. The bus data itself is proven accurate by the cruise control operating correctly.

18. C — Simply installing new batteries on a corroded, acid-damaged tray leaves the root cause unaddressed and accelerates damage to the new batteries' terminals and cables. The corroded tray must be replaced or repaired, the acid residue must be neutralized with a baking soda and water solution, and the cause of excessive acid accumulation — such as a previous overcharging condition or a cracked case on the old batteries — must be identified to prevent recurrence.

19. B — Both bulbs are the same manufacturer and part number, but halogen bulbs can vary slightly in color temperature between production lots due to minor differences in gas fill composition, filament geometry, or glass tint. A newer replacement bulb may appear slightly different from an older one that has aged. This is a manufacturing tolerance issue, not an electrical fault.

20. D — Winter conditions bring temperature cycling that causes condensation to form inside connector housings and splice enclosures. Water condensation between CAN_H and CAN_L pins creates a temporary low-resistance path between the two bus wires, degrading the differential signal and producing intermittent communication errors. When spring temperatures warm and dry the connectors, the moisture evaporates and the faults disappear until the next winter.

21. C — The engine firing during the start position proves fuel delivery, compression, and the starting circuit are all functional. The engine dying immediately when the key moves to the run position indicates a critical circuit — the ECM power feed, fuel pump relay, or main engine relay — is wired through a switch contact that works in the start position but has failed in the run position. This contact failure cuts power to engine-critical circuits only after the key is released.

22. D — The brake/turn filament working correctly proves the socket, ground connection, and main power feed to the right rear light are all functional. The left rear tail light working normally eliminates the headlight switch, tail light fuse, and common wiring as causes. The fault is isolated to the right rear

tail light filament specifically — it has burned out, the socket contact for that filament is not making connection, or the dedicated tail light wire to that fixture has an open.

23. B — The code appearing during extended highway driving and clearing after overnight cooling is a classic heat-soak pattern. The intake manifold temperature sensor or its wiring may have a fault — a heat-sensitive component, cracked solder joint, or marginal connector — that produces elevated resistance or an erratic signal only when fully heat-soaked after extended operation. When the engine cools overnight, the component contracts back to a functional state and the code clears.

24. A — Both technicians are correct. Opening a door during a parasitic draw test wakes multiple modules — the BCM, interior lighting timers, security systems, and others — that draw significant active current. This invalidates the reading because the test measures sleep-mode draw, not active-mode draw. After closing the door, the technician must wait the full 20 to 45 minutes for all modules to complete their shutdown cycles and return to sleep before taking a new baseline reading.

25. D — A properly functioning charging system should produce enough voltage on the alternator side of the indicator bulb to equalize with the ignition feed side, creating zero voltage differential and extinguishing the light. A dim glow indicates a small residual voltage difference exists — likely from a sense wire that is not connected to the optimal point or has a marginal connection, preventing the alternator-side voltage from fully matching the ignition side.

26. C — The gauge reading correctly at full and empty confirms the gauge mechanism, wiring, and upper and lower portions of the sending unit's resistor element are functional. The fault is in the mid-range section of the resistor track. A worn, contaminated, or damaged section of the resistance element in the float's mid-travel range produces an open circuit at those positions, causing the gauge to drop to the empty reading whenever the float is in the lower half of its travel.

27. A — The horn sounding with a direct jumper wire proves the horn itself is functional. The relay clicking proves the coil energizes when the button is pressed. The horn not sounding through the relay despite the coil clicking means the relay's load contacts are not making connection — burned, pitted, or mechanically stuck contacts prevent battery power on the input terminal from passing through to the output terminal and reaching the horn.

28. B — The nine-pin diagnostic connector is a mechanical plug-and-socket connection that endures constant vibration. The ELD plug inserted into the connector adds weight and leverage that can accelerate wear on the connector pins. Loose, corroded, or bent pins create intermittent contact that drops the ELD's communication link momentarily. Inspecting and repairing the connector restores reliable contact.

29. D — Batteries and cables have been verified as good, eliminating those as causes. A starter motor that sits in one position overnight allows the brushes to develop a slight oxidation or flat spot at their contact point on the commutator. On the first crank attempt, this poor initial contact limits current flow to the motor, causing slow cranking. Once the commutator rotates and the brushes seat against fresh copper surface, subsequent attempts crank normally.

30. B — All other cluster functions operating normally eliminates power supply, ground, and data bus faults. The odometer display momentarily showing zeros while the correct mileage returns indicates the cluster's non-volatile memory circuit that stores the accumulated mileage is experiencing a brief read failure. The module recovers from a backup memory location or re-reads the primary memory, restoring the correct display within seconds.

31. A — The BCM scan data confirms the module is internally commanding both relay outputs on. The relays not clicking means the electrical command is not physically reaching the relay coils. The wiring between the BCM output pins and the relay coil terminals — including connectors, splices, and the relay coil ground return — must be tested for opens or high resistance that prevent the BCM's voltage command from energizing the coils.

32. D — The headlight housing shows no external damage or looseness, and the aiming adjustment is correct by external measurement. Internal warping of the reflector — caused by prolonged heat exposure from the bulb — can shift the reflected beam pattern downward without any visible external indication. The reflector's geometry determines beam direction, and even a small change in reflector shape alters the beam aim independent of the external adjustment mechanism.

33. C — A rhythmic clicking noise from inside the alternator that tracks with RPM is characteristic of a bearing defect. A damaged ball or roller in the bearing produces a click each time it contacts a pit or spall in the bearing race during rotation. The frequency increases with RPM because the bearing rotates faster. Charging output may remain within specification initially, but the bearing condition will worsen and eventually cause alternator failure.

34. A — The turn signal flasher or relay creates an electrical transient on the vehicle's power supply bus each time it opens and closes the turn signal circuit. This transient propagates through the shared power wiring and couples into both the radio and CB radio power feeds. Without adequate power supply filtering in the audio equipment, the noise pulse is amplified and becomes audible through the speakers in sync with the flash rate.

35. B — The up/down function working correctly proves the shared fuse, main connector, and up/down motor are functional. The forward function working proves the forward/backward motor, its forward-direction wiring, and the forward switch contact are operational. The rearward function alone failing isolates the fault to the rearward-direction switch contact or the specific wire that carries the reverse-polarity signal to the motor for rearward movement.

36. D — The headlights illuminating correctly confirms the headlight circuit is functional. The parking lights working in the parking light position confirms those bulbs and wiring are good. The parking lights going out specifically when the switch moves to the headlight position indicates the switch's internal contact arrangement disconnects the parking light circuit when the headlight contacts close. A faulty contact design or worn internal mechanism in the switch is the cause.

37. C — The fault occurring more frequently under loaded conditions than empty is the key diagnostic clue. A loaded trailer flexes significantly more than an empty one — the chassis twists, bends, and

shifts under the weight. If the ABS wiring harness passes over or through a point that moves during chassis flex, the wire is repeatedly stressed. Under heavier loads, the greater flex creates more wire movement, increasing the frequency of the intermittent open or short.

38. B — The washer pump activating whenever the wiper switch is turned on — without pressing the washer button — indicates the washer pump circuit is receiving power from the wiper circuit. A short between the wiper motor power feed wire and the washer pump power feed wire in the harness creates an unintended bridge between the two circuits, energizing both simultaneously whenever the wiper switch delivers power to the wiper motor.

39. D — The temperature gauge not participating in the self-test sweep but reading correctly during normal operation indicates a stepper motor or driver fault that manifests only during rapid, full-range movement. The self-test requires the motor to sweep quickly from minimum to maximum and back — a demanding movement sequence. Normal temperature tracking requires only slow, incremental position changes. The motor can handle the slower movements but fails during the rapid sweep.

40. A — Using Watt's Law: I = P ÷ E = 55 ÷ 12 = 4.58 amps expected. The measured readings of 4.8 and 5.1 amps are slightly above the calculated value, but this is normal. The actual operating voltage may be slightly above or below exactly 12 volts, and the hot filament resistance of a halogen bulb varies from its cold resistance. Both readings fall within acceptable manufacturing and operational tolerance.

41. D — The replacement BCM communicates on the data bus and responds to scan tool commands, confirming the module's processor and communication interface are functional. All lighting outputs remaining inoperative despite correct bus communication indicates the module does not know which physical output pin corresponds to which lighting function. Without vehicle-specific option codes and output configuration, the BCM cannot map switch inputs to lighting outputs.

42. B — Battery voltage during cranking is 10.2 volts and starter motor terminal voltage is 8.8 volts — a total of 1.4 volts is being dropped across the cables and connections between the battery and the motor. The maximum acceptable total is approximately 0.8 volts (0.5V positive side + 0.3V ground side). At 1.4 volts total, the cranking circuit has excessive resistance that is stealing voltage from the starter motor, reducing cranking performance.

43. C — Light A illuminating at normal brightness proves the shared fuse, power feed, and ground up to the splice point are all functional. Light B flickering intermittently while Light A is steady isolates the fault to Light B's individual circuit branch between the splice and the fixture. A loose bulb in the socket, a corroded socket contact, or a damaged wire in that short branch creates the intermittent connection that produces the flicker.

44. A — Both the air horn and electric horn sounding weak simultaneously indicates a system-wide issue rather than individual horn faults. Battery voltage of 12.1 volts with the engine running is well below the normal 13.5 to 14.5 volt charging range, confirming the charging system is underperforming. Both horns receive insufficient voltage because the alternator is not maintaining proper system voltage. Diagnosing the charging system resolves both horn complaints.

45. D — The right turn signal working correctly at the exterior lights proves the flasher, multifunction switch, and right-side wiring are all functional. The left turn indicator working correctly on the cluster proves the cluster's indicator function is capable. The fault is isolated to the right turn indicator specifically — a burned-out indicator bulb or LED in the cluster, or an open in the wire or circuit path between the right turn signal circuit and the cluster's right indicator input.

46. B — The gauge reading correctly at full and empty confirms the gauge mechanism and the sending unit's resistance at the extreme positions are within calibration. The gauge reading higher than actual at mid-range indicates the sending unit produces incorrect resistance in the middle portion of the float travel. A worn or contaminated section of the resistor track in the mid-range alters the resistance curve, causing the gauge to misread at those positions while remaining accurate at the extremes.

47. C — With the ignition off, the 60-ohm reading confirms both termination resistors are properly connected and the bus backbone is healthy. With the ignition on, the reading dropping to 45 ohms means an additional parallel resistance path has appeared on the bus. A module with a failing bus transceiver that presents abnormally low resistance when powered adds this parallel path, pulling the total below 60 ohms. Systematic module disconnection with the ignition on identifies the faulty unit.

48. A — The release solenoid clicking immediately confirms the electrical command reaches the valve and it opens. The slow release — five seconds instead of one — indicates restricted airflow between the valve and the brake chambers. A kinked, partially blocked, or undersized air line limits the flow rate of compressed air needed to push back the spring brake diaphragm. The solenoid is fully open but the air cannot reach the chambers fast enough for rapid release.

49. C — A consistent 0.5 to 0.8 volt higher reading on the dash voltmeter across every truck in the same fleet — regardless of truck age — indicates a design characteristic of this model rather than individual faults. The cluster voltmeter on this model likely reads voltage from a sense point that is electrically closer to the alternator output than the battery terminals. The normal charging circuit voltage drop between that point and the battery produces the consistent offset.

50. B — The sensor has been replaced and the code returns, eliminating the sensor as the cause. The signal must travel from the sensor through a wiring harness — including a connector at the transmission, possible inline splices, and a connector at the TCM — to reach the module. An open, short, or high-resistance fault anywhere in this wire path prevents the valid sensor signal from reaching the module, producing the same "no signal" code regardless of sensor condition.