PRACTICE EXAM 13: ASE T6 SIMULATION

1. A technician is diagnosing a truck with multiple inoperative circuits — the blower motor, the power windows, and the radio are all dead. The headlights, marker lights, and engine operation are unaffected. The technician checks the cab fuse panel and finds a single maxi fuse that feeds the accessory bus bar has blown. What should the technician do after replacing the fuse?

A. Return the truck to service since the blown fuse was likely a one-time event caused by a voltage spike

B. Replace all individual accessory circuit fuses as a precaution since the maxi fuse failure may have damaged them

C. Investigate why the maxi fuse blew — check each accessory circuit for a short-to-ground or overcurrent condition before returning the truck to service, because a maxi fuse blowing indicates a significant overcurrent event

D. Upgrade the maxi fuse to the next higher rating to prevent future nuisance trips from the combined accessory load

2. A heavy-duty truck's battery disconnect switch is located on the frame rail between the battery bank and the main power distribution panel. The switch is in the on position. The technician measures 12.6 volts at the battery bank positive terminal and 11.9 volts at the main distribution panel input terminal. What does the 0.7-volt difference indicate?

A. The battery disconnect switch or its connections have excessive resistance, dropping 0.7 volts across the switch even with no significant load — this resistance will worsen dramatically under the high-current demands of cranking and will cause starting and charging problems

B. Normal voltage loss for a battery disconnect switch in good condition

C. The switch is partially turned to the off position and is not fully engaged

D. The battery bank has an internal imbalance that produces different voltages at different measurement points

3. A truck's scan tool retrieves a DTC from the ECM indicating "Intake Air Temperature Sensor — Signal Implausible." The sensor reads -15°F on the scan tool, but the truck has been parked indoors in a 70°F shop for 12 hours. What does "signal implausible" mean in this context?

A. The sensor has an internal calibration drift that reads colder than actual but is still within the ECM's acceptance window

B. The ECM detected a brief voltage spike on the sensor circuit that lasted less than one second

C. The ECM firmware is outdated and cannot correctly interpret the current sensor's resistance curve

D. The ECM compared the sensor reading against expected values — a reading of -15°F after 12 hours in a 70°F environment is physically impossible, so the module flags the data as implausible

4. A commercial vehicle's left front headlight produces a beam pattern that is noticeably scattered and diffused compared to the focused beam on the right side. Both bulbs are the same type and age. The left headlight housing is not cracked or damaged externally. What is the most likely cause?

A. A voltage regulation fault that delivers pulsed current to the left headlight, causing the filament to vibrate and scatter the beam

B. Internal moisture condensation or oxidation on the left headlight's reflector surface that scatters light instead of focusing it into a defined beam pattern

C. A misaligned left headlight housing that directs the beam at an angle the lens cannot properly focus

D. An incorrect replacement bulb with a filament positioned differently than the original, causing the reflector to project a distorted pattern

5. A fleet technician notices that a truck's alternator drive belt tensioner arm is at the extreme end of its travel range, near the minimum tension mark. The belt is the correct part number and was installed six months ago. What does the tensioner position indicate?

A. The tensioner spring has failed and must be replaced immediately to prevent belt loss

B. Normal tensioner position for a belt that has been in service for six months and has stretched within its designed wear range

C. The alternator bearings have seized, preventing the pulley from spinning and stretching the belt

D. The belt has stretched beyond its useful life and is no longer being maintained at adequate tension by the tensioner — the belt should be replaced even though it is only six months old, and the tensioner's spring tension should be verified

6. Technician A says that when checking for a short-to-ground in a wire, the circuit should be de-energized and the load disconnected before measuring resistance between the wire and chassis ground. Technician B says that a near-zero resistance reading between the wire and ground confirms the short-to-ground. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Technician B only

D. Neither Technician A nor Technician B

7. A medium/heavy truck's instrument cluster performs its key-on self-test normally — all gauges sweep and all warning lights illuminate. After the engine starts, the temperature gauge, oil pressure gauge, and voltmeter all read correctly, but the fuel gauge reads empty even though the tank was filled yesterday and the truck has been driven only 20 miles. The scan tool shows the ECM has no fuel system codes. What is the most likely cause?

A. A data bus communication fault preventing the fuel level data from reaching the cluster

B. A failed instrument cluster stepper motor affecting only the fuel gauge position

C. A faulty fuel level sending unit or an open in the direct analog wire between the sending unit and the cluster — the fuel gauge receives its signal through a hardwired sensor connection rather than the data bus

D. An ECM fuel calculation error that is broadcasting an empty fuel level on the J1939 bus

8. A truck's right rear combination light assembly has been replaced. After installation, the right rear turn signal works but the right rear brake light does not function when the brake pedal is pressed. The left rear brake light works normally. What is the most likely cause of the right rear brake light failure?

A. The brake light switch has an internal fault affecting only the right-side output terminal

B. The brake light wire was not connected to the correct pin on the replacement housing's connector, or the socket contact for the brake filament is not making proper connection with the bulb

C. The replacement assembly has an internal ground fault that prevents current flow through the brake filament

D. A blown fuse for the right rear brake circuit that only affects the right side of the vehicle

9. A heavy-duty truck's batteries have been replaced with new units. The technician connects the inter-connect cables and tightens the terminals. Before reconnecting the main negative cable to complete the circuit, what precaution should the technician take regarding the vehicle's electronic modules?

A. Verify that the ignition switch is in the off position and all electrical loads are turned off to prevent voltage spikes or inrush current surges that could damage electronic modules when the main circuit is completed

B. Start the engine within 10 seconds of reconnection to begin charging the new batteries immediately

C. Disconnect the alternator output cable to prevent the charging system from overcharging the new batteries during initial connection

D. Apply battery terminal protectant spray before reconnection to ensure maximum conductivity

10. A commercial vehicle's windshield washer system delivers fluid to only the driver-side nozzle. The passenger-side nozzle is completely dry. The washer pump sounds normal. What is the most likely cause?

A. A failing washer pump with a cracked impeller that cannot build adequate pressure for both nozzle lines

B. A faulty washer switch that only activates one nozzle delivery circuit at a time

C. A body controller module fault that commands fluid delivery to only one side of the windshield

D. A clogged passenger-side nozzle, a kinked delivery hose, or a disconnected hose fitting on the passenger-side line

11. A truck driver reports that the electric seat heater on the driver seat works intermittently — it functions sometimes when the switch is pressed but not other times. When it does activate, it heats normally. What is the most likely cause?

A. A failing seat heater element with a developing open that breaks contact when the driver shifts weight

B. An intermittent connection in the seat heater circuit — a loose connector under the seat, a damaged wire at the seat track pivot point, or a faulty seat heater switch contact that makes and breaks connection inconsistently

C. A body controller module that limits seat heater operation based on ambient temperature and cabin conditions

D. A thermal cutoff device in the heater pad that triggers prematurely and takes several minutes to reset

12. A truck's scan tool shows the transmission control module receiving a coolant temperature of 185°F from the J1939 bus. The instrument cluster displays 185°F on the temperature gauge. However, a mechanical temperature gauge installed directly in the engine coolant passage reads 210°F. What does the 25-degree discrepancy between the electronic reading and the mechanical gauge suggest?

A. The electronic readings are correct and the mechanical gauge is inaccurate due to gauge tolerance or incorrect installation location

B. The data bus is introducing a 25-degree calculation error during the message transmission

C. A CAN bus message conflict is reducing the temperature value between the ECM and the receiving modules

D. The ECM's coolant temperature sensor or its circuit has drifted and is reporting a lower temperature than actual — the mechanical gauge reading directly from the coolant provides the independent reference that confirms the electronic reading is inaccurate

13. A heavy-duty truck has a no-crank condition. The batteries are fully charged at 12.65 volts. When the key is turned to start, the solenoid does not click. The technician bypasses the clutch interlock switch by jumping across its connector terminals, and the starter cranks normally. What does this test confirm?

A. The starter relay is defective and must be replaced along with the clutch interlock switch

B. The ignition switch has a faulty start-position contact that intermittently fails to send the cranking signal

C. The clutch interlock switch is the cause of the no-crank condition — it is either failed, misadjusted, or has an open in its circuit

D. The neutral safety switch is out of adjustment and preventing the control circuit from completing

14. A commercial vehicle's power outlet in the cab works normally, but the driver reports that high-draw accessories such as tire inflators and small heaters blow the outlet fuse repeatedly. The outlet fuse is the correct rating. What should the technician explain to the driver?

A. The accessories being used likely draw more current than the outlet circuit is designed to handle — the fuse is doing its job by protecting the circuit from the overcurrent condition created by the high-draw device

B. The outlet fuse is defective and a higher-quality fuse from a different manufacturer should be installed

C. The power outlet connector has increased resistance that artificially limits current capacity below the fuse rating

D. The alternator output is insufficient to support high-draw accessories through the power outlet circuit

15. Technician A says that a truck's headlight circuit uses separate fuses for the left and right headlights so that if one fuse blows, the driver still has illumination from the other side. Technician B says that headlight circuits typically use a relay controlled by the headlight switch to handle the high current rather than routing it through the switch contacts. 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

16. A truck's electronic instrument cluster displays a "SERVICE TRANSMISSION" warning message. The scan tool shows the transmission control module has set a DTC for low transmission fluid temperature — the TCM reports fluid at -40°F. The truck was started in a shop at 70°F after sitting overnight. What is the most likely cause?

A. The transmission fluid has degraded to the point where its thermal properties have changed, producing an extremely cold reading at the sensor

B. An open circuit in the transmission temperature sensor wiring, causing the TCM to read maximum resistance and interpret it as the coldest possible temperature (-40°F)

C. A failed transmission oil cooler thermostat that is bypassing all fluid around the heat exchanger

D. A data bus communication error between the TCM and the instrument cluster that corrupts the temperature value

17. A technician is diagnosing a truck where the left headlight is completely inoperative. The right headlight works on both high and low beam. The left headlight fuse is good. The technician measures 12.2 volts at the left headlight connector power terminal with the headlights activated. What should the technician check next?

A. The left headlight's filament continuity by removing the bulb and testing it with a DMM

B. The headlight relay for an internal fault that reduces current to the left side only

C. The ground connection at the left headlight, since voltage is present at the power terminal but the light does not illuminate — a complete ground-side open would prevent current flow

D. The multifunction switch for an internal short between the left and right headlight contacts

18. A heavy-duty truck's batteries are being tested. The technician performs a specific gravity test on Battery 1 and records: Cell 1: 1.260, Cell 2: 1.255, Cell 3: 1.262, Cell 4: 1.258, Cell 5: 1.260, Cell 6: 1.259. What do these readings indicate?

A. The battery is fully charged with consistent cell readings — the maximum variation of 0.007 between cells is well within the 0.050 acceptable limit, confirming all six cells are healthy

B. Cell 2 at 1.255 is significantly lower than the others and indicates a developing cell weakness

C. The readings are invalid because specific gravity tests require the battery to be under load

D. The battery needs equalization charging because the cells are not perfectly balanced

19. A truck's right front marker light is inoperative. The technician connects a jumper wire directly from the battery positive terminal to the marker light power terminal. The light illuminates brightly. What does this test confirm?

A. The marker light's internal wiring has a partial short that only allows current from a direct battery connection

B. The light bulb and ground connection are functional — the fault is in the power delivery path between the fuse panel and the marker light

C. The battery has enough reserve capacity to power the marker light but the alternator cannot sustain the circuit

D. The marker light bulb and its socket are good, but the ground connection still needs to be independently verified — the jumper test only confirms the bulb illuminates when power and an existing ground path are provided

20. A commercial vehicle's scan tool retrieves a U-code from the ABS module indicating lost communication with the transmission control module. All other modules communicate normally, including the TCM communicating with the ECM and instrument cluster. What does this specific pattern suggest?

A. A global CAN bus backbone fault that intermittently drops the TCM from the network

B. A failing ABS module that cannot receive messages from any other module

C. A fault in the specific message exchange between the ABS and TCM — the TCM is broadcasting on the bus (proven by other modules receiving its data), but the ABS module is not recognizing the TCM's messages, possibly due to a configuration mismatch, a module-specific software issue, or a localized bus connection fault at the ABS module

D. A TCM firmware version incompatibility that prevents it from communicating with the ABS module's newer software

21. A truck's alternator output voltage reads 14.3 volts at the B+ terminal. The technician measures voltage at the battery positive terminal and reads 13.5 volts. The technician then measures at the ECM power input pin and reads 12.8 volts. What do these decreasing voltage readings along the circuit indicate?

A. Cumulative voltage drop through the charging and power distribution circuits — 0.8 volts lost between the alternator and battery, and an additional 0.7 volts lost between the battery and the ECM, with both drops exceeding acceptable limits

B. Normal voltage distribution in a heavy-duty truck's electrical system under moderate load conditions

C. A failing alternator that cannot sustain output voltage as load increases at downstream points

D. A battery that is absorbing excessive charging current, pulling down voltage at all downstream points

22. A heavy-duty truck's trailer has intermittent brake light operation. The tractor brake lights work consistently. The trailer marker lights, tail lights, and turn signals all function normally. Only the trailer brake lights are affected. What is the most likely cause?

A. An intermittent connection in the brake light wire at the trailer connector, the trailer cord, or within the trailer harness

B. A faulty brake light switch that sends an intermittent signal to the trailer circuit only

C. An intermittent high-resistance connection specific to the brake light circuit on the trailer — either at the J560 connector's yellow or green pin (which carries brake/turn), at a splice in the trailer harness, or at a connector feeding the rear brake lights

D. A body controller module that intermittently drops the trailer brake output

23. A technician discovers that a truck's battery hold-down bracket is missing and the batteries shift approximately one inch during hard braking. The battery terminals and cables appear undamaged. Why is this condition a safety concern even though the electrical connections appear intact?

A. The shifting batteries may contact the hood latch mechanism and prevent the hood from opening for service

B. Battery acid may slosh out of the vent caps during the shifting movement and damage surrounding components

C. The batteries may interfere with the steering linkage if they shift far enough to contact adjacent components

D. Battery movement can stress and eventually fracture the cable terminals, create intermittent connections during vehicle operation, and in severe cases allow the batteries to contact the vehicle frame or other metal components, creating a direct short-circuit and fire hazard

24. A commercial vehicle's scan tool reads the alternator field duty cycle from the ECM at 85% while the engine runs at 2,000 RPM with moderate electrical loads. The charging voltage is 14.1 volts. What does an 85% field duty cycle indicate?

A. The alternator is operating inefficiently and should be replaced because it requires excessive field current

B. The voltage regulator is commanding the field winding on for 85% of each PWM cycle to maintain the target voltage — this is a normal operating point for moderate electrical load conditions

C. The alternator stator has lost 15% of its output capacity due to a developing winding fault

D. The drive belt is slipping 15% of the time, requiring 85% field duty to compensate

25. A truck's power door lock actuator on the rear sleeper door locks but does not unlock. All other door locks operate normally in both directions. What is the most likely cause?

A. The sleeper door lock actuator has an internal fault that allows movement in the lock direction but not the unlock direction — either a stripped gear in one direction, a broken internal mechanism, or a failed motor winding for the unlock polarity

B. The body controller module has disabled the sleeper door unlock function as a security feature

C. A blown fuse that only affects the unlock circuit for the rear sleeper door

D. The lock switch has reversed polarity at the sleeper door connector, sending a lock command when unlock is pressed

26. A heavy-duty truck's engine cranks at normal speed but will not start. The technician notices the glow plug indicator light on the dash does not illuminate during the key-on prove-out. The ambient temperature is 25°F. Why is the inoperative glow plug indicator relevant to the no-start condition?

A. The glow plug indicator is wired in series with the fuel injection relay, and its failure has disabled fuel delivery

B. The indicator not illuminating during prove-out simply means the bulb is burned out, which has no connection to the no-start

C. The glow plug indicator is powered by the same fuse as the starter control circuit, so a blown fuse has disabled both

D. The inoperative indicator suggests the glow plug or intake air heater circuit may not be functioning — at 25°F, the engine may require preheated air or cylinder heating to achieve the combustion temperature needed to start a cold diesel engine

27. A technician is testing a truck's horn relay by substituting it with an identical relay from the headlight circuit. The horn now works. The headlights also work with the horn relay installed in the headlight position. What does this crossover test confirm?

A. Both relays are good and the original problem was an intermittent wiring fault that happened to resolve during the relay swap

B. The original horn relay socket has corroded contacts that prevented the original relay from functioning in that position

C. The original horn relay has failed — it did not function in the horn position, but the substitute relay works in both positions, and the original relay works in the headlight position, proving the relay is the variable that changed the outcome

D. The horn button has an intermittent ground fault that coincidentally resolved during testing

28. A fleet technician discovers that a group of trucks has elevated CAN bus error counts on the scan tool's network diagnostic page. No active DTCs are present and all modules communicate. The error counts increment slowly over time. What does an elevated error count without active faults suggest?

A. A marginal bus condition — possibly a connector with developing corrosion, a wire with partial insulation damage, or a module transceiver beginning to fail — that produces occasional signal errors not severe enough to trigger DTCs but degrading communication quality over time

B. Normal CAN bus operation that accumulates errors as part of the protocol's error-checking mechanism

C. A scan tool firmware bug that inflates the error count display on this vehicle platform

D. Electromagnetic interference from the engine ignition system that produces background noise on every vehicle

29. A heavy-duty truck's starter motor has been bench-tested and passes all electrical tests. When installed on the truck, the starter cranks the engine but produces a loud clunking noise at the start of each cranking event. The noise is a single clunk, not continuous. What is the most likely cause?

A. A cracked starter nose housing that allows the motor to shift during the initial torque application

B. Excessive clearance between the starter mounting surface and the bell housing, allowing the starter to slam forward when the solenoid engages the drive — a missing or incorrect shim, a worn mounting boss, or loose mounting bolts create the space that produces the clunk on initial engagement

C. A worn flywheel ring gear starter tooth that catches the pinion gear during the first revolution

D. The starter solenoid plunger is overshooting and slamming against its internal stop during engagement

30. A commercial vehicle's dome light circuit is controlled by the body controller module. The BCM log shows the dome light was commanded on 142 times in the past 24 hours. The driver reports opening the door approximately 6 times. What is the most likely cause of the excess door-open events?

A. A data bus communication error that duplicates the door-open message 20 times for each actual door event

B. A failing BCM module that generates phantom door events in its internal log

C. A faulty door jamb switch with worn or corroded contacts that intermittently makes and breaks contact due to vibration, temperature changes, or mechanical wear, registering each momentary contact closure as a separate door-open event

D. A parasitic draw on the dome light circuit that the BCM misinterprets as door activations

31. A technician is diagnosing a truck where the scan tool shows the ECM broadcasting a barometric pressure value that is 4 kPa lower than a known accurate weather station reading for the same elevation. The truck has been parked with the engine off for two hours. What does this discrepancy suggest?

A. Normal acceptable tolerance between the ECM's internal barometric sensor and external weather instrumentation

B. The engine's intake system has a restriction that affects the barometric sensor reading even with the engine off

C. The ECM's firmware has an incorrect elevation calibration table for the vehicle's current geographic location

D. The ECM's barometric pressure sensor has drifted from calibration, reading 4 kPa lower than actual atmospheric pressure, which will affect fuel delivery calculations and engine performance

32. A heavy-duty truck's right turn signal and right brake light are both inoperative on the tractor. The left side turn signal and brake light work normally. The right turn signal fuse is good. What does the simultaneous failure of both the right turn signal and right brake light on the same side suggest?

A. Two separate simultaneous faults — one in the turn signal circuit and one in the brake circuit — that coincidentally affect the same side

B. A common failure point that affects both the right turn signal and right brake light — since both functions share the same wire path and bulb filament on the right side, a single open in the shared green wire, a failed bulb, or a faulty socket affects both functions simultaneously

C. A faulty multifunction switch that has failed on both the right turn and the brake output contacts

D. A body controller module output driver failure affecting both the right turn and brake channels

33. A truck's electronic cruise control system maintains set speed but takes noticeably longer to resume to set speed after the driver cancels and re-engages the cruise than it did when the system was new. The engine has adequate power and the throttle responds normally to manual pedal input. What is the most likely cause?

A. The cruise control module's throttle authority ramp rate has slowed due to a calibration drift in the electronic throttle control system — a faulty throttle position sensor, a slow-responding throttle actuator,

or an ECM calibration issue is reducing the speed at which the module commands throttle changes during resume

B. The cruise control memory has degraded and can no longer store the set speed value accurately

C. The data bus latency has increased, slowing the communication between the cruise module and the ECM

D. The vehicle speed sensor has developed a lag in its signal response that delays the cruise module's feedback loop

34. A commercial vehicle's heated windshield operates on both zones but the driver reports it takes significantly longer to clear frost than in previous winters. The heating elements test within resistance specification. System voltage is normal. What additional factor should the technician investigate?

A. Whether the windshield was recently replaced with a non-OEM unit that has heating elements with a different watt density or grid pattern

B. The alternator output capacity for evidence of reduced maximum current that limits the heater circuit

C. The heated windshield relay contacts for increased resistance that reduces current delivery to the heating elements, lowering total heat output despite the elements themselves testing within resistance specification

D. The body controller module timer settings for the heated windshield cycle duration

35. A truck's left headlight dims noticeably when the left turn signal is activated and returns to full brightness when the turn signal flashes off. The right headlight is unaffected. This behavior repeats with every flash cycle. What is the most likely cause?

A. A failing left headlight bulb with increased filament resistance that makes it more sensitive to voltage fluctuations

B. A multifunction switch that internally connects the left headlight feed to the left turn signal circuit

C. A body controller module output fault that reduces the left headlight PWM duty cycle during turn signal activation

D. A high-resistance shared ground connection on the left side of the vehicle that causes current interaction between the headlight and turn signal circuits each time the turn signal pulses current through the shared return path

36. A heavy-duty truck's fuel gauge has been reading approximately 10% higher than actual fuel level for the past three months. The gauge read accurately before that. The technician grounds the sending unit wire at the tank connector and the gauge reads full. What does this test eliminate?

A. It eliminates the wiring and gauge as causes — the gauge responds correctly to a known-zero resistance input, confirming the gauge mechanism and wire path are functional

B. It eliminates the fuel sending unit as the cause, confirming the wiring has developed increased resistance over the past three months

C. It eliminates the instrument cluster module because grounding the wire tests only the analog input

D. It eliminates the fuel tank as a factor since the gauge response proves the system measures resistance correctly

37. Technician A says that when jump-starting a heavy-duty truck, the booster vehicle should be running during the jump-start attempt. Technician B says that running the booster vehicle allows its alternator to supplement the current delivery during cranking and reduces the strain on the booster vehicle's batteries. 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

38. A truck's electronic parking brake system applies when the switch is pressed but the apply force feels weaker than normal — the truck holds on level ground but slowly rolls on a moderate incline. The parking brake air system tests show normal pressures. What electrical component should the technician investigate?

A. The parking brake warning light circuit, as a dim warning light indicates reduced system voltage that also affects brake force

B. The CAN bus for a communication delay between the parking brake module and the air system controller

C. The parking brake apply solenoid circuit for a partial energization fault — excessive resistance in the solenoid wiring or a corroded connector may limit the solenoid's ability to fully open, restricting the air exhaust rate and preventing complete spring brake application

D. The vehicle speed sensor, as some electronic parking brake systems reduce apply force based on detected vehicle movement

39. A commercial vehicle's scan tool shows the ABS module receiving valid wheel speed data from all four wheels during normal driving. However, during an ABS activation event on slippery pavement, the driver reports that the left front wheel locks up momentarily before the ABS intervenes. What is the most likely cause?

A. A data bus communication delay that prevents the ABS module from receiving the left front speed signal quickly enough

B. A faulty ABS modulator valve for the left front channel that responds slower than the other channels, allowing the wheel to lock momentarily before the valve reduces brake pressure

C. An incorrectly calibrated left front wheel speed sensor that reports a higher speed than actual, delaying the ABS module's recognition that the wheel is decelerating toward lockup

D. A worn left front brake pad that generates less friction than the other wheels, causing it to lock before the ABS threshold is reached

40. A heavy-duty truck battery's built-in hydrometer indicator shows a dark/black color instead of green or clear. What does the dark indicator mean?

A. The battery electrolyte level is too high and needs to be reduced by removing excess liquid

B. The indicator ball is stuck and the reading is unreliable — a full specific gravity test of all cells should be performed

C. The battery has been recently fast-charged and the surface charge is giving a false dark reading

D. The battery electrolyte level is below the minimum line and the battery needs distilled water added before any further testing — the dark indicator means the hydrometer float ball is not submerged and cannot provide a color indication

41. A truck's right rear tail light glows very dimly — barely visible during the day. All other tail lights on the truck illuminate at normal brightness. The right rear bulb is new and the correct part number. A DMM at the socket measures 11.8 volts on the power terminal with the lights activated. What should the technician check next?

A. The right rear tail light's ground connection for high resistance, since adequate power is reaching the socket but the bulb glows dimly

B. The right rear tail light socket for a corroded or damaged contact that creates resistance between the terminal and the bulb

C. The alternator output voltage since 11.8 volts at the socket suggests a system-wide undercharging condition

D. The headlight switch for an internal fault reducing current capacity to the right rear output

42. A commercial vehicle driver reports that the cruise control system occasionally disengages on its own during highway driving. There is no pattern — it happens randomly. No DTCs are stored. The brake switch, clutch switch, and vehicle speed signal all test normal during static testing. What type of diagnostic approach would most likely identify the cause?

A. Replace the cruise control module since no other component has been identified as faulty

B. Reprogram the ECM with the latest software update to address possible cruise control calibration drift

C. Perform a parasitic draw test to determine if a power interruption is causing the cruise module to reset

D. Connect a recording scan tool or data logger that monitors cruise control status, brake switch state, clutch switch state, and vehicle speed simultaneously during actual highway driving to capture the exact input conditions at the moment of each disengage event

43. A truck's scan tool shows the body controller module commanding the marker light output on at 100% duty cycle, but the marker lights are flickering rapidly. The BCM output pin measures a steady 12.2 volts. What does steady voltage at the BCM output with flickering lights indicate?

A. The fault is downstream of the BCM — in the wiring, connectors, or ground path between the BCM output and the marker lights — an intermittent connection somewhere in the delivery path is causing the rapid flickering despite the BCM delivering steady voltage

B. The BCM's internal output driver has a PWM fault that produces a flicker frequency visible to the human eye but too fast for the DMM to detect

C. The marker light bulbs are nearing end of life and the aging filaments are vibrating at their resonant frequency

D. A CAN bus noise signal is modulating the marker light output downstream of the BCM

44. A heavy-duty truck's air compressor governor is controlled electronically by the ECM on newer vehicles. The compressor runs continuously and does not cut out at the normal 130 PSI threshold. System air pressure has reached 150 PSI and is still climbing. What is the most immediate safety action?

A. Disconnect the alternator field wire to reduce engine RPM and slow the compressor output

B. Wait for the mechanical safety relief valve to open at its preset pressure before taking any action

C. Shut off the engine immediately to stop the compressor from building dangerous over-pressure in the air system, then diagnose the electronic governor circuit for a fault preventing the ECM from commanding the compressor off

D. Disconnect the air compressor clutch wire to disable the compressor electrically while the engine continues running

45. A technician is performing a charging system voltage drop test. With the engine at 2,000 RPM and maximum load applied, the output-side drop between the alternator B+ and battery positive reads 0.3 volts. The ground-side drop between the alternator case and battery negative reads 0.6 volts. What does this identify?

A. Both the output and ground sides have excessive voltage drop requiring repair on both circuits

B. The output side is within specification at 0.3 volts, but the ground side at 0.6 volts exceeds the 0.3-volt maximum — the ground-side cable, connections, or ground straps have excessive resistance that must be repaired

C. Both readings are within acceptable limits for a heavy-duty truck charging circuit under full load

D. The alternator housing has developed internal resistance that inflates the ground-side reading

46. A truck's electronic throttle pedal has been replaced. After installation, the engine responds to the pedal but the scan tool shows a stored DTC for "Throttle Position Sensor — Correlation Error." The pedal functions but engine response feels slightly delayed. What does the correlation error indicate?

A. The replacement pedal's internal sensors produce a voltage range that does not match the ECM's expected calibration for this vehicle

B. The replacement pedal has reversed internal wiring that sends the signal on the wrong pin

C. The ECM requires a minimum 24-hour drive cycle to learn the new pedal's characteristics

D. The replacement pedal's dual TPS signals do not track each other within the expected tolerance — either the pedal has a manufacturing defect, or a calibration/relearn procedure needs to be performed after installation

47. A commercial vehicle's scan tool retrieves a DTC from the body controller module indicating "Left Rear Clearance Light — Open Circuit." The technician inspects the left rear clearance light and finds it illuminated normally. What could explain a stored open-circuit code with a working light?

A. The code was set during a previous condition — such as when the bulb was momentarily loose or the connector was briefly disconnected during maintenance — and the condition has since been resolved, but the stored code remains until manually cleared

B. The BCM is malfunctioning and generating false open-circuit codes for functional circuits

C. The open-circuit detection algorithm in the BCM is incompatible with the replacement bulb installed in the fixture

D. A CAN bus message error caused the BCM to misidentify which light output was affected

48. A heavy-duty truck's battery terminals have been cleaned and the connections reinstalled. The truck starts and runs normally. Two weeks later, heavy corrosion has returned on the positive terminal but the negative terminal is clean. What should the technician investigate?

A. The alternator for an overcharging condition that causes excessive outgassing concentrated at the positive terminal area

B. Whether the terminal protectant was applied to the negative terminal but accidentally skipped on the positive terminal during the service

C. The battery case near the positive terminal for a crack or a leaking cell vent cap that is allowing acid to seep onto the terminal — the concentrated corrosion on only the positive terminal suggests a localized acid source rather than general outgassing

D. The battery tray drainage system for a blockage that is pooling acid around the positive terminal

49. A truck driver reports that the windshield wipers occasionally skip or chatter across the glass instead of wiping smoothly. The issue is worse when the windshield is lightly misted rather than heavily wet. The wiper motor operates at the correct speed. What is the most likely cause?

A. A failing wiper motor gear reduction mechanism that produces uneven arm pressure during each sweep

B. Worn wiper blades that have lost flexibility and cannot maintain consistent contact pressure against the windshield surface, particularly when insufficient moisture is present to lubricate the glass-to-rubber contact

C. An incorrect wiper arm spring tension that is set too tight, causing the blade to bind against the glass

D. A body controller module fault that commands the wiper motor at an uneven duty cycle, producing hesitation during each sweep

50. A fleet of trucks has experienced a pattern where the electronic logging device connected to the nine-pin diagnostic connector resets intermittently during driving. The ELD manufacturer confirms the devices are functioning correctly on other fleet's trucks. All affected trucks are the same model. What vehicle-side issue should the technician investigate?

A. The engine ECM for a software conflict with the specific ELD manufacturer's data request protocol

B. The alternator for voltage instability that drops below the ELD's minimum operating voltage during load transitions

C. The CAN bus for an intermittent backbone fault that briefly drops all communication including the diagnostic connector

D. The nine-pin diagnostic connector and its mounting, wiring, and terminal condition for a fleet-wide quality issue — corrosion, loose pins, or a connector mounting that allows vibration-induced intermittent contact with the ELD plug

PRACTICE EXAM 13: ANSWER KEY

1. C — A maxi fuse protects the entire accessory bus bar and carries the combined current of all circuits fed by that bus. A maxi fuse blowing indicates a significant overcurrent event — not a minor fluctuation. Simply replacing the fuse without investigating the cause risks an immediate repeat failure or, worse, a fire if the underlying short-to-ground or overloaded circuit is still present.

2. A — With no significant load on the circuit (engine off, accessories off), there should be virtually zero voltage drop across the battery disconnect switch. A 0.7-volt drop under no-load conditions indicates severe resistance in the switch or its terminal connections. Under the 300+ amp cranking load, this resistance would produce a dramatic voltage drop that starves the starter of voltage and generates dangerous heat at the switch.

3. D — "Signal implausible" is a rationality check performed by the ECM. The module compares the sensor's reported value against what is physically reasonable given other known conditions. A reading of -15°F after 12 hours in a 70°F shop is thermodynamically impossible — the sensor, its wiring, or its connector has a fault producing a resistance value that corresponds to -15°F in the ECM's lookup table.

4. B — Both bulbs are the same type and the housing is externally undamaged, eliminating bulb and housing damage as causes. Internal moisture condensation or oxidation on the reflector's mirrored surface disrupts the precise focusing geometry that creates a defined beam pattern. Instead of reflecting light in a focused pattern, the degraded surface scatters light in random directions, producing the diffused beam the driver observes.

5. D — A serpentine belt stretches over time as the rubber compound ages and the internal reinforcement cords elongate. When the tensioner arm reaches the extreme end of its travel near the minimum tension mark, the belt has stretched beyond the tensioner's ability to maintain adequate tension. The belt should be replaced and the tensioner inspected for adequate spring pressure regardless of the belt's calendar age.

6. A — Both technicians are correct. The circuit must be de-energized and the load disconnected to prevent the meter from reading the load's normal resistance path to ground, which would produce a misleading near-zero reading even on a healthy circuit. After isolation, a near-zero resistance reading between the suspected wire and chassis ground confirms current has an unintended direct path to ground — the definition of a short-to-ground.

7. C — The temperature, oil pressure, and voltmeter gauges receiving correct data from the J1939 bus confirms the data bus and cluster are functioning. The fuel gauge on many commercial vehicles receives its signal through a direct analog wire from the fuel level sending unit rather than the data

bus. A faulty sending unit or an open in this dedicated wire prevents the fuel gauge from receiving valid data while all bus-fed gauges continue operating normally.

8. B — The right turn signal working proves the socket, ground, and main connector at the replacement housing are electrically connected for that filament. The brake light using a separate filament in the same dual-filament bulb requires its own dedicated wire connection to the correct socket contact. If the brake wire was not connected to the proper pin during installation, or if the socket contact for the brake filament is not engaging the bulb, only the brake function fails.

9. A — Reconnecting the main battery cable to a vehicle with multiple electronic modules can create a sudden inrush current as capacitors in various modules charge and modules initialize. Having the ignition off and all loads turned off minimizes this inrush. Some manufacturers also recommend connecting the negative cable slowly or through a resistor to prevent voltage spikes that could damage sensitive electronics during the initial reconnection.

10. D — The washer pump sounding normal confirms the pump motor and its electrical circuit are functional. The driver-side nozzle receiving fluid confirms the pump is building adequate pressure and the main delivery hose is intact. The passenger side receiving no fluid with the pump running and the driver side working isolates the fault to the passenger-side delivery branch — a clogged nozzle, a kinked hose, or a disconnected fitting on that specific line.

11. B — An intermittent electrical connection that sometimes makes contact and sometimes does not is the classic cause of a component that works sometimes and fails other times with no apparent pattern. A loose connector under the seat that shifts with driver movement, a wire that flexes at the seat track pivot point, or a switch contact that does not fully engage every time creates the inconsistent operation described.

12. D — The mechanical gauge reads directly from the coolant and provides an independent reference at 210°F. The ECM and all bus-connected modules agree on 185°F, but this simply means the ECM sensor is consistently producing a reading that the bus faithfully delivers to all receivers. The 25-degree discrepancy between the electronic chain and the mechanical reference confirms the ECM's coolant temperature sensor or its circuit has drifted from accurate calibration.

13. C — Jumping across the clutch interlock switch connector terminals bypasses the switch entirely, directly connecting the two wires that the switch normally connects when the clutch pedal is depressed. The starter cranking normally with the bypass proves every other component in the control circuit — ignition switch, relay, solenoid coil — is functional. The only component removed from the equation is the clutch interlock switch, confirming it as the cause.

14. A — Power outlets in commercial vehicles are protected by fuses sized for the circuit's wiring capacity, not for the maximum draw of any conceivable accessory. A tire inflator or small heater that draws more current than the outlet's fuse rating will blow the fuse every time. The fuse is functioning correctly by protecting the wiring from overcurrent. The accessories exceed the circuit's design capacity.

15. D — Both technicians are correct. Many commercial vehicle headlight circuits use separate fuses for left and right headlights so that a single fuse failure does not leave the driver without any forward illumination. Additionally, headlight circuits typically use relays to carry the full headlight current, with the dash switch controlling only the low-current relay coil circuit, protecting the switch contacts from the high current that headlights demand.

16. B — A -40°F reading is the classic indicator of an open temperature sensor circuit. NTC thermistors have high resistance when cold and low resistance when hot. An open circuit presents infinite resistance to the TCM, which the module interprets as the coldest possible temperature in its lookup table — typically -40°F, where the Fahrenheit and Celsius scales converge. The sensor wiring has an open that must be found and repaired.

17. C — Voltage present at the power terminal confirms the fuse, relay, switch, and power feed wiring are all delivering voltage to the headlight. Despite this voltage being present, the light does not illuminate. Since a bulb needs both power and a complete ground path to operate, the next logical check is the ground connection. A complete ground-side open prevents any current from flowing through the bulb regardless of how much voltage is present at the power terminal.

18. A — All six cells read between 1.255 and 1.262, with a maximum variation of only 0.007 between the highest and lowest cells. This is far below the 0.050 maximum acceptable variation. The readings of 1.255 to 1.262 all fall within the fully charged range (approximately 1.260 to 1.265). The battery is healthy with consistent cell chemistry across all six cells.

19. D — The jumper wire test confirms the bulb illuminates when provided with direct battery power, but it only proves the bulb and whatever ground path currently exists are functional. The test does not independently verify the ground connection — the existing ground path may have marginal resistance that allows the bulb to illuminate during the test but would cause problems under different conditions. A separate ground-side voltage drop test should be performed.

20. C — The TCM communicating successfully with the ECM and instrument cluster proves it is broadcasting on the bus and its transceiver is functional. The ABS module being the only one reporting lost TCM communication suggests the fault is specific to the ABS module's ability to recognize or process the TCM's messages — a configuration mismatch, a specific message identifier issue, or a localized bus connection fault at the ABS module's connector.

21. A — The progressive voltage decrease from 14.3 volts at the alternator to 13.5 volts at the battery to 12.8 volts at the ECM represents cumulative voltage drop through the distribution system. Each drop represents resistance in the wiring and connections between those measurement points. Both drops — 0.8 volts from alternator to battery and 0.7 volts from battery to ECM — exceed acceptable limits and must be addressed to ensure adequate voltage reaches all modules and loads.

22. C — The tractor brake lights working consistently eliminates the brake switch and tractor wiring. The trailer's other lighting functions operating normally eliminates the trailer cord, ground pin, and main power distribution. The intermittent fault affects only the brake light function, isolating it to the

specific circuit path carrying the brake/turn signal — a connector, splice, or wire section dedicated to that function on the trailer side.

23. D — Unsecured batteries that shift during vehicle operation create multiple hazards. The movement stresses cable terminals and connections, eventually fracturing them or creating intermittent contact. Repeated shifting can work terminals loose from the battery posts. In a worst case, the batteries can shift enough to contact the vehicle frame or battery box metal, creating a direct short between the battery terminals and grounded metal — producing an arc capable of causing an electrical fire.

24. B — The field duty cycle represents the percentage of time the voltage regulator keeps the rotor field winding energized during each pulse-width modulation cycle. An 85% duty cycle at moderate load is a normal operating point — the regulator is commanding the field on for 85% of each cycle to maintain the target 14.1-volt output. At light loads, duty cycle would be lower; at maximum loads, it would approach 100%.

25. A — The lock function working proves the actuator motor, power feed, and ground connection are all functional in one direction. The unlock function using the same motor with reversed polarity failing indicates the motor cannot operate in the reverse direction. A stripped internal gear, a broken mechanism that allows movement in only one direction, or a failed winding for the reverse polarity are all consistent with a one-direction-only actuator failure.

26. D — At 25°F ambient temperature, the intake air and engine metal are cold enough that a diesel engine may not achieve the compression-heated air temperature needed for reliable combustion without preheat assistance. The glow plug indicator not illuminating during prove-out suggests the preheat circuit may be completely inoperative — no indicator light, no glow plugs, and no intake air heating. This is directly relevant to the cold no-start condition.

27. C — The substitute relay works in the horn position, proving the horn circuit is functional. The original horn relay works in the headlight position, which might seem to prove the relay is good — but the headlight circuit and horn circuit have different current requirements and contact demands. The original relay fails specifically in the horn application, confirming it has degraded to the point where it cannot reliably control the horn circuit's specific load characteristics.

28. A — Elevated error counts that accumulate slowly without triggering DTCs indicate a marginal bus condition. The CAN protocol's error-checking mechanism catches and corrects individual bit errors, incrementing the error counter each time. A developing fault — corroding connector pins, partially damaged insulation, or a weakening transceiver — produces occasional errors that the protocol handles but that degrade overall communication quality and will eventually progress to an active fault.

29. B — A single clunk at the moment of engagement — not during continuous cranking — points to the starter shifting or slamming into position during the initial solenoid engagement. Excessive clearance between the starter mounting surface and the bell housing allows the motor body to move forward

under the engagement force before the pinion contacts the ring gear. A missing shim, a worn mounting boss, or incorrectly torqued bolts create this gap.

30. C — The BCM log accurately records each time the dome light circuit is activated by the door switch closing to ground. A worn or corroded door jamb switch that intermittently makes and breaks contact — from vibration, temperature cycling, or mechanical wear — registers each momentary contact closure as a separate door-open event. The 142 logged events versus 6 actual door openings confirms a faulty switch producing phantom activations.

31. D — The truck has been parked with the engine off for two hours, so there is no intake restriction, exhaust backpressure, or turbo boost affecting the sensor. The barometric pressure sensor should read true atmospheric pressure under these conditions. A consistent 4 kPa offset from the known-accurate weather station reading indicates the sensor has drifted from calibration, which will cause the ECM to miscalculate air density and adjust fuel delivery incorrectly.

32. B — On commercial vehicle rear combination lights, the right turn signal and right brake light share the same wire (green wire in the SAE J560 standard) and the same bulb filament. A single failure in this shared path — an open in the green wire, a burned-out turn/brake filament, or a faulty socket contact — simultaneously disables both the right turn signal and the right brake light because both functions depend on the same circuit.

33. A — The engine responding normally to manual throttle input confirms adequate engine power is available. The cruise control's slower resume response indicates the system's ability to command throttle changes has degraded. A faulty throttle position sensor producing a delayed signal, a slow-responding electronic throttle actuator, or an ECM calibration drift that reduces the cruise system's throttle ramp rate would all produce the gradually worsening resume performance described.

34. C — The heating elements testing within resistance specification confirms the elements themselves are not degraded. System voltage is normal, confirming adequate power is available. The relay contacts carrying the high current to the heating elements can develop surface corrosion or pitting over time, increasing contact resistance. This resistance reduces the actual current delivered to the elements below their rated capacity, producing less heat despite the elements being structurally sound.

35. D — The left headlight dimming in sync with the left turn signal and only on the left side is the classic symptom of a high-resistance shared ground. When the turn signal pulses current through the shared ground, the voltage drop across the resistance reduces the effective voltage available to the left headlight. Each turn signal on-cycle increases the ground-side voltage drop, dimming the headlight. Each off-cycle releases the ground, restoring full brightness.

36. A — Grounding the sending unit wire provides a zero-resistance input to the gauge, which should produce a full-scale (full) reading. The gauge responding correctly to this known input confirms the gauge mechanism and the wire between the cluster and the tank are both functional. The fault must be in the only remaining component — the fuel level sending unit — which is producing a resistance value that corresponds to a reading 10% higher than actual fuel level.

37. A — Both technicians are correct. Running the booster vehicle during a jump-start provides two benefits: the booster vehicle's alternator contributes additional charging current to supplement its batteries, and the running engine prevents the booster vehicle's own batteries from being deeply discharged during the high-current cranking event. This protects the booster vehicle's electrical system while providing maximum current to the disabled truck.

38. C — The air system testing at normal pressures eliminates the pneumatic supply as the cause. The parking brake apply solenoid controls the exhaust of air from the spring brake chambers — when energized, it opens to release air pressure, allowing the springs to apply the brakes. If the solenoid circuit has excessive resistance from corroded wiring or a deteriorated connector, the solenoid may only partially open, restricting air exhaust and preventing full spring extension and therefore full brake apply force.

39. B — The ABS module receiving valid wheel speed data from all four wheels during normal driving confirms the sensors and wiring are functional. The left front wheel locking momentarily before ABS intervention indicates a delayed response in the left front channel's modulator valve. A slow-responding valve cannot reduce brake pressure quickly enough to prevent the initial lockup, though it eventually activates and releases the wheel.

40. D — The built-in hydrometer indicator uses a colored ball that floats in the electrolyte. A dark or black indicator means the electrolyte level has dropped below the point where the ball is submerged — the ball has sunk to the bottom and is not visible through the indicator window. The battery requires distilled water to bring the electrolyte level above the plates and the indicator before any electrical testing can produce valid results.

41. A — The DMM reads 11.8 volts at the power terminal — acceptable voltage is reaching the socket. The bulb is new and correct. Despite adequate power, the bulb glows very dimly, which means current is being severely restricted. Since voltage is present at the power terminal, the restriction must be on the ground side — a high-resistance ground connection is preventing adequate current from flowing through the bulb to complete the circuit.

42. D — Intermittent cruise disengagement with no stored DTCs and all components testing normal during static testing requires real-time data capture during actual driving conditions. A recording scan tool monitoring multiple parameters simultaneously — cruise status, brake switch, clutch switch, vehicle speed, and throttle position — captures the exact input state at the moment of each disengage, revealing which signal triggered the cancellation.

43. A — The BCM output pin measuring a steady 12.2 volts confirms the module is delivering consistent power. Flickering lights despite steady BCM output means the interruption is occurring after the power leaves the BCM. An intermittent connection in the wiring, a loose splice, a corroded connector, or a poor ground connection between the BCM and the marker lights is causing the rapid make-and-break contact that produces the visible flicker.

44. C — An air compressor that will not cut out and is building pressure beyond its normal 130 PSI threshold toward dangerous levels is an immediate safety hazard. Air tanks, fittings, and hoses have maximum pressure ratings, and exceeding them risks catastrophic failure. Shutting off the engine immediately stops the compressor and prevents further pressure buildup. The electronic governor circuit can then be safely diagnosed without the risk of a pressure-related blowout.

45. B — The output-side voltage drop of 0.3 volts is within the 0.5-volt maximum specification for the positive charging path. The ground-side voltage drop of 0.6 volts exceeds the 0.3-volt maximum specification by double. The excessive ground-side resistance — in the alternator mounting, the engine-to-frame ground strap, or the battery ground cable — is the bottleneck limiting charging effectiveness despite the output side being healthy.

46. D — A correlation error DTC indicates the dual throttle position sensors inside the pedal assembly are not tracking each other within the expected tolerance range. Modern electronic throttle pedals use two independent sensors that should produce proportional but distinct voltage curves. If the two signals diverge beyond the programmed tolerance — due to a manufacturing defect or the need for a post-installation relearn procedure — the ECM flags the discrepancy and may limit throttle response as a safety measure.

47. A — A stored code represents a condition the BCM detected at some point in the past. If the bulb was momentarily loose in its socket, the connector was briefly disconnected during maintenance, or a vibration-related contact loss occurred and then resolved, the BCM would store the open-circuit code at the moment of detection. Once the condition corrected itself, the light resumed normal operation, but the stored code remains in memory until manually cleared.

48. C — Heavy corrosion concentrated on only the positive terminal while the negative remains clean indicates a localized acid source near the positive terminal rather than general outgassing that would affect both terminals. A crack in the battery case near the positive post or a leaking vent cap above the cells closest to the positive terminal allows acid to seep onto the terminal continuously, causing the rapid and concentrated corrosion recurrence.

49. B — Wiper blades are rubber components that degrade over time — UV exposure, heat cycling, and chemical contact harden the rubber and reduce its flexibility. Worn blades cannot maintain consistent contact pressure across the windshield surface, causing them to skip or chatter. The problem is worse with light mist because heavy rain provides lubrication that compensates for the blade's poor contact, while light mist offers insufficient lubrication.

50. D — The ELD manufacturer confirming the devices work correctly on other fleets eliminates the ELD hardware as the cause. All affected trucks being the same model suggests a vehicle-side commonality. The nine-pin diagnostic connector is the physical interface between the vehicle and the ELD — connector quality issues such as corroded pins, loose terminal retention, or a mounting design that allows excessive vibration would be consistent across a fleet of identical vehicles and would cause intermittent contact with the ELD plug during driving.