

PRACTICE EXAM 10: CANADIAN 310T TRUCK AND COACH TECHNICIAN SIMULATION (135 QUESTIONS)

This practice exam contains 135 multiple-choice questions, each with four options (A, B, C, and D), matching the format of the Interprovincial Red Seal exam for this trade. Allow about four hours and work without manuals or notes. Choose the single best answer for each question. A score of 70 percent, or 95 correct answers, is the pass mark. Check your answers against the key and explanations at the end of the exam.

1. A highway tractor shows a diesel particulate filter soot load of 105 percent, and the dash lamp is lit. The driver cannot complete a parked regeneration because of a fault. What should the technician check first?

- A. Whether the engine oil was last changed within its service interval
- B. The air brake governor cut-in and cut-out settings
- C. Active fault codes and the regeneration temperature and pressure sensors
- D. The transmission range selector position sensor and its wiring

2. A transmission is locked in third gear after a fault code is set. The fluid level is correct. What is the most appropriate first step?

- A. Read the stored codes, then inspect the related wiring
- B. Replace the torque converter before reading any codes
- C. Drain and refill the transmission with a different fluid grade
- D. Remove the shift tower and replace all of the solenoids

3. A chafed wire in a chassis harness has exposed copper. Which repair meets good practice?

- A. Twist the wires together tightly and wrap the joint with electrical tape
- B. Wrap the exposed copper with several turns of masking tape

- C. Replace the section with larger wire joined by household wire nuts
- D. Make a sealed, adhesive-lined splice and cover it with heat shrink

4. A variable reluctance crankshaft sensor is suspected of failing. Which test is appropriate during cranking?

- A. Apply 12 volts directly to the sensor to see if it moves
- B. Measure the AC voltage it produces and its coil resistance against specification
- C. Measure the sensor's DC reference voltage at the connector
- D. Check for a steady 5 volts at the signal wire while cranking

5. A truck's power steering fluid appears foamy and the pump whines when turning. The reservoir level is slightly low. What is the most likely cause?

- A. A worn transmission output shaft seal that is leaking oil
- B. A bent tie rod end that is binding on the steering arm
- C. Air entering the pump inlet from a leak or low fluid
- D. A cracked wheel that is rubbing against the brake drum

6. A technician must remove the refrigerant before replacing a compressor. Which practice is correct?

- A. Vent the refrigerant slowly outdoors to avoid any pressure from building up
- B. Pour the refrigerant into a drain that leads to a waste tank
- C. Leave the refrigerant in place and loosen fittings carefully
- D. Recover the refrigerant with approved equipment as a certified technician

7. A diesel engine runs with black smoke under load. Boost is normal, but the air filter restriction gauge reads high. What is the best corrective action?

- A. Replace the air filter and recheck the restriction and smoke
- B. Increase the fuel rail pressure to clear the carbon

- C. Add DEF to the fuel tank to reduce the opacity
- D. Retard the injection timing at the control module

8. A tractor's air pressure climbs past the governor cut-out until the safety valve opens. The compressor does not unload. Which component is most likely at fault?

- A. The brake application valve diaphragm in the cab
- B. The trailer supply valve in the dash
- C. The governor or the compressor unloader mechanism
- D. The automatic slack adjuster on the rear axle

9. An A/C system with R-134a shows 600 kPa on both gauges with the compressor engaged, and the cab is warm. What is the most likely cause?

- A. A restricted receiver-drier that is blocking the liquid line
- B. A compressor that cannot build pressure internally
- C. An overcharged system with too much oil in it
- D. A cooling fan that is running at an incorrect speed

10. A transmission control unit has been replaced on an automated manual transmission. What must be done before the truck is released?

- A. Install the unit and rely on it to learn the configuration unaided
- B. Clear the codes and let the driver test the shifts on the road
- C. Swap the wheel speed sensors to match the new unit's address
- D. Program the unit with the correct calibration and perform the required learn procedures

11. A driver reports wind noise from the driver door at highway speed. Which check best confirms a seal problem?

- A. Close a paper strip in the door and see where it pulls out

- B. Spray the door hinges and latch with penetrating oil, then retest the door
- C. Replace the side mirror and then check the noise again at highway speed
- D. Adjust the tire pressure on the steer axle to the maximum rated value

12. A technician must reprogram an engine controller using a laptop. What precaution protects the controller during the flash?

- A. Connect a stable battery maintainer to hold voltage steady
- B. Disconnect the battery to prevent a surge during programming
- C. Start the engine so the alternator keeps the voltage high
- D. Turn on all of the lights to load the charging system

13. A technician finds an emulsion of oil and water in the air dryer purge discharge, and the air tanks show oil when drained. Which source is most likely?

- A. Normal moisture from the engine's crankcase ventilation system
- B. A trailer that has been left connected with its air lines charged
- C. A compressor that is passing excess oil into the air system
- D. A governor that is cutting out at too high a pressure setting

14. A hydraulic driveline retarder produces weak braking, and the technician finds the retarder oil level low. What is the next step?

- A. Fill the retarder with engine oil until it overflows the vent
- B. Disconnect the retarder control valve to increase the oil flow rate
- C. Replace the transmission output seal and continue in service
- D. Find and fix external leaks, then refill with the specified fluid

15. A battery cable has a resistance of 0.0008 ohm and carries 500 amps during cranking. What voltage drop appears across it?

- A. 0.04 volt
- B. 0.4 volt
- C. 4.0 volts
- D. 0.625 volt

16. A technician finds a cracked spring brake chamber with a broken power-spring housing on a trailer. Which repair is correct?

- A. Cage the spring and remove the clamp ring to inspect the diaphragm
- B. Replace the complete spring brake chamber assembly and its mounting hardware
- C. Weld the cracked housing and pressure test the repaired chamber
- D. Drill out the cracked area and fit a larger bolt through the housing

17. A tractor's clutch slips under load. A technician measures zero free play at the clutch pedal. What is the effect of having no free play?

- A. The clutch brake engages too early and grinds the transmission gears
- B. The pilot bearing receives extra lubricant from the transmission
- C. The flywheel spins faster than the crankshaft at idle speed
- D. The release bearing stays loaded and the clutch can slip

18. During cranking, a voltmeter shows 1.1 volts between the battery positive post and the starter battery terminal, and 0.1 volt on the ground side. What does this reading indicate?

- A. Excess resistance in the ground cable and engine ground strap
- B. A battery with low capacity that needs a longer charging time
- C. Excess resistance in the positive cable or its connections
- D. A starter that is drawing too little current to function

19. A trailer tracks sideways, or dog-tracks, behind a tractor. The tires on one tandem axle show scrubbing wear. What is the likely cause?

- A. Tandem axles that are not square to the kingpin
- B. Underinflated tires on the steer axle of the tractor unit
- C. An air dryer cartridge that is saturated with moisture
- D. A fifth wheel plate that has been over-lubricated recently

20. A tandem tractor is stuck on ice with one drive wheel spinning. When should the driver engage the inter-axle power divider lockout?

- A. While the wheels are spinning, so that the lock forces them to grip
- B. Before wheel spin starts, then release it when traction returns
- C. Only when the vehicle is travelling above 80 km/h on dry highway
- D. At all times, since it improves fuel economy and tire wear

21. A starter relay clicks, but the starter does not engage. Battery voltage is good. Which test best isolates the fault?

- A. Replace the ignition switch together with the key cylinder first
- B. Measure the specific gravity of the electrolyte in each cell
- C. Measure voltage drop across the relay contacts under load
- D. Disconnect the air dryer heater wiring and retest the circuit

22. A tractor-trailer combination loses its trailer and the supply line opens. Which device closes to preserve air in the tractor?

- A. The tractor protection valve in the supply line
- B. The relay valve on the rear axle of the tractor
- C. The quick-release valve at the front brake chamber
- D. The air dryer purge valve on the supply line

23. A coolant test strip on a fleet tractor shows nitrite levels much lower than the supplemental coolant additive recommendation. What risk does this create?

- A. Excessive thickening of the engine lubricating oil
- B. Premature wear of the fan belt idler pulley
- C. Higher exhaust gas temperature at the turbine inlet
- D. Cavitation erosion and corrosion of the cylinder liners

24. A technician couples a tractor to a trailer and wants to confirm that the fifth wheel is locked. Which check is correct?

- A. Rely on the sound of the latch alone and release the trailer brakes
- B. Check the kingpin by looking at the dash lights and warning lamps only
- C. Raise the landing gear fully before you look at the jaws
- D. Inspect the jaws, then tug test against the applied trailer brakes

25. A technician installs a new hydraulic hose assembly. Which practice is correct?

- A. Route it untwisted, within its bend radius, and clamped away from heat
- B. Twist the hose slightly so it fits the pre-bent route
- C. Pull the hose tight so it has no slack under pressure
- D. Route the hose along the exhaust manifold to keep it short

26. A cooling system has a pressure cap rated at 105 kPa. After a hard climb, the coolant boils over, but the radiator is clean and the fan engages. Which fault is most likely?

- A. A thermostat that is opening too early at a low temperature
- B. An engine oil level that is slightly above the full mark
- C. A weak or incorrect pressure cap that releases pressure too early
- D. A fan clutch that engages when the coolant is hot

27. A Class 6 truck with hydraulic brakes has a soft pedal that sinks slowly. The master cylinder level is correct, and there are no leaks. After inspection, what is the best repair step?

- A. Add extra brake fluid to the reservoir until it reaches the top
- B. Bleed the system in the maker's sequence, farthest wheel first
- C. Replace the front tires so the pedal feel is restored
- D. Disconnect the ABS controller and drive for a short test

28. A trailer's air suspension height is set too low after unloading, and the ride height valve is working. What adjustment is appropriate?

- A. Increase the governor cut-out pressure setting on the tractor unit
- B. Adjust the shock absorber mounting to the highest setting
- C. Remove one air spring from the axle to raise the trailer
- D. Adjust the height valve linkage to the ride height specification

29. A tractor loses communication with the engine, transmission, and ABS controllers at the same moment, and the dash goes dark. Which fault is most likely?

- A. Three separate module failures that occurred at the same time
- B. A restricted fuel filter that has starved the injectors of fuel
- C. A shared power, ground, or data backbone fault
- D. A worn clutch disc that is slipping under heavy load

30. With power off, a technician measures 120 ohms between CAN high and CAN low at the diagnostic connector. What does this indicate?

- A. One terminating resistor is missing or an open exists in the backbone
- B. The network is healthy because 120 ohms is the expected total
- C. The network has a short between CAN high and the battery positive
- D. The module is asleep and will wake when the key is turned on

31. A scan tool shows active fault SPN 110, FMI 3 on a tractor with an overheating complaint. What does this code establish by itself?

- A. That the coolant temperature sensor has failed and must be replaced at once
- B. A circuit signal condition that must be tested to find the cause
- C. That the engine control module has an internal fault and needs reprogramming
- D. That the coolant is overheating and the thermostat must be inspected next

32. A technician has shut down a transit coach, locked and tagged the battery disconnect, and chocked the wheels. A hydraulic fan drive on the same coach still needs service. What must happen before the fan motor hoses are opened?

- A. Stored hydraulic pressure is released and the zero-energy state is verified
- B. The engine is restarted briefly to circulate the fluid and cool the lines
- C. A second lock is placed on the ignition key so no one can start the coach
- D. The hoses are loosened slightly to see whether any pressure sprays out

33. A hydraulic clutch pedal sinks slowly to the floor, and the remote reservoir level stays full. There are no external leaks. Which fault is most likely?

- A. A worn throwout bearing that is noisy at idle speed
- B. A cracked flywheel that is vibrating at higher engine speed
- C. Internal leakage in the clutch master cylinder
- D. A leaking trailer air line that is losing pressure

34. A tractor engine shows high crankcase blow-by and the oil dipstick tube is being pushed out by pressure. Compression is low on all cylinders. What does this most likely indicate?

- A. A single burned exhaust valve in cylinder number one
- B. A stuck thermostat in the closed position
- C. A defective fuel pressure regulator on the rail
- D. General ring and cylinder wear throughout the engine

35. A hybrid bus has an electric A/C compressor that is driven by a high-voltage motor. What must the technician use when servicing the oil?

- A. Any conventional PAG oil from the shop shelf for A/C
- B. The non-conductive oil the maker specifies, usually POE
- C. Engine oil of the same viscosity as that used in the diesel
- D. Transmission fluid to protect the motor bearings and gears

36. A leaf spring pack on a drive axle has a cracked main leaf. What is the correct repair?

- A. Clamp the cracked leaf with a U-bolt and return the truck to service
- B. Weld the cracked leaf and apply paint to hide the repair
- C. Remove the cracked leaf and operate with one leaf missing
- D. Replace the damaged spring and its mating spring on the axle

37. A DMM set to AC volts reads 1.2 volts across the battery terminals with the engine running. What does this reading indicate?

- A. Failed alternator diodes leaking AC into the system
- B. A fully charged battery bank that is accepting charge normally
- C. A weak cell inside a battery that needs equalizing
- D. A poor ground connection between the engine and the frame

38. A Type 30 clamp-type brake chamber on a drive axle is measured with the brakes applied at about 620 kPa, and the pushrod stroke is 57 mm. The axle has automatic slack adjusters. What is the best action?

- A. Leave it as is, since automatic adjusters can exceed the limit slightly
- B. Find why the automatic adjuster failed, then correct and re-measure
- C. Back off the chamber mounting nuts to shorten the pushrod stroke
- D. Replace the brake chamber diaphragm and return the truck to service

39. A battery rated at 1,000 cold cranking amps is fully charged. A load test at half the rating for 15 seconds drops the terminal voltage to 8.9 volts. What is the conclusion?

- A. The battery passes because voltage stays above zero volts
- B. The battery needs only a longer charge before it is retested
- C. The battery fails the load test and should be replaced
- D. The battery is good, but the cables must be loose

40. A tractor wanders and pulls after a front-end repair. The technician finds the front toe is 12 mm toe-out against a specification of 1.5 mm toe-in. What should be done?

- A. Add extra air to the front tires to stabilise the steering
- B. Set the toe to specification with the tie rods and re-check
- C. Replace the steering gear to cure the wander and the pull
- D. Rotate the front tires from side to side before testing

41. A technician measures a fuel supply pressure of 40 kPa at cranking on an engine that requires at least 300 kPa. The filters are new, and the supply line has no leaks. Which component should be tested next?

- A. The turbocharger wastegate actuator and linkage
- B. The EGR cooler bypass valve and its actuator
- C. The crankshaft damper and its bolts
- D. The lift pump and its pressure regulation

42. The trailer marker lights flicker and flash with the turn signals. The tractor connector voltage is steady. What is the most likely cause?

- A. A poor ground connection on the trailer side
- B. A discharged battery in the tractor starting system
- C. A restricted air filter on the tractor engine
- D. A misadjusted pushrod on a trailer brake chamber

43. A driver of a battery-electric truck says regenerative braking is weaker on a very cold morning, with a full battery. What is the most likely explanation?

- A. The brake pads have worn through and need to be replaced soon
- B. The tires are underinflated and slipping on the wet pavement
- C. The battery management system is limiting regen to protect the pack
- D. The air dryer has failed and needs a new cartridge

44. A tech checks diesel exhaust fluid with a refractometer and reads 22 percent urea. What is the most likely explanation?

- A. The fluid has oxidized after storage and now needs only a filter change
- B. The fluid has frozen and thawed and is normal once fully warmed up
- C. The refractometer is reading in the correct range for this temperature
- D. The fluid has been diluted with water or is not genuine DEF

45. A truck with ABS sets a wheel speed sensor code that appears only above 50 km/h. The sensor wiring and connector test normal when stationary. What is the most likely cause?

- A. An air dryer purge valve that is venting at a low pressure
- B. A damaged tone ring giving an erratic signal at speed
- C. A brake lining that is thinner than the minimum thickness
- D. A governor that is cutting in at an incorrect pressure

46. A frame rail on a truck requires a bracket for a new accessory. Which practice follows the manufacturer's usual rules?

- A. Drill several holes in the top flange to spread the bracket loads
- B. Weld the bracket to the flange to avoid drilling any holes at all
- C. Use existing or approved web holes and avoid drilling the flanges
- D. Cut a notch in the flange to give the bracket a flush mounting

47. A starter engages with a loud grinding noise, then the engine fails to rotate. Battery voltage is normal. Which fault is likely?

- A. A damaged ring gear or worn starter pinion
- B. A weak air governor spring that allows low system pressure
- C. A leaking radiator hose that has dropped the coolant level
- D. A failed oil pressure sensor that is disabling the starter

48. The trailer's marker lights are dim after a new trailer is hooked up. Voltage at the tractor connector is normal. What is the best next test?

- A. Replace the alternator on the tractor and recheck the lights
- B. Measure the voltage drop on the trailer ground circuit
- C. Increase the bulb wattage on the trailer to make them brighter
- D. Add a second battery to the tractor's battery box

49. A technician replaces a clutch on an automated manual transmission truck. What must be done after installation?

- A. Adjust the pedal free play with a wrench at the clutch housing
- B. Fill the clutch housing with transmission oil to the filler plug
- C. Disconnect the batteries for ten minutes to reset the controller
- D. Perform the clutch calibration or touch-point learn procedure with the diagnostic tool

50. A technician lowers a tilt cab after service on a tractor. What must be confirmed before the truck is moved?

- A. The cab prop has been left in position for the next service
- B. The hydraulic pump has been disconnected from the tilt cylinder
- C. The cab latches are engaged and the lock indicator shows secured
- D. The windshield wipers have been run through a full cycle

51. A technician adjusts a tapered roller wheel bearing and measures the end play with a dial indicator at 0.20 mm. The specification is 0.025 to 0.127 mm. What should be done?

- A. Readjust the bearing to bring the end play within the specification
- B. Accept the reading because 0.20 mm is close to the upper limit
- C. Add more grease to the hub cavity and remeasure after a day
- D. Install a thicker brake drum and remeasure the end play

52. A technician is setting valve lash on a six-cylinder engine at TDC of cylinder 1 on compression. Which practice is correct?

- A. Set only the valves for that position, then rotate and set the rest
- B. Set every valve on all six cylinders at that one crankshaft position without turning the engine
- C. Set the exhaust valves tight and the intake valves loose by feel
- D. Skip the intake valves because only the exhaust valves are adjustable

53. A hydraulic cylinder has a bore of 90 mm and is supplied at 15 MPa. What is the approximate extend force?

- A. 48 kN
- B. 95 kN
- C. 135 kN
- D. 9.5 kN

54. A tractor drains its batteries overnight. A meter in series with the negative cable shows 0.8 amps after the modules should be asleep. What is the best method to locate the draw?

- A. Replace the alternator and recheck the draw after one full day
- B. Disconnect the positive cable and test the batteries for resistance
- C. Pull one fuse at a time while watching the meter current
- D. Load test each battery and charge it with a fast charger

55. A diesel engine has hard starting on cold mornings, white smoke, and fuel that has formed wax crystals in the filter. What is the most appropriate corrective action?

- A. Add gasoline to the tank to lower the freezing point of the fuel
- B. Increase the injector pressure through the control module software settings
- C. Remove the thermostat so the engine warms up more slowly
- D. Replace the filter, warm the fuel, and use winter diesel or additive

56. A technician measures a brake drum and finds it exceeds the discard diameter cast on the drum. What is the correct action?

- A. Machine the drum again and fit thicker brake lining to make up the difference
- B. Reuse the drum and replace the lining on only one side of the axle
- C. Replace the drum, since its wall is too thin to absorb heat
- D. Clean the drum and apply a heat-resistant paint to the braking surface

57. A technician must weld a cracked crossmember on a tractor fitted with several electronic control modules. Which preparation best protects the electronics and bearings?

- A. Leave the batteries connected so the modules keep their stored fault memory
- B. Clamp the ground at the rear axle and weld from the opposite end of the frame
- C. Switch the ignition to accessory and rely on the module internal surge protection
- D. Disconnect the battery cables and module connectors, then clamp the ground close to the weld

58. A windshield wiper motor runs, but the blades do not move. What is the most likely fault?

- A. A weak battery that cannot supply the wiper motor current
- B. A loose or stripped wiper arm or linkage connection
- C. A worn thermostat that is stuck in the engine cooling system
- D. A leaking washer reservoir that has lost its fluid

59. A turbocharger has oil leaking into the intake piping, and the compressor wheel has noticeable radial play. What is the most likely consequence if the turbo is left in service?

- A. Compressor wheel rub and eventual failure with the engine ingesting debris
- B. Improved boost response because the clearance has increased
- C. A rise in coolant temperature caused by the extra oil flow
- D. Better fuel economy due to the reduced bearing friction

60. A truck has excessive steering wheel play. Before adjusting the steering gear, what should the technician check first?

- A. Tie rod ends, drag link ends, and column joints for wear
- B. The air dryer cartridge and the compressor governor settings
- C. The clutch pedal free play and the release bearing wear
- D. The alternator output voltage and the battery state of charge

61. A fifth wheel base plate is found with loose mounting bolts on a tractor. What should the technician do?

- A. Tighten the bolts by hand and recheck them at the next service
- B. Add a second set of smaller bolts beside the old ones
- C. Inspect, replace any damaged fasteners, and torque to the specification
- D. Apply thread locker and leave them at the loose position

62. After a battery coolant hose is replaced on an electric truck, the pack temperature rises quickly under load. What is the most likely cause?

- A. A transmission fluid that is too thin for the traction motor
- B. Air trapped in the thermal loop that needs bleeding
- C. A hydraulic brake line that has been connected to the pack
- D. A starter motor that has been left connected in the circuit

63. After wheel installation on a tractor, the technician must recheck wheel nut torque. When is this normally required?

- A. Only at the next scheduled annual safety inspection of the unit
- B. After the first 10,000 km of normal operation
- C. Only if the driver reports a wheel vibration
- D. After the first 80 to 160 km of operation

64. A gladhand coupling leaks air at its connection to the trailer line. The tractor and the trailer pressure drops as soon as the supply is connected. What is the correct repair?

- A. Wrap the coupling with tape to seal the leak around it
- B. Tighten the coupling with a pipe wrench to force a seal
- C. Replace the gladhand seal and inspect the coupling faces for damage
- D. Remove the seal and rely on the couplings fitting tightly

65. A tractor loses power on a steep grade. The scan tool shows turbo boost at 90 kPa when 200 kPa is expected, and the air filter restriction is normal. Which test should come first?

- A. Replace the turbocharger and recheck the boost reading
- B. Pressure-test the charge air piping and cooler for leaks
- C. Flush the fuel tank and replace both fuel filters
- D. Recalibrate the accelerator pedal position sensor

66. A scan tool shows an ABS controller power code, and the ABS warning lamp stays on after starting. The batteries test good. What is the most appropriate next step?

- A. Replace all four wheel speed sensors as a set before further tests
- B. Disconnect the air dryer heater and clear the stored fault codes
- C. Adjust the pushrod stroke on each brake chamber to the minimum
- D. Test voltage and voltage drop at the ABS controller

67. An engine brake works on only four of six cylinders, and the driver reports reduced retarding power. A scan tool shows no codes. What is the most appropriate first inspection?

- A. Check the lash and the slave piston and solenoid on the weak cylinders
- B. Replace the turbocharger oil feed line with a larger diameter line and fittings
- C. Test the DPF differential pressure sensor and its sensing tubing lines
- D. Check the torque on the oil pan drain plug and its washer

68. A rear drum brake on a tractor stays hot and drags after the pedal is released, and the pushrod retracts fully. Which fault is most likely?

- A. A leaking air dryer purge valve on the supply side
- B. Seized cam bushings or a broken return spring
- C. A low air governor cut-in setting at the compressor
- D. A worn steering gear sector on the front axle

69. A hydraulic pump whines loudly and the fluid in the reservoir is foamy. Which cause is most likely?

- A. Excessive pressure at the relief valve outlet on the return line
- B. A cracked cylinder rod end bearing on the work equipment boom
- C. Air entering the suction side or a low fluid level
- D. Hydraulic fluid that is too clean for the pump to use

70. A technician installs a hub-piloted drive wheel and tightens the nuts. Which procedure gives an even clamp load?

- A. Snug the nuts crisscross, then torque in stages
- B. Tighten each nut fully in a circle, starting at the top stud
- C. Use an impact wrench at full power until the wrench stops
- D. Lubricate the nut faces with grease and torque to a lower value

71. During a leakage test with the brakes applied and the engine off, pressure on the dash gauge falls steadily. Which method best locates the leak?

- A. Pull each brake chamber off the axle and measure its pushrod length
- B. Replace the air dryer cartridge and repeat the test
- C. Raise the governor cut-out setting to compensate for the loss
- D. Coat suspect fittings and chambers with soap solution and watch for bubbles

72. A tractor pulls to the right under braking. Pushrod stroke is 38 mm on the right front brake and 52 mm on the left front brake. Which conclusion is correct?

- A. The left brake is weak or out of adjustment
- B. The right brake is dragging because the return spring has failed
- C. The steering gear is worn and needs a new sector shaft seal
- D. The air governor is cutting in too early and wasting pressure

73. A driveshaft is suspected of having a worn universal joint. Which inspection is appropriate?

- A. Spin the shaft with the engine at high idle and listen for squeaks or knocks
- B. Apply grease at the slip yoke and see whether the vibration then stops
- C. Measure the voltage across the transmission output speed sensor leads
- D. Lift and rotate the shaft by hand, checking for play at the cups

74. An automatic transmission fluid check is needed on a truck with an Allison transmission. Which procedure is correct?

- A. Shut the engine off and read the COLD band on the dipstick immediately
- B. Run the engine at high idle in drive and read the fluid level
- C. Idle in neutral at operating temperature on level ground and read HOT
- D. Check the level only after the vehicle has stood overnight on level ground

75. An oil analysis report for a regional-haul tractor shows high sodium and potassium and a rise in glycol. What does this combination most strongly suggest?

- A. Fuel dilution from a leaking injector seat
- B. A coolant leak into the lubricating oil
- C. Normal wear of the camshaft lobes and tappets
- D. Soot loading from extended low-load idling

76. A tractor takes much longer than normal to build air pressure from 585 to 690 kPa at fast idle. There are no audible leaks, and the governor cuts out normally. What should be inspected before replacing the compressor?

- A. The compressor intake and discharge line for carbon or restriction
- B. The drive axle ratio and the tire rolling radius of the tractor
- C. The transmission oil cooler lines for any external leakage
- D. The parking brake control valve knob for sticking or binding

77. An oil analysis shows a drop in viscosity, a low flash point, and a normal amount of metal. Which condition fits these findings?

- A. Coolant contamination from a head gasket breach
- B. Fuel dilution of the engine oil
- C. Excessive soot loading from long idle periods
- D. Normal oxidation after an extended drain interval

78. A trailer ABS lamp stays on after the tractor is connected, and the tractor lamp is normal. What should be checked first?

- A. The trailer landing gear gearbox oil level and its crank handle linkage
- B. The reefer unit fuel level and the engine oil level
- C. Power and ground at the trailer ABS connector, plus stored codes
- D. The tire tread depth on the trailer's rear axle tires

79. A technician has repaired an A/C line and is about to recharge the system. Why is evacuation required?

- A. To cool the compressor before the refrigerant is added to it
- B. To add oil to the system through the low-side service port
- C. To bleed the refrigerant into the atmosphere for safety reasons
- D. To remove air and moisture and confirm the system holds vacuum

80. A truck has a noise in neutral with the clutch engaged that disappears when the clutch pedal is depressed. Which components are most likely involved?

- A. The rear axle ring and pinion gears that turn with the wheels
- B. The universal joints on the drive shaft behind the transmission
- C. Input and countershaft bearings or gears turning with the clutch engaged
- D. The water pump bearing that is turning at all times

81. A 13-speed manual transmission will not shift into high range, though the splitter works. What should be checked first?

- A. The oil level in the rear axle carrier housing
- B. Air supply to the range valve and cylinder
- C. The engine oil filter for restriction or bypass
- D. The wheel bearing end play at the steer axle

82. A trailer landing gear leg cranks with great effort and makes a grinding noise. What is the best action?

- A. Inspect and lubricate the gearbox and check the legs for bending
- B. Strike the leg with a hammer to try to loosen the internal parts
- C. Lubricate only the crank handle and test the load again
- D. Disconnect the legs and pull the trailer without them

83. An apprentice is about to remove a brake chamber without chocking the wheels or releasing air pressure because the customer is waiting. What is the best response from the journey person?

- A. Let the apprentice finish quickly and review the safety steps at the end of the shift
- B. Reassign the job to a different apprentice and say nothing about the shortcut
- C. Write the apprentice up in the shop log and leave the vehicle untouched until morning
- D. Stop the job calmly, explain the hazard, and demonstrate the correct lockout and chocking steps

84. A driver reports gear clash when selecting first gear or reverse from a standstill, though shifts on the move are smooth. Which component is the most likely cause?

- A. A leaking rear main seal that is oiling the clutch disc
- B. A worn pilot bearing in the crankshaft that causes the slipping
- C. A worn clutch brake that fails to stop the input shaft
- D. A loose transmission yoke that is clunking at idle speed

85. A tractor has a coolant temperature display of minus 40 degrees Celsius with the engine fully warm. A scan tool shows the sensor voltage at 5 volts. What is the most likely cause?

- A. An open circuit in the sensor or its harness
- B. A thermostat stuck open that is overcooling the engine block
- C. A failed coolant pump that is no longer circulating the coolant
- D. A short to ground in the sensor signal wire of the harness

86. A tractor with air suspension sits low on the left side after being parked overnight. The levelling valve works normally when the system is charged. What is the best next step?

- A. Replace both shock absorbers on the left side of the axle
- B. Raise the system pressure by adjusting the compressor governor cut-out
- C. Remove the left leaf spring and have the entire pack re-arched
- D. Soap-test the left air spring, fittings, and lines for the leak

87. A truck develops a vibration at 85 to 95 km/h that is the same in every gear. What does this point to?

- A. An engine misfire on one cylinder that is dependent on speed
- B. A rotating part tied to road speed, such as the driveshaft
- C. A worn clutch disc that is slipping in higher gears
- D. A restricted exhaust that is slowly changing back pressure levels

88. After use, a click-type torque wrench is put away in the tool drawer. Which storage practice protects its accuracy?

- A. Leave it at the last torque used so the next job starts at that value
- B. Tighten it to its maximum setting so the spring stays fully preloaded
- C. Back it off to the lowest scale setting so the internal spring is relaxed
- D. Lubricate the ratchet head heavily and store it with the handle locked

89. A driver reports weak airflow from the vents at every blower speed. The system cools when air does flow. What should be inspected first?

- A. The refrigerant charge by adding more refrigerant to the high side
- B. The cabin air filter and the evaporator for restriction or icing
- C. The compressor clutch gap and the drive belt tension
- D. The expansion valve capillary tube for kinks

90. Two 55-watt lamps are wired in parallel on a 12-volt circuit. What current does the pair draw?

- A. 4.6 amps
- B. 18.3 amps
- C. 0.2 amp
- D. 9.2 amps

91. An engine control module derates power and sets a code for a low 5-volt sensor reference supply. Several sensors on the same reference wire are reading zero. What is the most likely cause?

- A. A short to ground on the shared reference circuit
- B. A failed turbocharger actuator on the exhaust side
- C. Worn piston rings on one cylinder of the engine
- D. A stuck open thermostat in the cooling system

92. A 1,500 kg engine is lifted with a two-leg chain sling. Each leg makes a 60-degree angle with the horizontal. What is the approximate tension in each leg?

- A. 866 kg
- B. 750 kg
- C. 1,299 kg
- D. 1,732 kg

93. A technician reads a rail pressure of 1,200 bar at idle on a common-rail engine whose specification at idle is 500 bar. There is no leak. Which component is the most likely cause of the discrepancy?

- A. A restricted low-pressure fuel filter on the supply side
- B. A cracked exhaust manifold on cylinder number three
- C. A worn water pump bearing in the cooling system
- D. A faulty rail pressure sensor or pressure control valve

94. A system shows low readings on both gauges, and the sight glass shows bubbles. What should the technician do first?

- A. Add refrigerant until the gauges show normal pressures again
- B. Add oil to the system until the sight glass is clear
- C. Repair the leak, then evacuate and recharge to specification
- D. Replace the cabin air filter and retest the system

95. A tire pressure monitoring system shows one steer tire dropping 40 kPa every morning. The tire has no visible damage. What is the best next step?

- A. Remove the sensor and ignore the warning on the dash
- B. Inflate to placard pressure, then soap-test the valve, bead seat, and tire
- C. Increase the pressure to 200 kPa above the placard value
- D. Rotate the tire to the drive axle and leave it alone

96. A hydraulic system will not reach its specified pressure. A gauge at the test port reads 40 percent of the specification at full pump flow. What is the best next step?

- A. Replace all of the hoses in the system before testing further
- B. Add more fluid to the reservoir until it overflows the filler cap
- C. Test the relief valve and check the pump output
- D. Increase the engine speed to the maximum governed value

97. After a collision, a tractor frame is measured, and the diagonal measurements differ by 12 mm. What does this indicate?

- A. The frame is within the usual tolerance and no action is needed
- B. The frame is likely out of square and needs correction
- C. The suspension is overloaded and the springs need to be replaced
- D. The tires are unevenly worn and need to be rotated

98. Dual tires on a drive axle have different overall diameters. What problem does this create?

- A. Both tires share the load equally and last longer than usual
- B. The tires create less rolling resistance and so save some fuel
- C. The axle ratio is automatically corrected by the size mismatch
- D. The larger tire carries more load and the smaller one scrubs

99. A hydraulic system runs hot, with oil temperature above the normal range. The reservoir level is correct. Which cause should be investigated?

- A. A restricted cooler or a relief valve stuck open
- B. A fuel filter that has been replaced too recently
- C. A fully charged battery that has been overcharging lately
- D. A cabin heater valve that has been left open

100. A technician measures a kingpin and finds that wear has exceeded the manufacturer's limit with a gauge. What is the correct action?

- A. Weld a bead to the pin to build up the worn surface
- B. Leave it in service and lubricate the fifth wheel more often
- C. Replace the kingpin or the trailer upper coupler as required
- D. Increase the fifth wheel jaw adjustment to take up the wear

101. Engine speed rises 400 rpm under heavy load while vehicle speed does not follow. The clutch pedal free play is correct. What should the technician suspect and check?

- A. A seized fan clutch that is overloading the engine crankshaft
- B. An oil-contaminated or worn clutch disc, with seal leaks to find
- C. A weak alternator belt that is slipping on the pulley
- D. A blocked fuel filter that is limiting the engine speed

102. A pump delivers 40 litres per minute to a cylinder with a 90 mm bore. About how fast does the rod extend?

- A. 4.2 cm/s
- B. 25.2 cm/s
- C. 63 cm/s
- D. 10.5 cm/s

103. A vehicle speed sensor code is set as erratic on a truck with a transmission output speed signal. The sensor wiring tests normal. What is a likely mechanical cause?

- A. A restricted fuel filter on the engine supply line
- B. A leaking air spring on the rear suspension
- C. A damaged tone ring on the output shaft
- D. A weak thermostat in the engine cooling system

104. A drum of hydraulic fluid in a shop has lost its supplier label, and a technician gets some on a cut hand. Which document should the shop supervisor consult first for first-aid measures?

- A. The safety data sheet for that product, matched using the drum's purchase records
- B. The vehicle manufacturer's service manual section for the hydraulic system
- C. The workplace label from a different drum of a similar fluid on the shelf
- D. The warranty bulletin issued with the most recent hydraulic pump purchase

105. During a leak-down test on a warm diesel, cylinder 4 shows 45 percent leakage with air hissing from the oil filler tube. Where is the leakage most likely occurring?

- A. Past the exhaust valve into the exhaust manifold
- B. Past the piston rings into the crankcase
- C. Past the intake valve into the intake manifold
- D. Through a head gasket breach into the coolant

106. A technician is jump-starting a tractor with a dead battery. Where should the final negative clamp be connected?

- A. To a clean engine ground away from the battery
- B. To the negative post of the dead battery itself
- C. To the positive post of the booster battery bank
- D. To the starter solenoid battery terminal stud on the engine

107. After resting overnight, a 12-volt battery measures 12.0 volts at open circuit. What does this reading indicate?

- A. The battery is fully charged and in good condition for service
- B. The battery is about 75 percent charged and needs no attention
- C. The battery has an internal short and must be replaced immediately
- D. The battery is about 25 percent charged and needs a recharge

108. The upper heater hose is hot, and the lower hose is cool, with weak heat in the cab. What does this suggest?

- A. A stuck open thermostat in the engine cooling system
- B. A failed air compressor on the engine front cover
- C. A restricted heater core
- D. A leaking steering gear that has lost its fluid

109. A steer tire shows sawtooth feathering across the tread. What is the most likely cause?

- A. Incorrect toe setting
- B. Overinflation of the tires
- C. Underinflation of the tire
- D. A worn drive axle ring gear

110. An automatic transmission fluid sample is dark with a burnt smell, and the level is correct. What is the best course of action?

- A. Add a bottle of friction modifier and return the unit to service
- B. Find the cause of the overheating, then service the fluid and filters
- C. Top the fluid with a different brand to dilute the burnt smell
- D. Ignore the condition if the shifts feel normal to the driver

111. On a multiplexed truck, the marker lights fail and no fuse is blown. The scan tool is connected. What is the best first step?

- A. Replace the main battery switch and then recheck the lights
- B. Run a jumper wire from the batteries to every lamp in turn
- C. Replace the body controller before you check any of the data
- D. Use the scan tool to view the controller output status and codes

112. With the engine at 1,500 rpm and the lights on, the system voltage is 12.4 volts. What is the most appropriate first diagnostic step?

- A. Replace the batteries because the charging voltage is too low
- B. Replace the voltage regulator before measuring anything else
- C. Check the belt and measure voltage at the alternator output
- D. Disconnect the batteries and run the engine from the alternator

113. A technician is installing new cylinder head bolts that are specified as torque-to-yield. What is the correct practice?

- A. Reuse the old bolts after cleaning the threads with a wire brush
- B. Tighten each bolt to the maximum torque in a single pass
- C. Apply thread sealant to the bolts to prevent them from stretching
- D. Use new bolts and follow the torque and angle sequence

114. After setting the toe, the steering wheel is not centred when the truck is travelling straight. Which adjustment corrects this?

- A. Change the drag link length to centre the wheel without altering toe
- B. Change the tie rod length on one side only to centre the wheel
- C. Rotate the steering wheel on its splines by two or more teeth
- D. Increase the air pressure in the tires on the lighter side

115. A technician drains a manual transmission and finds a small amount of fine gray paste on the magnetic plug, with no chips or slivers. What does this indicate?

- A. Imminent bearing failure that requires immediate removal
- B. Normal wear that does not require further teardown
- C. Water contamination that has caused rust in the case
- D. A broken gear tooth that has been ground into powder

116. A technician measures bonded brake lining on a steer axle and finds 5 mm remaining over the steel shoe. What should be done?

- A. Return the tractor to service because lining remains on the shoe
- B. Replace only the lining on the shoe with the thinnest measurement
- C. Replace the linings on both brakes of that axle
- D. Machine the drum to compensate for the reduced lining thickness

117. An air disc brake caliper shows one pad worn far more than the other. Which fault is most likely?

- A. Seized or corroded slide pins that stop the caliper floating
- B. A governor that cuts out at too high a system pressure
- C. A compressor intake filter that is partly restricted
- D. A trailer supply valve that closes at a low pressure

118. An accessory circuit is being added to a tractor. Where should the protective fuse be installed?

- A. Next to the accessory so it is easy for the driver to reach
- B. As close as practical to the power source, protecting the whole wire
- C. At the end of the wire furthest from the battery
- D. Anywhere on the wire, because location does not matter

119. A drive axle leaks oil at the pinion seal, and the technician finds the axle breather is plugged with dirt. What is the connection?

- A. A plugged breather lowers the oil temperature and thickens the oil
- B. A plugged breather draws extra oil into the differential gears
- C. A plugged breather has no effect on the housing pressure
- D. A plugged breather lets pressure build and pushes oil past seals

120. Which measurement must never be taken with a circuit still connected to power or modules?

- A. DC voltage
- B. AC voltage
- C. Voltage drop
- D. Resistance

121. A boom drifts downward slowly with the control valve centred. The valve and hoses are dry. What fault is most likely?

- A. A restricted return filter on the reservoir
- B. An overfilled hydraulic reservoir tank
- C. Internal leakage past the cylinder piston seal
- D. A worn pump drive coupling at the engine

122. A technician installs a new windshield with urethane adhesive. What must be observed before the truck is driven?

- A. The adhesive manufacturer's minimum cure time for safe drive-away
- B. Whether the wipers are working at the highest available speed
- C. Whether the glass has been washed with a glass cleaner solution
- D. Whether the tires have been inflated to the recommended pressure

123. An SCR-equipped engine sets a code for low NOx conversion efficiency. The DEF tank is full, the refractometer reads 32.5 percent, and there are no leaks. Which step is most appropriate next?

- A. Drain the DEF tank and refill it with ordinary tap water
- B. Check the NOx sensors and the dosing valve for correct operation
- C. Disable the DEF heater to prevent overheating of the fluid
- D. Replace the engine oil filter to restore the injector pressure

124. A technician changes the oil in a 2018 tractor and finds that the specification calls for API CK-4 15W-40. The shop has only FA-4 10W-30 on the shelf. What should the technician do?

- A. Use FA-4 because it is always an approved upgrade for older engines
- B. Mix half FA-4 and half old oil so the viscosity falls in between
- C. Add a second oil filter so the thinner oil is filtered twice
- D. Use the specified CK-4 15W-40 unless the engine maker approves FA-4 in writing

125. After sliding a trailer tandem to a new position, what must the technician or driver confirm before moving?

- A. The pins are retracted so that the tandem can move freely
- B. All slider pins are fully extended and seated in the rail holes
- C. The air suspension has been exhausted to the lowest height
- D. The trailer brakes have been released and the wheels unchocked

126. A truck rides harshly and the tires show cupped wear. The technician finds one shock absorber leaking and weak. What is the effect of a worn shock?

- A. The wheel bounces and contacts the road unevenly, causing cupping and instability
- B. The wheel is forced to track straighter and the tire wears evenly
- C. The axle is locked in position and the springs carry less load
- D. The brakes work better because the tire stays in contact with the road

127. A hydraulic filter bypass indicator is in the red zone with the fluid warm. What does this mean?

- A. The fluid level is too high in the reservoir tank
- B. The pump is producing excessive pressure in the system
- C. The filter element is restricted and should be replaced
- D. The fluid is too cold to be pumped through the circuit

128. A hybrid truck sets a high-voltage isolation fault code. What is the correct approach?

- A. Follow the procedure in rated gloves, inspect for damage or moisture, and test insulation
- B. Clear the code and return the truck to service if it does not return
- C. Disconnect the low-voltage battery and then spray contact cleaner on the cables
- D. Ignore the code because isolation faults are only a software warning

129. A tractor's low-air warning sounds and the primary service circuit gauge drops quickly, while the secondary gauge stays near normal. What does this indicate?

- A. A failed alternator that is not charging the batteries
- B. A significant leak in the primary service circuit
- C. A trailer parking brake that is applied by mistake
- D. A governor that has been adjusted to the cut-in limit

130. Air escapes from the breather hole on the side of a service brake chamber each time the brake pedal is applied. What is the most likely cause?

- A. A relay valve that is open to exhaust when released
- B. A parking brake valve that is out of adjustment on the dash
- C. A ruptured service diaphragm inside that brake chamber
- D. A trailer protection valve that closes at a low pressure

131. A technician is preparing to work on a high-voltage component of a battery-electric truck. Which sequence is correct?

- A. Remove the orange cables first and then switch off the key
- B. Verify zero volts before you remove the service disconnect
- C. Wear ordinary work gloves and test with a test lamp
- D. Power down, remove the service disconnect, wait, then verify zero volts

132. A reefer trailer shows poor cooling, and heavy frost covers the evaporator coil. The unit's setpoint is correct. Which fault is the most likely?

- A. A defrost fault such as a failed sensor or heater
- B. A worn trailer tire that is increasing the rolling resistance
- C. A loose landing gear leg that is moving on the frame
- D. A trailer ABS sensor that is giving an incorrect signal

133. A cab sways excessively over rough pavement, and the technician finds a collapsed rubber cab mount at the rear. What is the correct repair?

- A. Tighten the cab mount bolts beyond the specified torque rating
- B. Replace the worn mounts and check the cab shocks
- C. Pack the mount with grease to restore its lost stiffness
- D. Weld a spacer between the cab and the frame bracket

134. A technician is asked why a hot engine should not have its radiator cap removed immediately. What is the best reason?

- A. The cap is made of plastic that is damaged by heat
- B. The coolant level will fall below the sensor and set a code
- C. The pressure cap seal must cool before the gasket can be inspected
- D. The coolant is above its boiling point and can flash to steam

135. A scope shows a regular crankshaft sensor pattern with one gap in the signal every revolution. What does this indicate?

- A. A damaged sensor that is dropping signal on one cylinder
- B. A shorted sensor winding that is shunting current to ground
- C. A normal missing tooth giving a position reference
- D. A loose flywheel that is moving relative to the crankshaft

Practice Exam 10: Answer Key and Explanations

1. C — A regeneration that cannot start or finish is usually blocked by an active fault, such as an exhaust temperature or differential pressure sensor, or an injector or doser problem. Checking those codes and sensors first is the logical diagnostic path. Oil intervals, brake governor settings, and transmission sensors are not part of the regeneration permissive conditions.

2. A — Limp-home mode is a protective response to a fault, so the cause is found by reading the code and inspecting its circuit. Wiring and connectors are frequent causes. Replacing the converter or solenoids without data is wasteful, and changing the fluid grade does not address an electrical fault. That data also names the circuit involved.

3. D — A repair in a vehicle harness must be mechanically sound, sealed against moisture, and secured against vibration. A properly crimped or soldered splice covered by adhesive-lined heat shrink does this. Tape and twisted joints loosen and admit moisture, and wire nuts are household devices not suited to a vibrating chassis.

4. B — A variable reluctance sensor is a coil that generates its own AC signal as teeth pass the pole piece, so it is tested for coil resistance and AC voltage output during cranking. Applying 12 volts can damage it, and it has no DC reference or steady 5-volt signal that applies to Hall-effect sensors.

5. C — Foam and pump whine show aeration of the fluid. This happens when the reservoir is low or when air is drawn in on the suction side of the pump through a leaking hose or fitting. The cause must be found and the system refilled and bled. Tie rods and wheels do not aerate power steering fluid.

6. D — Refrigerants are regulated because of their effect on the environment, so they must be recovered with approved equipment by a certified person. Venting, draining, and opening a charged system are illegal or unsafe. Recovered refrigerant is recycled or reclaimed rather than released. Certified technicians also record the recovered amount, which proves nothing was lost.

7. A — A restricted filter limits intake air, causing a rich mixture that burns incompletely and produces black smoke. The service restriction indicator is the guide for replacement. Raising rail pressure would

make it worse, DEF belongs only in the SCR tank, and changing timing is not a service fix. Replacing the element is the correct and cheapest fix.

8. C — The governor senses system pressure and signals the compressor to unload at cut-out. If pressure keeps climbing, the governor is not signalling or the compressor unloader is stuck, and the safety valve is protecting the system. The application valve, trailer supply valve, and slack adjusters do not control compressor loading.

9. B — A healthy compressor creates a pressure difference between the suction and discharge sides. Equal pressures on both gauges with the clutch engaged mean that the compressor is not pumping, usually from internal wear or valve failure. A restriction would show a split in pressures, and the fan and oil do not equalise the gauges.

10. D — A replacement controller must be loaded with the right calibration for the transmission and vehicle and then taught the system with the manufacturer's procedures. Releasing the truck without these steps can cause rough shifting or faults. Clearing codes and swapping sensors do nothing for calibration. Skipping this step often leaves the shifts harsh and sets fresh fault codes.

11. A — The paper test checks seal compression: if the strip slides out without resistance, the seal is not pressing there. This locates the gap so the seal or latch can be adjusted or replaced. Oil on hinges, a new mirror, and tire pressure do not address air leaking past a door seal.

12. A — A reprogramming session is sensitive to voltage drops that can corrupt the controller's memory. A stable power supply or maintainer holds voltage steady with the key on and the engine off. Disconnecting the battery stops the process, and a running engine or extra loads add voltage swings. A dropped supply mid-flash can leave the module unusable.

13. C — Dryers remove water vapour but oil in the purge or in the tanks signals that the compressor is passing oil, often from worn rings, a restricted intake, or a failing unloader. Crankcase ventilation is a different system, a charged trailer does not add oil, and governor settings do not create oil carryover.

14. D — A hydraulic retarder produces braking by shearing fluid, so a low level reduces its output. The technician must find where the fluid is going and fix it before topping up with the specified fluid. Engine oil is the wrong fluid, disconnecting the control disables it, and changing a seal without finding the leak is guesswork.

15. B — Voltage drop equals current times resistance, or 500 amps times 0.0008 ohm, which gives 0.4 volt. This is within a reasonable limit for a cable. A decimal slip gives 0.04 or 4.0 volts, and 0.625 comes from dividing instead of multiplying. Measuring the drop confirms a cable is carrying current well.

16. B — A spring brake chamber holds a powerful compressed spring that can cause severe injury if released. Chambers are not serviceable in the field, so the complete assembly is replaced. Welding or drilling the housing weakens it, and removing the clamp ring from a caged chamber is dangerous and prohibited. Replacement is therefore the only acceptable repair.

- 17. D** — Free play is the pedal travel before the release bearing touches the pressure plate. With none, the bearing stays under load, which wears it and can prevent the pressure plate from clamping fully, leading to slip. The clutch brake, pilot bearing, and flywheel speed are not governed by this adjustment.
- 18. C** — Voltage drop is measured across the portion of circuit being tested while current flows. A high drop on the positive side, with a normal ground side, locates the resistance in the positive cable or its terminals. Low battery capacity would show at the battery posts, not across the cable. The ground side is fine.
- 19. A** — If the trailer axles are not square to the kingpin and to each other, the trailer tracks to one side and the tires scrub. The axles are measured and aligned. Steer tire pressure, a saturated dryer, and an over-lubricated fifth wheel do not produce a dog-tracking trailer. Parallel alignment returns straight tracking and normal tire life.
- 20. B** — The lockout makes both drive axles turn at the same speed, which helps in poor traction. It should be engaged before wheels spin, or with the wheels stopped, because engaging it while spinning can damage the unit. It should be released on good surfaces because locking is hard on tires and drivetrain.
- 21. C** — A relay that clicks has an energized coil, but the contacts may be burned or high in resistance. Measuring the voltage drop across the contacts while commanding the starter shows whether power passes through. Specific gravity and the dryer heater are unrelated, and replacing the ignition switch is a guess.
- 22. A** — The tractor protection valve shuts off the supply and service lines to the trailer when pressure falls below its closing pressure, which keeps the tractor's brakes charged. Relay valves, quick-release valves, and purge valves all have other jobs and do not isolate the tractor from a broken trailer line. Without it, the broken line would drain the tractor.
- 23. D** — Heavy-duty engines with wet liners need corrosion inhibitors, often nitrites, to protect against liner pitting from cavitation. Low levels leave the metal exposed to pitting and corrosion. Oil thickening, belt idler wear, and exhaust gas temperature are not directly connected to the coolant additive concentration. Test strips or a titration kit confirm the additive level.
- 24. D** — After coupling, the technician must visually confirm that the jaws have closed around the kingpin and that the release handle is in place, then pull gently against the trailer brakes to confirm the connection. Relying on sound or dash lights is inadequate, and the landing gear should not be raised before the coupling is verified.
- 25. A** — A twisted hose can fail early under pressure, and a hose bent too sharply restricts flow and weakens the reinforcement. A hose also needs slack to change length under pressure, and clamps and clearances protect it from heat and rubbing. Pulling it tight or routing it near heat shortens its life.
- 26. C** — The cap raises the boiling point by holding pressure; a weak or wrong cap vents early and lets the coolant boil at a lower temperature. A thermostat that opens early would not cause boil-over, an oil level a little high does not heat the coolant, and a fan clutch that engages hot is behaving as designed.

27. B — A soft pedal with no leaks is usually due to air in the lines, which is removed by bleeding in the specified order, commonly beginning at the wheel farthest from the master cylinder. Overfilling the reservoir does not remove air, tires have nothing to do with pedal feel, and disconnecting ABS only hides faults.

28. D — A height control valve sets ride height by metering air to the springs, and the length of its linkage determines the height. Adjusting the linkage to specification restores the correct height. Governor pressure, shock mounting, and removing air springs are not valid adjustments. Correct height keeps the axle travel centred and prevents bottoming out on bumps.

29. C — Several unrelated modules failing at one instant points to something they share, such as a power feed, a ground, or the data link. Three independent failures at the same time are far less likely. A fuel filter and a clutch disc cannot cause modules to lose communication. Checking shared power and grounds comes first.

30. A — A J1939 backbone has a 120-ohm terminating resistor at each end, which measures about 60 ohms in parallel. A reading of 120 ohms shows that only one resistor is present or the backbone is open. A short to battery positive would give a different reading, and sleeping modules do not change the resistance.

31. B — A fault code identifies a parameter and a failure mode, here coolant temperature voltage above normal, and points to a circuit rather than to a specific part. The technician must test the sensor, wiring, connector, and reference voltage to find the cause. Replacing parts from a code alone often misses harness or connector faults.

32. A — Lockout is not complete until every stored energy source is released and the result is verified. A hydraulic circuit can hold pressure long after the engine stops, so verification comes before any fitting is opened. Loosening a hose to test for pressure risks an injection injury, and restarting the engine reintroduces energy.

33. C — A pedal that sinks under steady foot pressure while the fluid level is stable suggests the master cylinder piston seal is leaking internally, bypassing fluid without losing it externally. A worn throwout bearing makes noise and does not sink the pedal. A cracked flywheel and a trailer air leak do not affect the hydraulic circuit.

34. D — High blow-by together with low compression on every cylinder points to widespread ring and cylinder wear, because combustion gas is passing the pistons into the crankcase. A single burned valve would affect one cylinder and not cause blow-by. A stuck thermostat and a fuel regulator fault do not reduce compression.

35. B — Electric compressors have a motor winding in contact with the refrigerant and oil, so the oil must be non-conductive to maintain the high-voltage insulation. Many use POE oil, but the technician follows the manufacturer. A conventional PAG oil conducts and can cause an isolation fault, and engine oil and transmission fluid are the wrong products.

36. D — A cracked main leaf compromises axle location and load capacity. The spring or leaf is replaced, and the opposite spring is replaced as a pair to keep ride height and load sharing equal. Welding spring steel and operating with a missing leaf are unsafe practices that violate normal repair standards.

37. A — A healthy charging system shows less than about 0.5 volt of AC ripple on the DC system. A reading of 1.2 volts indicates that a rectifier diode is open or shorted, allowing AC through. A weak cell or a poor ground would not create AC on the battery terminals. The rectifier bridge usually needs replacing.

38. B — The allowable stroke for a Type 30 clamp-type chamber is 51 mm, so 57 mm is out of limits. Automatic adjusters should keep the stroke in range, so a long stroke signals a defect in the adjuster, linkage, or cam. The cause must be found and repaired, not hidden by loosening mountings or by swapping a diaphragm.

39. C — A common load test applies half the CCA rating, here 500 amps, for 15 seconds and expects the voltage to stay above about 9.6 volts at normal temperature. A fully charged battery that falls to 8.9 volts has failed. Recharging does not change the result, and the test was done at the terminals.

40. B — Excessive toe-out makes the tires scrub and the steering unstable. Adjusting the tie rod to specification corrects the geometry, and the steering wheel position is rechecked afterward. Extra air and tire rotation do not cure a geometry fault, and the steering gear is not the cause when the toe is clearly wrong.

41. D — Low supply pressure with new filters and no leaks points to the fuel transfer or lift pump, or to a regulator that is relieving pressure. The wastegate, EGR bypass, and damper do not affect low-pressure fuel delivery. A technician confirms the pump output and relief valve before looking at injectors.

42. A — When different circuits interact, a shared ground that is poor often causes lamps to flicker or to appear on a different circuit. A voltage drop test of the trailer ground locates it. Starting batteries, air filters, and brake chambers do not link marker and turn-signal circuits. Cleaning or repairing the ground restores steady lighting.

43. C — The battery management system limits charge current when the pack is cold or nearly full, so regenerative braking is reduced and the friction brakes pick up the difference. This is normal behaviour and not a fault. Pad wear, tire pressure, and dryer problems do not account for weaker regeneration. The behaviour returns to normal as the pack warms.

44. D — Correct DEF is 32.5 percent urea in deionized water, so a reading near 22 percent shows dilution or substitution. Such fluid can cause poor NO_x conversion and crystal buildup. Freeze-thaw cycles do not change concentration when the tank is mixed, and DEF does not oxidize in a way a filter change would fix.

45. B — A wheel speed sensor reads the teeth of a tone ring. Damaged teeth, debris, or an excessive air gap can give a weak or erratic signal that only shows up when the ring is spinning quickly. Dryer purge behaviour, lining thickness, and governor pressure do not generate a speed sensor signal fault.

- 46. C** — Heat-treated frame rails are sensitive to stress concentrations and heat. Drilling the flanges, welding to them, or notching them can crack the rail. Manufacturers allow holes in the web in approved locations and prescribe fastener types. Using existing holes avoids creating new weak points. Following these limits protects the rail's strength.
- 47. A** — Grinding at engagement indicates the pinion and ring gear are not meshing correctly, often from damaged ring gear teeth or a worn pinion. Battery voltage is good, so the electrical supply is not the issue. An air governor, a radiator hose, and an oil pressure sensor do not produce grinding at the starter.
- 48. B** — Dim lights with normal supply voltage often come from a poor ground path, and a voltage drop test of the ground side through the connector locates the resistance. Replacing the alternator does not fix a ground fault, higher-wattage bulbs overload wiring, and a second battery does nothing for connector resistance.
- 49. D** — An automated manual transmission has no clutch pedal. Its controller learns the clutch engagement point, so after a clutch replacement the touch point must be relearned with the service tool. Free play does not apply, the clutch housing is dry, and disconnecting batteries does not teach the controller anything. The result is stored in memory.
- 50. C** — A cab that is not latched can tilt forward on braking, which is extremely dangerous. The technician must confirm that the latches are engaged and the indicator or handle shows it is locked. The prop must be stowed, not left in position, and the pump and wipers are not part of securing the cab.
- 51. A** — Wheel bearing end play must be within the maker's range to protect the bearing and seal. A reading of 0.20 mm exceeds the upper limit and calls for readjustment. Accepting it is wrong, extra grease will not alter the clearance, and a different brake drum has no effect on bearing end play.
- 52. A** — Lash is measured on the base circle of the cam, so only the valves that are closed in that crankshaft position can be set. The sequence repeats at the next position until all valves are done. Setting all at once or by feel produces incorrect lash. Both intake and exhaust valves are adjustable on most engines.
- 53. B** — Force equals pressure times piston area. The area of a 90 mm bore is about 0.00636 square metres, and 15 million pascals multiplied by that area gives about 95 kilonewtons. Using the radius as the diameter halves the area, and a decimal slip gives 9.5 or 950, so area must be calculated first.
- 54. C** — A parasitic draw is isolated by interrupting circuits one at a time. With the meter in series, pulling a fuse and seeing the current fall shows which circuit carries the draw. Replacing the alternator is a guess, and battery tests do not locate a draw, since the batteries are only the victim.
- 55. D** — Wax crystals from cold-weather gelling block the filter and starve the engine. Replacing the filter, warming the fuel, and using winter-grade fuel or an approved anti-gel additive solves it. Gasoline is dangerous in a diesel system, software changes do not remove wax, and removing the thermostat makes the engine run cooler.

56. C — The discard dimension is the maximum wear diameter, beyond which the drum wall is too thin to handle heat and stress and may crack. The drum must be replaced. Machining it further only increases the diameter, thicker lining does not restore the strength, and paint cannot change the drum's safe dimension.

57. D — Welding current can flow through wiring, bearings, and electronics if it finds a path to the ground clamp. Disconnecting power and module connectors and clamping the ground right beside the weld keeps the current path short and away from sensitive circuits. Leaving batteries connected or grounding far away invites damage, and internal protection is not designed for welder current.

58. B — If the motor runs but the arms do not sweep, the drive between the motor and the arms is not transmitting, typically a loose nut, stripped splines, or a broken linkage. A weak battery would slow the motor, and the thermostat and washer reservoir have no part in the mechanical drive.

59. A — Excess radial play in the turbo shaft bearings allows the wheels to contact their housings, creating metal debris and a risk of wheel failure that can damage the engine. Oil in the intake also signals seal failure. The play does not improve response, lower friction, or affect coolant temperature in any useful way.

60. A — Play at the steering wheel can come from worn linkage, joints, or the gear itself. The technician checks the linkage and the column joints first because they are the most common and easiest to verify. Air brake, clutch, and electrical components do not contribute to steering wheel play. Only after those checks should the gear itself be adjusted.

61. C — Loose fifth wheel fasteners can allow movement and cause fatigue and failure. The technician must inspect the mounting for damage, replace faulty hardware, and torque to specification. Hand tightening is not accurate, smaller extra bolts do not carry load properly, and thread locker cannot compensate for a loose joint. Loose bolts can crack the plate.

62. B — A thermal management loop that has been opened can trap air, which reduces coolant flow and heat transfer. The maker's service procedure usually includes a bleed or fill routine with the scan tool and pump. Transmission fluid, brake lines, and a starter motor are not part of the battery cooling system.

63. D — Wheel nuts can lose clamp load as paint and mating surfaces settle, so the usual recommendation is to retorque after the first 80 to 160 km. Waiting for the annual inspection or for a vibration is too late, and 10,000 km is far beyond when the joint settles. This check keeps the nuts from loosening.

64. C — A gladhand seal is a replaceable rubber gasket that makes the connection airtight. A worn seal leaks, so it is replaced and the faces are checked. Tape does not seal against pressure, forcing the coupling damages it, and removing the seal guarantees a leak. Always inspect the coupling faces for nicks that cause leaks.

65. B — Low boost with a clean air filter often comes from a leak between the turbocharger and the intake manifold, so the charge air system is pressure-tested before any part is replaced. Replacing the

turbo without testing can waste money, and fuel or throttle sensor problems would not produce a boost-specific shortfall by themselves.

66. D — A controller power code points to its supply or ground, so testing voltage and voltage drop at the connector is the efficient next step. Replacing four sensors ignores the code, an air dryer heater has no connection to the controller, and pushrod stroke affects braking force and not ABS electrical supply.

67. A — Compression-release brakes depend on correctly set lash and working slave pistons and solenoids to open the exhaust valves at the right time. Cylinders that are not contributing suggest a lash, piston, or solenoid fault in that housing. The turbo oil line, DPF sensor, and drain plug do not affect the brake action.

68. B — If the chamber retracts fully but the brake still drags, the problem is mechanical at the brake: seized cam bushings or a broken or weak return spring keep the shoes against the drum. Dryer purge, governor setting, and steering gear wear are not part of the brake release path. Inspecting the cams and springs finds the cause.

69. C — Whine and foam are classic signs of cavitation and aeration, which occur when the pump draws in air or is starved from a low level or restricted suction line. A relief valve fault changes pressure, not the foam, and a rod bearing has no connection to pump noise. Clean fluid does not harm a pump.

70. A — A wheel must seat evenly against the hub, so the nuts are tightened in a crisscross pattern and brought to final torque in stages. Going around in a circle can tilt the wheel, and full impact power can over-stress studs. Grease on nut faces changes friction, so the specified torque would no longer give the intended clamp load.

71. D — A steady pressure drop means air is escaping somewhere in the circuit under test, and a soap solution shows bubbles exactly where it leaks. Removing chambers is slow and unnecessary, a new dryer cartridge does not stop a leak, and raising the governor setting hides the problem while stressing the system.

72. A — A truck pulls toward the side that brakes harder. A longer stroke on the left means that brake is applying with less force, so the right brake does more work and the truck pulls right. A dragging right brake would show a hot drum with brakes released, and steering or governor faults do not give this stroke pattern.

73. D — A worn U-joint shows radial play when the shaft is moved by hand, and rust-coloured dust at the cups shows needle bearing wear. Spinning the shaft is unsafe and does not measure play. Greasing the slip yoke does not fix joint wear, and a speed sensor voltage is unrelated to joint condition.

74. C — Automatic transmission fluid expands with temperature, so the level must be read at normal operating temperature with the engine idling in neutral on level ground, using the hot band. A cold reading with the engine off or a reading in drive at high idle will give a false level. The hot band reading therefore guides any fluid addition.

75. B — Sodium and potassium are common coolant additive elements, and glycol is the antifreeze itself. Together they point to coolant entering the oil, perhaps through a failed oil cooler or head gasket.

Fuel dilution shows lowered viscosity and flash point, and normal cam wear shows iron, while soot loading produces a different pattern.

76. A — A compressor that pumps slowly can be hampered by a restricted intake or a discharge line choked with carbon, which raises the load and slows pumping. Inspecting both is cheap compared with replacing the compressor. Axle ratio, transmission cooler lines, and the parking brake knob have nothing to do with air pumping rate.

77. B — Fuel thins the oil and lowers its flash point, the temperature at which vapours ignite. Metal readings can remain normal if wear has not yet increased. Coolant contamination shows glycol and sodium, soot loading increases viscosity, and oxidation also thickens the oil, so only fuel dilution matches all of the observations.

78. C — A trailer ABS lamp that stays on indicates a fault in the trailer system, and the controller needs proper power and ground through the connector. Checking those and reading the codes locates the problem. Landing gear oil, reefer fuel, and tread depth do not affect ABS operation. Reading the codes shows which circuit failed.

79. D — Air and moisture in a refrigeration system cause poor performance, corrosion, and ice or acid formation. A vacuum pump removes them, and a system that holds vacuum shows there are no leaks. Evacuation does not cool the compressor, add oil, or vent refrigerant, which must be recovered. Vacuum should hold steady for several minutes.

80. C — With the transmission in neutral and the clutch engaged, the input shaft and countershaft turn with the engine. Depressing the pedal stops them, so the noise disappears. Axle gears and U-joints are not turning when the vehicle is stationary, and the water pump noise would continue with the pedal down.

81. B — Range and splitter shifts are air-operated. If the splitter works, the air supply is present, so the technician checks the range valve and the range cylinder seals and lines. Axle oil, the engine oil filter, and steer axle bearings do not affect the transmission range shift. Air leaks at the range cylinder are a common cause.

82. A — Hard cranking and grinding indicate dry or damaged gears or bent legs. The gearbox must be inspected and lubricated, and damaged parts replaced, before the landing gear is used. Striking the leg can damage it further, lubricating only the handle misses the problem, and removing the legs is unsafe. Bent legs or worn gears must be replaced.

83. D — A journeyperson mentors by correcting unsafe behaviour at once, explaining why, and modelling the safe method. Waiting until the end of the shift lets the hazard continue. Silently reassigning the job teaches nothing, and an immediate disciplinary entry without instruction does not give the apprentice the skill needed on the next job.

84. C — The clutch brake stops the input shaft when the pedal is pressed to the floor, so a stationary shift into first or reverse goes smoothly. When it is worn or the pedal travel is wrong, the shaft keeps spinning and the gears clash. A leaking seal would cause slipping, not clash at rest.

85. A — Temperature sensors are thermistors fed with a 5-volt reference. An open circuit lets the signal float to the reference, which the module reads as an extremely cold temperature. A short to ground would pull the voltage to zero and read extremely hot, while a thermostat or pump fault would change the real temperature, not produce an impossible reading.

86. D — An air spring that loses pressure overnight has a leak in the bag, fitting, or line. Soap solution shows bubbles at the leak. Shock absorbers control motion and do not hold height, raising governor pressure does not fix a leak, and an air-suspension axle does not have a leaf spring to re-arch.

87. B — A vibration that tracks road speed, regardless of gear or engine speed, comes from a part turning with the wheels, such as the driveshaft, wheels, tires, or axle. Engine faults change with engine rpm, and clutch slip and exhaust restriction would depend on load and not on a narrow band of road speed.

88. C — A click-type wrench relies on a calibrated spring. Leaving it wound to a high setting for long periods can fatigue the spring and shift the click point. Returning it to the lowest setting, but not below the lowest marked value, keeps the spring relaxed. Over-lubricating the head can contaminate the mechanism and does nothing for calibration.

89. B — Weak airflow at all speeds suggests a restriction in the air path, such as a plugged cabin filter, or an evaporator that is blocked with dirt or ice. The refrigerant charge, clutch, and expansion valve affect cooling capacity and not airflow volume. A restricted air path also lowers cooling because the evaporator cannot exchange heat properly.

90. D — Power equals voltage times current, so the current is the total power divided by voltage. Two lamps at 55 watts use 110 watts, and 110 divided by 12 gives about 9.2 amps. A single lamp draws 4.6 amps, and the other values come from doubling in error or using the wrong formula.

91. A — Sensors that share a 5-volt reference all lose their supply when that wire is shorted to ground, and each one reads zero. The module sets a reference fault and derates because it can no longer trust the inputs. Mechanical faults such as rings or thermostats would not collapse several electrical readings at once.

92. A — Each leg carries half the 1,500 kg load, or 750 kg of vertical force, and that force is divided by the sine of 60 degrees. 750 divided by 0.866 gives about 866 kg per leg. Using 750 ignores the sling angle, while 1,299 and 1,732 come from using the wrong trigonometric ratio or the full load.

93. D — A rail pressure far above specification implies that the control system is not releasing or regulating pressure correctly, or that the sensor is reporting a false value. Verifying the sensor against a known gauge and testing the control valve is the next step. A restricted filter would lower pressure, while the exhaust and water pump faults have no direct effect.

94. C — Low pressures and bubbles show a low charge, and refrigerant is only lost through a leak. The leak must be found and repaired, and the system evacuated and recharged to specification by weight. Topping up hides the leak, adding oil does not correct a refrigerant shortage, and the cabin filter has no connection to the gauge readings.

95. B — A steady overnight loss points to a slow leak at the valve, bead seat, or a puncture. Soap solution shows bubbles at the source. Ignoring the warning leaves the problem, over-inflating is dangerous and does not fix a leak, and moving a leaking tire to another position only moves the risk.

96. C — Low pressure at full flow often means oil is leaking back to the tank, through a relief valve that is stuck open or set low, or through a worn pump. Testing those narrows the cause. Replacing hoses without evidence is wasteful, and adding fluid or more engine speed does not fix a pressure shortfall.

97. B — Equal diagonals show that the frame is square. A difference of 12 mm is larger than the tolerance commonly allowed, about 3 mm, so the frame is likely distorted and must be inspected and possibly straightened. Suspension load and tire wear do not change frame diagonals. Straightening to specification restores handling and tire life.

98. D — On a dual assembly the tires should be matched in diameter. A larger tire carries more of the load and the smaller one is dragged, so both wear unevenly and run hot. Mismatching does not share load, save fuel, or alter the axle ratio. Matching diameters within the manufacturer's limit prevents this.

99. A — Hydraulic fluid heats when energy is wasted, such as when oil is forced over a relief valve or when a cooler cannot remove heat. Both must be checked. Fuel filters, batteries, and cabin heaters are not connected to hydraulic oil heating. Pressure and temperature checks at the cooler and relief valve locate the real cause quickly.

100. C — A kingpin worn beyond its limit can allow the trailer to separate or the jaws to release. Replacement is the safe repair. Welding changes the hardness and shape of the pin, additional lubrication does not restore the wear, and adjusting the jaw does not make a worn pin safe. The kingpin must be replaced.

101. B — Engine rpm rising without matching road speed is the classic sign of clutch slip. Wear or oil contamination of the disc is the usual cause, and the oil must come from somewhere, so the seals are inspected. A seized fan clutch, belt slip, or fuel restriction would change engine behaviour, not the speed relationship.

102. D — Speed equals flow divided by piston area. The bore area is about 63.6 square centimetres, and 40 litres per minute is 40,000 cubic centimetres per minute, giving about 629 centimetres per minute, or 10.5 centimetres per second. Forgetting to convert minutes to seconds or litres to cubic centimetres yields the other values.

103. C — A speed sensor reads the teeth of a reluctor or tone ring. If the ring is damaged, contaminated with metal debris, or loose, the signal becomes erratic even when the wiring is fine. A fuel filter, an air spring, and a thermostat do not influence the speed signal. The ring should be inspected, cleaned, or replaced.

104. A — The safety data sheet lists first aid, handling, and spill response for a specific hazardous product, so the supervisor must identify the product from purchase records and find its sheet. A service manual does not cover chemical first aid. A label from another drum may describe a different formulation, and warranty bulletins address parts coverage, not exposure.

105. B — Air escaping through the oil filler or crankcase breather points to leakage past the rings and cylinder wall, since that is the only path from the combustion chamber to the crankcase. Exhaust valve leakage is heard at the tailpipe, intake leakage at the air inlet, and a head gasket breach shows as bubbles in the coolant.

106. A — The final connection can create a spark, and batteries emit hydrogen. Connecting the last clamp to a clean engine ground away from the battery keeps the spark away from the gas. The negative post of the dead battery puts the spark at the source, and the positive post or solenoid would cause a short circuit.

107. D — A rested 12-volt lead-acid battery reads about 12.6 volts or more when fully charged, and 12.0 volts corresponds to roughly a quarter charge. It should be charged and then load tested to confirm its condition. The reading alone does not show a short, and it is not a normal full-charge value.

108. C — Hot coolant entering the core and cool coolant leaving it, with weak cab heat, shows that flow through the core is restricted, often from debris or scale. A stuck thermostat would make both hoses cooler, and the air compressor and steering gear are unrelated to heater flow. Reverse flushing or replacing the core restores flow.

109. A — Feathering, where tread blocks are worn to a taper across the tire, results from incorrect toe that makes the tire scrub sideways. Overinflation wears the centre of the tread, underinflation wears both shoulders, and a worn ring gear affects the axle and not tire wear patterns. Correcting toe stops the scrubbing.

110. B — Burnt fluid means the transmission has overheated, often because of a clogged cooler, a slipping clutch pack, or heavy duty cycles. The cause must be found before fresh fluid is installed, or the problem will recur. Additives, dilution, and ignoring the sign do not correct the cause. Cooler flushing follows the repair.

111. D — Multiplexed systems switch loads through a controller, so the data link shows whether the controller is commanding and sensing the output. Viewing status and codes narrows the fault quickly. Swapping the battery switch or the controller without data is a guess, and jumper wires can overload or bypass protections. This approach saves time and avoids unneeded parts.

112. C — A charging voltage near battery voltage means the alternator is not producing enough. Checking the drive belt and measuring output at the terminal separates a mechanical or wiring problem from an alternator or regulator fault. Replacing parts without tests is wasteful, and running without batteries can damage electronics. Measuring first prevents wasted parts and repeat visits.

113. D — Torque-to-yield bolts are tightened into their plastic range to give a very consistent clamp load, so they stretch permanently and must be replaced. The tightening procedure of torque followed by angle, in the specified sequence, produces uniform gasket loading. Reusing them or over-tightening in a single pass risks an uneven clamp.

114. A — The drag link connects the pitman arm to the steering arm, and changing its length repositions the steering wheel without altering toe. Changing a single tie rod would upset toe, and moving the steering wheel on the splines would hide an off-centre gear. Tire pressure is unrelated to wheel position.

115. B — Fine gray paste is normal for gear wear on a magnet. Large chips, slivers, or bright metal would signal a failure in progress. Water would show as milky fluid or rust, and a broken tooth would leave chunks on the plug, so the finding supports routine service only. No teardown is justified by this finding.

116. C — The usual minimum for bonded lining is about 6.4 mm, so 5 mm is below the limit. Brakes are replaced in axle sets to keep braking balanced, which rules out replacing a single lining. Machining the drum does not restore lining thickness, and the vehicle should not be returned to service below the limit.

117. A — A floating caliper must slide freely to apply both pads evenly. Seized or corroded pins let one pad do most of the work, giving uneven wear. Governor, compressor, and trailer valve problems affect supply pressure and not the distribution of force across a single caliper. Cleaning and lubricating the pins corrects the wear pattern.

118. B — A fuse protects the wire between the power source and the load, so it must be near the source. If the wire shorts anywhere beyond the fuse, the fuse opens. A fuse near the load leaves most of the wire unprotected and can allow a fire. The fuse rating should also suit the wire gauge.

119. D — As the axle warms, air in the housing expands. The breather lets that pressure escape. When it plugs, pressure rises and pushes oil past the weakest seals. The breather must be cleaned or replaced along with the seal. It does not cool the oil, and it does affect housing pressure.

120. D — A meter measures resistance by sending a small current through the circuit, so any external voltage will give false readings and may damage the meter or modules. Voltage, AC voltage, and voltage drop are all measured on a live circuit by design. The circuit should be isolated before measuring resistance.

121. C — If a cylinder drifts while the valve is centred and there are no external leaks, fluid is bypassing the piston seal inside the cylinder. A return filter restriction or a high reservoir level would not allow a load to sink, and a pump coupling issue would affect flow rather than holding.

122. A — A windshield is a structural component and helps support the cab roof and passenger airbag in some designs. Urethane needs a specified cure time to reach the strength required, and the maker's safe drive-away time must be followed. Wiper speed, glass cleaner, and tire pressure have nothing to do with the bond.

123. B — With good fluid quality and no leaks, the next logical suspects are the NOx sensors, which measure conversion, and the dosing valve, which delivers the fluid. Tap water would destroy the system, the heater prevents freezing and does not cause low efficiency, and the oil filter is unrelated to NOx conversion.

124. D — FA-4 is a lower-viscosity, high-temperature, high-shear oil that is meant only for specific engines whose maker approves it. It is not backward compatible. The technician follows the specified grade. Mixing oils or adding filters does not address the incompatibility and could harm lubrication or violate the manufacturer's requirements. Check the maker's list before substituting any oil.

125. B — A slider tandem is held by locking pins that must pass through the frame and rail. A visual check that all pins are fully engaged prevents the tandem from shifting under braking. Pins must not be retracted when moving, and exhausting the suspension or releasing brakes does not secure the tandem.

126. A — Shock absorbers damp spring motion. When they are weak, the wheel bounces, which causes uneven contact and cupped wear and also reduces control. A worn shock does not improve tracking, lock the axle, or help the brakes. Replacing shocks in axle pairs restores damping and prevents further cupping of the tread blocks.

127. C — The indicator senses the pressure drop across the filter. In the red zone with warm fluid, the element is loaded with contaminants and must be changed. A cold reading can give a false indication, but with warm fluid it is a real restriction. Level and pump pressure do not trigger the indicator.

128. A — An isolation fault means a high-voltage conductor may be leaking to the chassis, a shock hazard. The technician must follow the procedure, wearing the rated gloves, and inspect for damage or moisture and measure insulation resistance. Clearing, spraying cleaner, or ignoring the code leaves a hazard in place. Only then should repairs and clearing codes follow.

129. B — Dual-circuit systems isolate the service circuits with protection valves so a leak in one does not drain the other. A fast drop in the primary circuit with a normal secondary indicates a leak limited to the primary side. The alternator, trailer parking brake, and governor setting do not drain a single service circuit.

130. C — The service diaphragm separates the pressurised air from the open breather side. When it ruptures, air passes through and escapes at the breather hole when the brake is applied. A relay valve or dash valve issue would show elsewhere, and the protection valve does not vent at one chamber. The chamber is replaced as an assembly.

131. D — High-voltage systems must be de-energized in the sequence given by the maker: shut down, remove the service disconnect, wait for capacitors to discharge, and then verify zero volts with a meter rated for the system while wearing the specified gloves. Removing cables first or verifying beforehand is unsafe, and ordinary gloves and test lamps are not rated.

132. A — Frost that blocks the evaporator coil restricts airflow and heat transfer, which is what the defrost cycle clears. If the sensor, heater, or controller of the defrost system fails, frost builds. Tire wear, landing gear, and ABS sensors do not influence evaporator coil frost. Repairing the defrost circuit restores normal cooling quickly.

133. B — Cab mounts isolate vibration and keep the cab located. A collapsed mount must be replaced, and the associated shocks and air springs checked since they work together. Over-tightening does not

restore a mount's rubber, grease does not stiffen it, and welding a spacer would transmit vibration and distort the cab.

134. D — A pressurized cooling system keeps coolant liquid above 100 degrees Celsius. Releasing the cap suddenly drops the pressure, and the coolant can flash to steam and erupt, causing severe burns. The hazard is scalding, not the cap material or a sensor reading, so the engine must cool and pressure be relieved slowly.

135. C — Many crankshaft tone wheels have a deliberate gap or missing teeth so the controller can find a reference position once per revolution. A regular, repeatable gap is therefore normal. A damaged sensor or a shorted winding would show irregular amplitude or a weak signal. Faults show as inconsistent or missing pulses elsewhere.