# PRACTICE EXAM 7: T6 SIMULATION (50 QUESTIONS)

1. A heavy-duty truck shows multiple unrelated symptoms: dim headlights, slow cranking, and erratic gauge behavior. The most likely common cause is:

A. Loose or corroded primary battery ground connection

B. Failed engine ECU producing system-wide faults

C. Failed body controller producing system-wide faults

D. Failed alternator producing AC ripple system-wide

2. A truck driver reports the dome light dims when the headlights are turned on, but both still operate. Tech A says this indicates excessive load on the alternator. Tech B says this indicates voltage drop in a shared circuit ground or power feed. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

3. A heavy-duty truck shows fault codes from multiple modules following a single short-circuit event in the cab. The most likely root cause of the multi-module codes is:

A. Permanent damage to multiple modules from the short

B. Voltage transients during the short event affecting multiple modules

C. Coincidental simultaneous module failures unrelated to the short

D. Failed body controller cascading faults to other modules

4. A truck driver complains that the dash gauges flutter and headlights flicker simultaneously during operation. The most likely common cause is:

A. Failed engine ECU producing data bus issues

B. Failed body controller producing erratic outputs

C. Loose battery cable connection at the terminal

D. Loose primary chassis ground connection at the engine block

5. A heavy-duty truck shows symptoms of charging system over-voltage (typically above 15 volts). Which downstream symptom is the LEAST likely consequence?

A. Reduced cranking torque from the starter motor

B. Premature battery failure from overcharging

C. Damaged electronic modules from over-voltage

D. Premature lamp failures from over-voltage

6. A heavy-duty truck driver reports that turn signals flash too fast (hyper-flash) after recent LED retrofit installation. Tech A says LEDs draw more current than incandescent bulbs causing the issue. Tech B says LEDs draw less current than incandescent bulbs causing the issue. Who is correct?

A. Tech A only

B. Both Tech A and Tech B

C. Tech B only

D. Neither Tech A nor Tech B

7. A heavy-duty truck shows a complaint of intermittent ABS warning lamp activation along with intermittent gauge cluster blackouts. The most likely common cause is:

A. Loose or corroded primary chassis ground connection

B. Failed ABS module unrelated to gauge issues

C. Failed body controller unrelated to ABS issues

D. Coincidental simultaneous module failures

8. Tech A says voltage drop in a battery ground cable affects every electrical circuit on the truck. Tech B says voltage drop in a battery positive cable also affects every circuit fed from that source. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

9. A heavy-duty truck shows fault codes for "low voltage" from multiple modules during cranking only. The codes do not return after the engine starts. The most likely cause is:

A. Multiple module failures producing simultaneous codes

B. Battery condition or starter cable resistance causing low voltage during cranking

C. Failed alternator unable to maintain voltage during cranking

D. Failed engine ECU producing communication faults during cranking

10. A heavy-duty truck driver reports radio interference appears when the headlights are turned on. Tech A says the headlight circuit may have an issue producing electrical noise. Tech B says the radio antenna may have a failure causing interference reception. Who is correct?

A. Tech A only

B. Both Tech A and Tech B

C. Tech B only

D. Neither Tech A nor Tech B

11. A truck shows symptoms of intermittent communication faults across the J1939 network. The truck has had no recent service. Which condition is the LEAST likely cause?

A. Loose or corroded primary chassis ground connection

B. Failed terminating resistor producing intermittent open

C. Wire damage at a specific cab-to-chassis flex point

D. Failed instrument cluster producing communication faults

12. A heavy-duty truck shows reduced cranking power along with dim accessory lighting. Battery testing shows full charge and capacity. The most likely cause is:

A. Failed alternator unable to maintain voltage

B. High resistance in the battery cable circuit affecting all loads

C. Failed starter motor unrelated to lighting issues

D. Failed body controller affecting both systems

13. Tech A says a failed alternator diode produces excessive AC ripple that can damage electronic modules and cause data bus faults. Tech B says AC ripple above 0.5 volts can produce communication faults on the J1939 bus. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

14. A heavy-duty truck shows symptoms of multiple dashboard warning lamps illuminated simultaneously after a recent jump-start. The most likely cause is:

A. Permanent damage to multiple modules from the jump-start

B. Reverse polarity during the jump-start damaging modules

C. Voltage transients during disconnect or reconnect affecting modules

D. Coincidental simultaneous module failures

15. A heavy-duty truck shows slow cranking that started after a recent alternator replacement. Battery testing shows discharged condition. The most likely cause is:

A. Failed starter motor unrelated to alternator replacement

B. Improper alternator installation reducing output and discharging batteries

C. Battery condition deteriorating coincidentally with alternator service

D. Wiring damage during alternator replacement affecting starter

16. A truck has had repeated battery replacements every 12 months. The fleet uses the same battery brand. The truck has had no other electrical service. Which diagnostic step is most appropriate?

A. Replace the batteries with a different brand

B. Replace the alternator because of charging issues

C. Replace the starter because of cranking load

D. Verify charging system operation and parasitic draw

17. Tech A says a starter motor's high cranking current draw can produce voltage drop affecting other circuits. Tech B says voltage drop during cranking is normal and does not require diagnostic action unless excessive. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

18. A heavy-duty truck shows symptoms of slow cranking only during cold weather operation. Warm-condition cranking is normal. The most likely cause is:

A. Failed starter motor with bearing wear

B. Failed alternator unable to maintain charge

C. Battery capacity reduced at cold temperatures combined with marginal cable resistance

D. Failed body controller affecting cranking circuits

19. A heavy-duty truck has had its starter motor replaced 5,000 miles ago. The driver now reports the truck cranks normally but the engine does not start. The most likely cause is:

A. Defective replacement starter from the supplier

B. Wiring damage during starter replacement

C. Battery condition unrelated to starter replacement

D. Engine fuel or ignition issue unrelated to starter

20. Tech A says heavy-duty truck batteries should be replaced as a complete bank when one battery fails. Tech B says individual battery replacement is acceptable when batteries are matched in age and capacity. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

21. A heavy-duty truck shows symptoms of intermittent no-crank events. Battery and starter testing show normal results. The most likely cause is:

A. Battery condition deteriorating despite passing tests

B. Loose or corroded battery cable connection

C. Failed starter motor unrelated to cranking issue

D. Failed alternator unrelated to cranking issue

22. A heavy-duty truck has had three different starter motor brands installed in 200,000 miles. The fleet has not addressed any other electrical issue. The most likely root cause of repeated starter failures is:

A. Battery condition or cable resistance creating excessive cranking load

B. Defective starter motors from each respective supplier

C. Incorrect starter motor part number for the application

D. Engine condition increasing cranking load

23. A heavy-duty truck has had repeated alternator failures along with repeated battery failures over the past 300,000 miles. The most likely common root cause is:

A. Coincidental failures of unrelated components

B. Defective alternators and batteries from suppliers

C. Operator behavior shortening component life

D. Charging system load demand exceeding capacity

24. Tech A says a failed alternator producing low output discharges batteries during operation. Tech B says a failed alternator producing high output overcharges batteries during operation. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

25. A heavy-duty truck shows symptoms of dim headlights along with slow cranking. The truck shows alternator output of 12.4 volts at idle with no load. The most likely cause is:

A. Failed alternator unable to maintain output voltage

B. Failed body controller affecting both systems

C. Battery condition unrelated to alternator output

D. Loose drive belt allowing alternator slip

26. A heavy-duty truck has had its alternator replaced twice in 100,000 miles. The driver reports both alternators failed with similar symptoms. The most likely cause is:

A. Defective alternators from the supplier

B. System-side issue destroying each alternator

C. Drive belt issue not addressed during replacements

D. Battery condition affecting alternator life

27. Tech A says a heavy-duty alternator should be tested under full electrical load to verify rated output. Tech B says alternator AC ripple must be measured to verify rectifier diode integrity. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

28. A heavy-duty truck shows symptoms of dim headlights along with reduced overall electrical performance. Battery testing shows full charge. The most likely cause is:

A. Failed alternator unable to maintain voltage

B. Failed headlight bulbs reducing brightness

C. High resistance in the primary battery or chassis ground circuit

D. Failed body controller affecting headlight circuit

29. A heavy-duty truck driver reports the trailer brake lights do not function but tractor brake lights work normally. The seven-way connector tests show 12 volts at all positions when measured with a multimeter. The most likely cause is:

A. High-resistance connection in the trailer brake light circuit

B. Failed brake light switch in the tractor

C. Failed body controller affecting brake light circuits

D. Failed trailer brake light bulbs

30. Tech A says incandescent bulbs draw lower current as they age. Tech B says LED retrofit lights typically require flasher unit replacement to compensate for reduced load. Who is correct?

A. Tech A only

B. Both Tech A and Tech B

C. Tech B only

D. Neither Tech A nor Tech B

31. A heavy-duty truck has had repeated headlight bulb failures on the passenger side. The driver-side bulb has been in service much longer. The most likely cause is:

A. Excessive voltage at the passenger-side headlight socket

B. Defective replacement bulbs from the supplier

C. Vibration damage from chassis flex affecting passenger side

D. Battery condition affecting passenger-side bulb life

32. A heavy-duty truck driver reports that turn signals work correctly but the four-way flashers do not function. The most likely cause is:

A. Failed turn signal bulbs in all positions

B. Failed flasher unit shared between turn and four-way circuits

C. Wiring fault in the turn signal common circuit

D. Failed four-way flasher switch or related circuit

33. Tech A says heavy-duty truck headlight aim drift over time can result from suspension or load changes. Tech B says aim verification at scheduled intervals is recommended even without driver complaints. Who is correct?

A. Tech A only

B. Both Tech A and Tech B

C. Tech B only

D. Neither Tech A nor Tech B

34. A heavy-duty truck has experienced repeated trailer connector corrosion despite cleaning at every service. The most likely root cause is:

A. Damaged connector seal allowing moisture ingress

B. Defective replacement connector from the supplier

C. Operator behavior using improper coupling procedures

D. Coincidental corrosion events unrelated to connector condition

35. A heavy-duty truck shows multiple gauges erratic along with intermittent dash blackouts. The truck has had no recent service. The most likely cause is:

A. Failed instrument cluster requiring replacement

B. Failed body controller producing erratic outputs

C. Loose or corroded primary chassis ground connection

D. Failed engine ECU affecting cluster communication

36. A heavy-duty truck driver reports the check engine lamp illuminated after a recent fuel filter replacement. The most likely cause is:

A. Air introduced during fuel filter service producing temporary fuel system fault codes

B. Defective fuel filter from the supplier

C. Engine damage from the fuel filter service

D. Coincidental engine fault unrelated to filter service

37. Tech A says a heavy-duty truck instrument cluster receives speed data from the transmission output speed sensor via the J1939 bus. Tech B says modern multiplexed clusters do not receive direct analog speed sensor inputs. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

38. A heavy-duty truck shows symptoms of telematics module not transmitting data along with intermittent J1939 communication faults. The most likely common cause is:

A. Failed telematics module unrelated to J1939 issues

B. Failed J1939 backbone wiring affecting multiple systems

C. Failed engine ECU affecting communication

D. Failed body controller affecting both systems

39. A heavy-duty truck has had its instrument cluster reflashed 20,000 miles ago. The driver now reports the speedometer reads 5 mph low. The most likely cause is:

A. Failed cluster from the reflash service

B. Speed sensor wear since the reflash

C. Cluster calibration data not properly programmed during reflash

D. Wiring damage during reflash service

40. Tech A says a scan tool can read live data values from sensors and modules during operation. Tech B says scan tool data is critical for diagnosing intermittent issues that do not produce stored fault codes. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

41. A heavy-duty truck shows fault codes for low voltage from multiple modules. The codes appear randomly during operation. The most likely cause is:

A. Coincidental simultaneous module failures

B. Loose or corroded primary battery cable connection

C. Failed alternator unable to maintain voltage

D. Failed body controller affecting voltage measurement

42. A heavy-duty truck has had its J1939 wiring repaired at a specific cab-to-chassis flex point. The driver now reports intermittent communication faults at the same location. The most likely cause is:

A. Failed engine ECU producing communication faults

B. Failed body controller producing communication faults

C. Coincidental wiring damage at a different location

D. Repeat damage at the same flex point requiring re-routing

43. A heavy-duty truck driver reports the cluster shows incorrect mileage after a recent service. The cluster was not replaced. The most likely cause is:

A. Cluster reset during the service event

B. Speed sensor failure during the service

C. Cluster failure unrelated to the service

D. Engine ECU mileage data corruption

44. Tech A says heavy-duty truck warning lamps can be hardwired to specific modules for redundancy. Tech B says warning lamps can also be activated through data bus messages from various modules. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

45. A heavy-duty truck has had repeated warning lamp activations for low coolant level despite verified normal coolant level. The most likely cause is:

A. Coolant level fluctuating above and below sensor threshold

B. Failed body controller activating the lamp without input

C. Failed wiring producing false signals

D. Failed coolant level sensor with intermittent signal

46. A heavy-duty truck shows symptoms of multiple module fault codes after a recent battery replacement. The codes clear with a scan tool clear command. The most likely cause is:

A. Voltage transients during battery replacement affecting modules

B. Permanent damage to modules from the battery replacement

C. Defective replacement batteries from the supplier

D. Wiring damage during the battery replacement service

47. Tech A says heavy-duty truck telematics modules typically connect to the J1939 bus through a gateway module. Tech B says telematics modules can only transmit data via cellular connection during operation. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

48. A heavy-duty truck driver reports the temperature gauge reads in the red zone with verified normal engine temperature. Scan tool shows correct temperature data on the J1939 bus. The most likely cause is:

A. Temperature sensor producing incorrect data

B. Engine cooling system actually overheating

C. Cluster gauge calibration or scaling error

D. Failed body controller affecting gauge display

49. A heavy-duty truck shows symptoms of intermittent dash freezing along with random module communication faults. The truck has had no recent service. The most likely cause is:

A. Loose or corroded primary chassis ground connection

B. Failed body controller producing communication faults

C. Failed engine ECU producing communication faults

D. Multiple module failures producing simultaneous symptoms

50. A heavy-duty truck telematics system shows incorrect fuel level data while the cluster reads correctly. The most likely cause is:

A. Failed telematics module requiring replacement

B. J1939 bus issues affecting fuel data transmission

C. Failed fuel sender unrelated to telematics

D. Telematics module configuration error for fuel data scaling

# PRACTICE EXAM 7: ANSWER KEY AND EXPLANATIONS

1. A — Loose or corroded primary battery ground connection. Multiple unrelated symptoms across different systems (lighting, cranking, gauges) point to a common-element fault, with primary ground connection issues being the most common cause that affects all electrical systems simultaneously. Module failures typically affect specific systems rather than producing system-wide symptoms.

2. C — Both Tech A and Tech B. Excessive load on the alternator can produce voltage drop visible as dimming when additional loads are added. Voltage drop in a shared circuit ground or power feed produces the same symptom because shared current paths affect all loads on that circuit. Both causes can produce the described pattern.

3. B — Voltage transients during the short event affecting multiple modules. Multi-module fault codes following a single short event most commonly trace to voltage transients during the short, which produce momentary out-of-range readings that modules log as faults. Permanent damage to multiple modules is statistically rare; typically codes clear after the event.

4. D — Loose primary chassis ground connection at the engine block. Simultaneous flutter and flicker across different electrical systems indicate a common-element fault, with primary chassis ground connection issues being the most common cause. Module and ECU faults typically produce different symptom patterns.

5. A — Reduced cranking torque from the starter motor. Charging system over-voltage damages electronics and shortens battery and lamp life, but does not reduce cranking torque since cranking occurs before the alternator produces output. The other three options are all consistent consequences of sustained over-voltage.

6. C — Tech B only. LEDs draw less current than incandescent bulbs of equivalent brightness, and the reduced current is below the threshold the flasher unit uses to time correctly, producing hyper-flash. Tech A is incorrect because LEDs draw less current, not more.

7. A — Loose or corroded primary chassis ground connection. Intermittent symptoms across unrelated systems (ABS, gauge cluster) point to a common-element fault, with primary ground connection issues being the most likely cause. Single-module failures rarely produce simultaneous multi-system symptoms.

8. D — Both Tech A and Tech B. Voltage drop in a battery ground cable affects every electrical circuit on the truck because all circuits share the chassis ground return path. Voltage drop in a battery

positive cable similarly affects every circuit fed from that source, producing system-wide symptoms.

9. B — Battery condition or starter cable resistance causing low voltage during cranking. Low voltage codes appearing only during cranking indicate the cranking event is reducing voltage below module thresholds, with battery capacity or cable resistance being the most common cause. Codes that don't return after starting confirm the issue is cranking-specific.

10. A — Tech A only. Radio interference appearing only when headlights are turned on points to the headlight circuit producing electrical noise, typically from defective bulbs, damaged wiring, or grounding issues. Tech B is incorrect because antenna failures cause general reception issues, not headlight-specific interference.

11. D — Failed instrument cluster producing communication faults. The least likely cause of network-wide intermittent communication faults is the instrument cluster, since cluster failures typically affect display rather than producing bus-wide intermittent faults. The other three options all directly affect bus operation.

12. B — High resistance in the battery cable circuit affecting all loads. Reduced cranking power along with dim accessory lighting with normal battery condition points to high resistance in the supply circuit affecting all loads simultaneously. Voltage drop testing on the battery cables identifies the specific high-resistance point.

13. A — Both Tech A and Tech B. A failed alternator diode produces excessive AC ripple that can damage electronic modules and disrupt data bus communication. AC ripple above 0.5 volts can produce communication faults on the J1939 bus by interfering with the differential signal. Both effects are documented consequences of diode failure.

14. C — Voltage transients during disconnect or reconnect affecting modules. Multi-warning lamp activation following jump-start most commonly traces to voltage transients during the connection or disconnection events, which produce momentary out-of-range readings logged as fault codes. Permanent damage to multiple modules is statistically rare.

15. B — Improper alternator installation reducing output and discharging batteries. Slow cranking with discharged batteries immediately after alternator service points to the service work, with improper installation reducing output being the most common cause of post-service charging issues. Pre-service operation confirms the prior alternator was charging correctly.

16. D — Verify charging system operation and parasitic draw. Repeated battery failures every 12 months point to a system-side cause that destroys each new battery, with charging system operation and parasitic draw being the most common system-side causes. Replacement of components without diagnosis continues the failure cycle.

17. A — Both Tech A and Tech B. High starter cranking current produces voltage drop affecting other circuits, which is why interior lights typically dim during cranking. This voltage drop during

cranking is normal and expected, not requiring diagnostic action unless excessive (above OEM specification limits).

18. C — Battery capacity reduced at cold temperatures combined with marginal cable resistance. Cold-only slow cranking with normal warm-condition operation points to the combination of reduced battery capacity at cold temperatures (about 50% at 0°F) and marginal cable resistance, where together they produce inadequate cranking voltage. Each alone may pass testing.

19. D — Engine fuel or ignition issue unrelated to starter. Normal cranking with no-start condition indicates the cranking circuit is functioning correctly, so the no-start trace is to engine systems (fuel, ignition, compression). Starter and battery issues would produce cranking problems, not no-start with normal cranking.

20. B — Tech B only. Individual battery replacement is acceptable when batteries are matched in age and capacity, since modern batteries can operate together if their characteristics are similar. Replacing the entire bank when only one fails is not always necessary, particularly when other batteries pass testing.

21. B — Loose or corroded battery cable connection. Intermittent no-crank events with normal battery and starter testing point to a connection issue that varies with vibration or temperature, with battery cable connections being the most common location. Static testing may not detect intermittent connection issues.

22. A — Battery condition or cable resistance creating excessive cranking load. Repeated starter failures across multiple brands point to a system-side cause, with battery condition or cable resistance being the most common cause that increases cranking load and shortens starter life. Verification of supply circuits is required.

23. D — Charging system load demand exceeding capacity. Repeated alternator and battery failures together point to system-wide overload, with charging system load demand exceeding capacity being the most common cause that destroys both components. Load analysis identifies the underlying issue.

24. C — Both Tech A and Tech B. Failed alternator producing low output discharges batteries during operation by failing to provide adequate charging current. Failed alternator producing high output overcharges batteries, damaging them through electrolyte loss and plate damage. Both failure modes affect battery life.

25. A — Failed alternator unable to maintain output voltage. Dim headlights with slow cranking and 12.4 volts at the alternator (below specification of 13.8-14.5) confirms the alternator is not providing charging output, which discharges batteries and reduces voltage to all systems. Replacement is required.

26. B — System-side issue destroying each alternator. Repeated alternator failures with similar symptoms across replacements point to a system-side cause that destroys each new unit, with the

underlying issue typically being load demand, drive belt, or electrical fault not addressed during replacements. Verification is required.

27. D — Both Tech A and Tech B. Heavy-duty alternators must be tested under full electrical load to verify rated output capacity, since unloaded testing may show normal voltage despite reduced current capability. AC ripple measurement is also required because diode failures produce excessive ripple while DC voltage may appear adequate.

28. C — High resistance in the primary battery or chassis ground circuit. Dim headlights with reduced overall electrical performance and full battery charge points to high resistance in the supply circuit affecting all loads simultaneously. The headlights are simply the most visible symptom of the system-wide voltage drop.

29. A — High-resistance connection in the trailer brake light circuit. Multimeter showing 12 volts at the connector indicates open-circuit voltage but does not verify the connection can deliver current under load, where corroded or partial connections fail. A test light or known load verifies functional delivery.

30. D — Neither Tech A nor Tech B. Incandescent bulbs do not draw lower current as they age — current is determined by voltage and bulb resistance, which does not change significantly with bulb age. LED retrofit installations typically require load resistors (not flasher unit replacement) to compensate for reduced load.

31. A — Excessive voltage at the passenger-side headlight socket. Repeated bulb failures on one specific side point to a side-specific cause, with elevated voltage at the socket from a wiring fault being the most common cause of accelerated bulb failure. Voltage measurement at the socket identifies the issue.

32. D — Failed four-way flasher switch or related circuit. Turn signals working correctly while four-way flashers fail indicates the failure is specific to the four-way circuit, with the four-way switch or its dedicated circuit being the most likely cause. Shared components (bulbs, common circuit) would affect both functions.

33. B — Both Tech A and Tech B. Heavy-duty truck headlight aim can drift over time from suspension settling, frame flex, or load changes affecting the truck's attitude. Aim verification at scheduled intervals is recommended even without driver complaints because aim drift may not produce noticeable symptoms but reduces road illumination quality.

34. A — Damaged connector seal allowing moisture ingress. Repeat trailer connector corrosion despite cleaning indicates an underlying cause that cleaning does not address, with damaged seal allowing continuous moisture ingress being the most common root cause. Connector replacement is required for lasting resolution.

35. C — Loose or corroded primary chassis ground connection. Multiple gauges erratic with intermittent dash blackouts points to a common-element fault, with primary chassis ground

connection issues being the most common cause that affects cluster operation system-wide. Component replacement is premature without ground verification.

36. A — Air introduced during fuel filter service producing temporary fuel system fault codes. Check engine lamp illumination immediately following fuel filter replacement most commonly traces to air in the fuel system from the service, which produces temporary low-pressure or rough-running fault codes. Codes typically clear after the system purges air.

37. D — Both Tech A and Tech B. Heavy-duty truck instrument clusters receive speed data from the transmission output speed sensor via the J1939 bus, with the transmission ECU broadcasting the speed message. Modern multiplexed clusters do not receive direct analog sensor inputs, eliminating point-to-point sensor wiring.

38. B — Failed J1939 backbone wiring affecting multiple systems. Telematics not transmitting along with intermittent J1939 faults points to the J1939 bus itself being the common element, with backbone wiring failure being the most likely cause. Telematics depends on J1939 data, so bus failure affects both symptoms simultaneously.

39. C — Cluster calibration data not properly programmed during reflash. A consistent speedometer offset 20,000 miles after a reflash points to the reflash service, with calibration data not properly programmed being a specific fault produced by improper reflash procedure. Reverification of calibration resolves the issue.

40. A — Both Tech A and Tech B. Scan tools read live data values from sensors and modules during operation, providing real-time visibility into system behavior. Live data is critical for diagnosing intermittent issues that do not produce stored fault codes, since stored codes only capture conditions that exceed module thresholds.

41. B — Loose or corroded primary battery cable connection. Random low-voltage codes from multiple modules point to a system-wide voltage issue, with primary battery cable connection problems being the most common cause that affects all modules during voltage variations. Single module failures do not produce multi-module low-voltage codes.

42. D — Repeat damage at the same flex point requiring re-routing. Repeat communication faults at the previously repaired location indicate the underlying cause (cab-to-chassis flex) was not addressed during the original repair, requiring re-routing or additional protection at the flex point for lasting resolution.

43. A — Cluster reset during the service event. Incorrect mileage display after a service event with the same cluster typically indicates the cluster was reset during service, possibly through inadvertent activation of programming functions or power cycling. Engine ECU stores backup mileage that can typically restore the correct value.

44. C — Both Tech A and Tech B. Heavy-duty truck warning lamps can be hardwired to specific modules for redundancy, particularly for safety-critical functions like ABS warning. Warning

lamps can also be activated through data bus messages from various modules, providing flexibility in warning logic and additional functions.

45. D — Failed coolant level sensor with intermittent signal. Repeat false low-coolant warnings with verified normal coolant level point to the sensor producing false signals, with intermittent sensor failures being the most common root cause. Sensor replacement resolves this fault pattern.

46. A — Voltage transients during battery replacement affecting modules. Multi-module fault codes following battery replacement that clear normally point to voltage transients during disconnect or reconnect, which produce momentary out-of-range readings logged as fault codes. Permanent damage is statistically rare.

47. B — Tech A only. Heavy-duty truck telematics modules typically connect to the J1939 bus through a gateway module that translates and filters bus messages for telematics processing. Tech B is incorrect because telematics modules typically buffer data locally and transmit when cellular signal is available, not requiring continuous cellular connection during operation.

48. C — Cluster gauge calibration or scaling error. Correct temperature data on the J1939 bus with incorrect gauge display indicates the cluster is receiving correct data but converting it incorrectly to gauge position, with calibration or scaling errors in the cluster being the typical cause. Sensor and engine condition are confirmed normal by the bus data.

49. A — Loose or corroded primary chassis ground connection. Intermittent dash freezing with random module communication faults across the network points to a common-element fault, with primary chassis ground connection issues being the most common cause affecting multiple modules simultaneously. Single-module failures rarely produce network-wide symptoms.

50. D — Telematics module configuration error for fuel data scaling. Telematics showing incorrect fuel data while cluster reads correctly indicates the data source (sender, J1939 message) is correct but the telematics module is interpreting it incorrectly, with configuration error for fuel data scaling being the typical cause. Configuration verification resolves the issue.