

PRACTICE EXAM 7: 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 hydrometer reads 1.250 on a flooded battery at 4.4 degrees Celsius. If 0.004 is subtracted for every 5.6 degrees below 26.7 degrees Celsius, what is the corrected specific gravity?

- A. 1.266
- B. 1.250
- C. 1.246
- D. 1.234

2. What resistance should a healthy 120-volt, 1,500-watt engine block heater element measure cold with an ohmmeter?

- A. 9.6 ohms
- B. 12.5 ohms
- C. 96 ohms
- D. 0.08 ohm

3. A technician installs a new castle nut on a tie rod end and finds the slot does not line up with the cotter pin hole at the specified torque. What is correct?

- A. Loosen the nut back to the previous slot and reinstall the original cotter pin
- B. Leave the castle nut unpinned because the specified torque has already been reached

- C. Tighten to the next slot, never loosen, and fit a new cotter pin
- D. Fill the gap with a thin washer and reuse the old cotter pin

4. A fleet adds methanol to its tractors' air systems each winter, yet air lines still freeze regularly. Which repair addresses the root cause?

- A. Add more methanol at every fill until the lines no longer freeze up
- B. Service the air dryer so moisture is removed before the tanks
- C. Replace the tractor's steel air lines with nylon tubing throughout the system
- D. Raise the governor cut-out pressure so the tanks hold more compressed air

5. At minus 30 degrees Celsius, a tractor with a manual transmission jerks forward when the clutch is released in neutral on a cold start. What is the most likely cause?

- A. A burned clutch disc left slipping after repeated heavy trailer towing
- B. A seized pilot bearing damaged by earlier overheating of the clutch
- C. Thick cold gear oil dragging the input shaft and countershaft
- D. A bent driveshaft left over from previous misalignment of the driveline

6. A technician is told to find which personal protective equipment is required before handling a windshield washer concentrate. Which safety data sheet section lists exposure controls and PPE?

- A. Section 8, exposure controls and personal protection
- B. Section 4, first-aid measures for skin and eye contact
- C. Section 2, hazard identification and signal word
- D. Section 14, transport information and shipping class

7. Which circuit is carried by the blue wire in a standard seven-way trailer connector?

- A. The right turn signal circuit used on the trailer's curb side
- B. The common ground return circuit for all trailer lamps

- C. The stop lamp circuit that is energized by the brake pedal
- D. The auxiliary circuit, commonly used for trailer ABS power

8. A truck hydraulic pump growls loudly on a cold start at minus 30 degrees Celsius, and the noise fades as the oil warms. What is the most likely reason?

- A. Cold, thick oil starving the pump inlet and causing cavitation
- B. An overfilled reservoir pressing air into the pump inlet port
- C. Excess oil temperature building up in the return line
- D. Air drawn into the pressure line through a loose fitting

9. A technician finds a flooded battery frozen solid after a night at minus 30 degrees Celsius. What is the correct action?

- A. Charge it at a high rate to melt the ice inside
- B. Let it thaw fully before testing or charging it
- C. Jump start it from another battery at once to warm it
- D. Add distilled water to dilute the frozen electrolyte first

10. A highway tractor on summer-blend diesel plugs its fuel filter at minus 25 degrees Celsius. Which fuel property is the temperature at which wax crystals first appear?

- A. Flash point of the fuel
- B. Cetane number rating
- C. Cold soak point of the injectors
- D. Cloud point

11. The cab blower on a truck works only on its highest speed. Which component is the most likely cause?

- A. The compressor clutch coil and its control relay wiring

- B. The heater core inlet hose and its shutoff valve
- C. The blower motor resistor or speed control module
- D. The receiver-drier and its low-pressure cycling switch circuit

12. A truck's steering wheel does not return to centre after a turn and feels heavy at low speed. Which condition is most likely?

- A. Excess fuel rail pressure at the injectors during low-speed turns
- B. A worn clutch release bearing in the transmission bell housing
- C. Air trapped in the brake chambers on the steer axle
- D. Binding steering linkage or kingpin joints, or too little caster

13. An air dryer purge valve freezes shut at minus 25 degrees Celsius, and the dryer cartridge is new. What should be checked first?

- A. Voltage at the dryer heater connector and element resistance
- B. The length and routing of the compressor discharge line
- C. The treadle valve return spring tension and exhaust port
- D. The tractor protection valve diaphragm and its seat

14. A truck makes a rattling noise only while the clutch pedal is held down, and the noise stops when the pedal is released. Which component is most likely at fault?

- A. The transmission countershaft gear and its bearing
- B. The drive axle pinion bearing under torque
- C. The clutch release bearing
- D. The front wheel hub bearing on the steer axle

15. A cab door is frozen shut after freezing rain at minus 20 degrees Celsius. What is the best practice for opening it and preventing a repeat?

- A. Pry it open with a pry bar to break the ice loose
- B. Thaw it gently with warm air, then treat the seals with silicone
- C. Pour boiling water along the door edge to melt the ice
- D. Spray engine oil on the seal to stop it freezing again

16. A battery in a snowplow truck shows plate shedding and repeated internal shorts. The hold-down is found loose. Why is this significant?

- A. A loose hold-down raises the charging voltage of the alternator
- B. It causes the electrolyte to freeze at a higher temperature
- C. Vibration from a loose battery damages the plates and shortens life
- D. It lowers the cranking current available to the starter motor

17. A heavy-duty engine in a prairie winter pushes oil out of the dipstick tube and leaks at the rear seal. The crankcase ventilation filter outlet is found frozen solid. What is the most likely cause of the oil leaks?

- A. Crankcase pressure from a blocked breather exceeding what seals can hold
- B. Cooling system pressure forcing coolant past the head gasket into oil
- C. Excess fuel pressure from a failed lift pump entering the sump
- D. A worn oil pump gear creating excess flow into the galleries

18. A driver of a battery-electric truck notices a large range drop in a deep freeze. What is the main reason?

- A. The traction motors lose strength at very low temperatures
- B. Cold slows battery chemistry, and heating draws stored energy
- C. The charge port adds extra weight to the vehicle
- D. The tires gain extra pressure from the cold air

19. A truck's camber measures within specification, but the steering axis inclination plus camber, known as the included angle, is far out. What does this suggest?

- A. Low tire pressure on the steer axle tires
- B. A worn clutch pedal bushing in the cab
- C. Weak shock absorbers on the front axle
- D. A bent spindle or axle beam

20. The wet tank safety valve of a coach pops open repeatedly at about 1,034 kPa (150 psi). Which condition is most likely?

- A. The spring brakes are applying too early as pressure falls
- B. The air dryer purge valve is leaking during each cycle
- C. The governor or unloader is not stopping air production at cut-out
- D. The service brake chambers are overstroked on every axle

21. A technician measures the bell housing bore and face runout with a dial indicator and finds it out of specification. What problem can this cause?

- A. Excess oil pressure building in the engine lubrication system
- B. Higher fuel economy from reduced friction in the clutch
- C. Early release of the spring brakes on the drive axle
- D. Transmission misalignment that wears the input shaft bearing and clutch

22. A truck's charge indicator lamp bulb is burned out, and the alternator will not charge on this older model. What is the likely reason?

- A. The lamp is the only path for battery voltage sensing
- B. The lamp supplies starting field current to excite the alternator
- C. The bulb filters the ripple coming from the diodes
- D. The lamp turns the voltage regulator off at idle

23. At minus 20 degrees Celsius, a coach shows white smoke at start-up that clears within three minutes of warm-up, and coolant level stays steady. What is the most likely explanation?

- A. Unburned fuel vapour from cold cylinders, which is normal
- B. A cracked cylinder head leaking coolant into a cylinder
- C. A failed head gasket between the oil and coolant passages
- D. Excess oil being burned past worn valve guides

24. Frozen diesel exhaust fluid is found in a shop drum after a night at minus 15 degrees Celsius. What should the technician do?

- A. Discard the whole drum because freezing destroys the urea
- B. Heat the drum quickly using an open torch flame
- C. Dilute it with extra water so it cannot freeze again
- D. Let it thaw naturally at room temperature, then use it normally

25. A trailer air suspension sags to its stops after sitting overnight, though the system fills normally. What is the most likely cause?

- A. An air leak in an air spring, fitting, or height control line
- B. A seized slack adjuster on one of the trailer axles
- C. A worn clutch disc on the tractor that towed it
- D. A weak glad hand gasket at the tractor connection

26. A hydraulic pump delivers 40 litres per minute at 15 MPa. About how much hydraulic power is this?

- A. 6 kilowatts
- B. 60 kilowatts
- C. 10 kilowatts
- D. 0.6 kilowatt

27. A crack is found at the edge of a truck frame rail web. Which repair practice is recommended?

- A. Weld straight across the crack without drilling any stop holes in the web
- B. Stop-drill the crack ends, weld it, and add a staggered reinforcing plate
- C. Drill several holes through the top and bottom flanges beside the crack
- D. Fill the crack with a flexible seam sealant and then repaint the rail

28. A starter keeps grinding after the engine has started. What is the most likely cause?

- A. The battery voltage is too high during the entire starting cycle
- B. The flywheel has become overheated from long periods of idling
- C. The ignition switch contacts are worn from years of key use
- D. The pinion stays engaged from a sticking solenoid or faulty drive

29. On a cold morning, a tractor's ABS lamp stays on after a weak battery cranked the engine slowly. What is the most likely explanation?

- A. The ABS modulator valves froze solid overnight in the cold
- B. Low supply voltage during cranking set a stored ABS controller fault
- C. The wheel sensors lost their magnetic strength in the cold
- D. The relay valve was installed backwards at the last service

30. How is a gear normally engaged in a non-synchronized heavy-duty manual transmission while the vehicle is moving?

- A. By double clutching to match gear speeds before the shift
- B. By pressing the clutch brake pedal fully to the floor
- C. By holding the shift lever with heavy forward force
- D. By shifting only when the vehicle has come to a stop

31. An intake air heater on a truck does not warm the intake at minus 15 degrees Celsius when commanded on. Which first check is best?

- A. Replace the air filter element first and then retest the intake heater circuit
- B. Change the thermostat for a colder rating and then recheck the cold start
- C. Measure voltage at the heater relay output with the heater commanded on
- D. Flush the entire cooling system to improve heat transfer at the intake manifold

32. After a coolant change, a cab heater gurgles and delivers poor heat at minus 20 degrees Celsius. What should be done?

- A. Replace the blower motor and its speed control resistor pack
- B. Bleed trapped air from the heater circuit per the manufacturer's procedure
- C. Charge the air conditioning system to the full nameplate amount
- D. Increase the blend door travel using the control linkage

33. A technician performs a voltage drop test on the positive side of a starter circuit while cranking. What reading is generally the maximum acceptable?

- A. About 0.5 volt total across the positive cables and connections
- B. About 3 volts across the starter motor itself under load
- C. About 6 volts across the positive battery post and clamp
- D. About 12 volts across the solenoid contacts alone while cranking

34. Why must leaf spring U-bolts be retorqued after a new suspension has been in service for some distance?

- A. The U-bolts stretch to a longer permanent length in service
- B. The bolts harden and become brittle with long use
- C. Spring leaves and seats settle, which reduces clamping force
- D. The axle housing changes size with outside temperature

35. What does the 15W in a 15W-40 engine oil grade indicate?

- A. Its working viscosity at 100 degrees Celsius
- B. Its fifteen-percent additive package by volume
- C. Its weight class when tested as a gear oil
- D. Its viscosity rating at low winter temperatures

36. After replacing a stability control module on a tractor, the system warns of calibration errors. What must be done?

- A. Disconnect the battery for ten minutes to reset the system
- B. Calibrate the module and steering angle with the manufacturer's scan tool
- C. Drive at highway speed until the warning lamp turns off
- D. Replace the wheel speed sensors on every axle at once

37. What is the purpose of the interlock mechanism in a manual transmission shift bar housing?

- A. To prevent two gears engaging at once
- B. To hold the transmission oil at the correct level
- C. To adjust the clutch pedal free play at the linkage
- D. To limit input shaft speed while in neutral

38. To protect the starter during a stubborn cold start, how long should cranking attempts normally last?

- A. Crank continuously for two minutes so the engine can warm up fully
- B. Crank for only one second at a time to protect the battery
- C. Crank for as long as battery voltage stays above six volts
- D. About 15 to 30 seconds, then rest two minutes to cool the starter

39. A technician finds a driver's seat belt with a frayed, partly cut webbing edge. What is the correct action?

- A. Trim the frayed edge and keep using it

- B. Apply tape over the damaged section
- C. Replace the complete seat belt assembly
- D. Wash the belt and inspect again later

40. A tandem axle truck shows uneven tire wear, and a worn torque rod bushing is found. What effect does this have?

- A. The axle can shift out of line and scrub the tires
- B. The air brakes lose line pressure in the tractor protection circuit
- C. The engine overheats at low speed in slow stop-and-go traffic
- D. The clutch pedal slowly loses all of its free play at the linkage

41. An oil analysis report on a truck that idles heavily in winter shows fuel dilution of 6 percent. What is the main effect on the oil?

- A. Higher viscosity and slower circulation during cold starts
- B. A higher total base number that neutralizes combustion acids
- C. Faster conversion of the oil into engine coolant over time
- D. Reduced viscosity and weaker lubricating film between bearing surfaces

42. A journeyperson mentors a first-year apprentice who must learn to bleed a brake system. Which sequence of coaching steps is most effective?

- A. Hand over the service manual and review the finished work later
- B. Demonstrate it once quickly and leave while the apprentice practises
- C. Explain safety rules, demonstrate, observe the apprentice, then give feedback
- D. Let the apprentice learn alone through trial and error on the job

43. An inspection shows a hairline crack at the upper coupler plate around a trailer's kingpin. What is the correct response?

- A. Fill the crack with paint and keep using the trailer until the next inspection
- B. Remove it from service until the plate is repaired or replaced
- C. Weld across the crack and return it to service at once without testing
- D. Grease the plate heavily to slow the crack and extend its service life

44. What does an ISO 4406 cleanliness code of 18/16/13 describe?

- A. The viscosity of the oil measured at three temperatures
- B. The water content of the oil at three tank depths
- C. Particle counts at three sizes in one millilitre
- D. The acid number of the oil at three service stages

45. A tractor's drive axle brakes give poor stopping, and the linings look hard and shiny with a mirror-like surface. What is the best repair?

- A. Add a film of grease to the drum surface to quiet them
- B. Increase the brake chamber output with a thicker spacer plate
- C. Sand the glaze off the linings lightly and reinstall them
- D. Replace the linings and resurface the drums within their specified limits

46. A transmission power take-off makes a loud whine whenever it is engaged. Which condition should be checked?

- A. Excess clutch pedal travel at the cab linkage pivot
- B. Incorrect backlash between the PTO and transmission gear
- C. Low coolant level in the radiator surge tank bottle
- D. A partly blocked purge valve on the air dryer outlet

47. A technician finds green corrosion inside a sealed connector on a chassis harness exposed to road salt. What should be done when repairing it?

- A. Replace damaged terminals and seals and use dielectric grease sparingly
- B. Fill the whole connector completely with a conductive paste compound
- C. Wrap electrical tape tightly over the corroded pins and seals
- D. Spray penetrating oil generously onto the terminals and seals

48. A tractor engine loses coolant steadily, the oil smells sweet, and the oil level slowly rises. Which component should be pressure tested first?

- A. The engine oil cooler core
- B. The coolant surge tank cap and seal
- C. The fuel filter housing seal and drain
- D. The thermostat housing gasket and bolts

49. Why does the A/C compressor engage when a truck's defrost mode is selected on a humid winter day?

- A. To warm the air that goes to the windshield
- B. To lower the blower motor current
- C. To dry the air, which clears the windshield faster
- D. To raise the engine idle speed

50. When tightening the shackle bolts of a leaf spring, why should the vehicle weight be on the springs?

- A. To prevent the spring leaves from rusting in the pack
- B. To lower the torque value required for the shackle bolts
- C. To make the bolts easier to cool down afterward
- D. So the rubber bushings are not pre-stressed in an unnatural position

51. A technician finds that regenerative braking is reduced on an electric bus on a very cold morning. What is the most likely reason?

- A. The brake pads have frozen to the rotors overnight
- B. The cold battery pack limits how much charge it can accept
- C. The inverter is badly overcharging the 12-volt auxiliary battery
- D. The air compressor is working far too hard at low speed

52. A technician replaces the pads on an air disc brake caliper. Which step is required before installing the new pads?

- A. Lubricate the pad friction surfaces lightly with brake grease
- B. Loosen all of the wheel studs one full turn first
- C. Drain the air tanks completely to zero pressure first
- D. Retract the caliper adjuster mechanism fully using the specified method

53. A technician drains the oil of a manual transmission after a harsh winter and finds large steel slivers and chips on the magnetic plug. What does this indicate?

- A. Normal wear that needs no further action
- B. Cold-weather condensation in the case
- C. Internal gear or bearing damage that calls for transmission inspection
- D. Overfilled oil from the last service

54. Which wire is larger in diameter and has less resistance per metre?

- A. 14 AWG wire
- B. 10 AWG wire
- C. 18 AWG wire
- D. 20 AWG wire

55. A driver finishes a long mountain climb and shuts the engine off immediately. Over time, this habit causes turbocharger bearing damage. What is the recommended practice?

- A. Idle three to five minutes before shutdown to cool the turbo
- B. Rev the engine to 2,000 rpm for a minute before shutdown
- C. Shut down at once to save fuel and reduce engine wear
- D. Keep the engine off and spray water on the housing

56. A fifth wheel release handle is very hard to pull when preparing to uncouple a loaded trailer. What should be done?

- A. Strike the release handle repeatedly with a heavy hammer until the jaws open
- B. Relieve jaw load using the landing gear or by backing up gently
- C. Pull the tractor forward slowly with the handle held in the release position
- D. Remove all of the grease from the top plate before pulling the handle

57. On a J1939 scan tool display, the fault code is shown as SPN 110, FMI 3. What does the FMI tell the technician?

- A. The manufacturer's part number of the sensor that has failed
- B. The number of times the fault has occurred since reset
- C. The software version loaded in the reporting module
- D. The failure type, such as voltage above normal or shorted high

58. A tractor must be supported outdoors on packed snow in winter before work under the front axle. Which support method is safest?

- A. Set rated stands on a steel plate over firm, level ground
- B. Set rated jack stands directly on top of the packed snow
- C. Rely on the hydraulic jack and keep the work short
- D. Place the stands on top of a pile of loose gravel

59. How does a tractor commonly communicate with a trailer ABS controller without a dedicated data wire in the seven-way connector?

- A. By low-power radio signals sent from the dash controller
- B. By coded air pressure pulses sent through the glad hand
- C. By power line carrier signals on the ABS power wire
- D. By switching signals on the clearance lamp circuit wire

60. In an open-center hydraulic system, what happens to the pump flow when all control valves are in neutral?

- A. It is blocked at the valves and pressure rises to relief
- B. It is diverted into the accumulator only for later use
- C. It is pumped slowly to the cylinders to hold them
- D. It returns through the valves to the tank at low pressure

61. A leakage test shows no pressure drop with the brakes released, but air drops quickly once the service brakes are applied. Where is the leak most likely located?

- A. In the air compressor discharge line between the head and the dryer
- B. In the service side downstream of the treadle valve
- C. In the supply side before the tanks and check valves
- D. In the governor signal line running to the compressor unloader

62. An automatic transmission overheats only while climbing long grades. Fluid level and condition are correct. Which cause is most likely?

- A. Low engine oil pressure at hot idle speed
- B. A worn steering gear box on the front axle
- C. A restricted cooler or reduced coolant flow
- D. A weak battery that fails the load test

63. A truck idles roughly and stalls at stops, and the exhaust gas recirculation valve is found stuck open. Why does this fault cause stalling at idle?

- A. Excess exhaust dilutes the intake charge so combustion becomes unstable
- B. Too much fresh air flows into the cylinders at idle
- C. Fuel pressure drops from the added exhaust flow in the rail
- D. Boost rises until the cylinders flood with fuel at idle

64. A technician installs a pintle hook and lunette eye on a trailer set-up. Which requirement must be met?

- A. Only the hook needs a tow weight rating for this load
- B. Both must be rated for the towed weight and match in size
- C. The eye may be any different size if it is welded in place
- D. The hook must be painted to match the colour of the eye

65. After an engine control module is replaced on a heavy truck, the engine runs poorly. What is the next step?

- A. Disconnect the battery for an hour to reset the module
- B. Replace all the injectors so they match the new module
- C. Program the new module with the correct calibration and parameters
- D. Increase the idle speed using a mechanical throttle stop

66. A delivery truck on short winter routes never reaches the exhaust temperature needed for passive regeneration, and the soot load keeps rising. When is a parked regeneration appropriate?

- A. When soot load is high and the truck is parked safely
- B. While the engine is shut down and the truck sits overnight in the yard
- C. Only after the filter has been removed from the exhaust system and cleaned
- D. Whenever the coolant temperature is still far below the thermostat opening rating

67. When bleeding a hydraulic brake system on a medium-duty truck, which wheel is normally bled first unless the manufacturer says otherwise?

- A. The wheel closest to the master cylinder
- B. Any front wheel, since they are the largest
- C. The wheel with the newest hose
- D. The wheel farthest from the master cylinder

68. An automatic transmission with an internal sensor fault stays in a single gear and the dash shows a warning. What is this called?

- A. Limp-home mode, which lets the truck reach a shop
- B. Torque converter lock-up mode, which engages while cruising at speed
- C. Neutral safety mode, which prevents the starter running in gear
- D. Retarder standby mode, which prepares the unit for braking on grades

69. A cab door drops and rubs on the sill when opened, and the latch misaligns. What is the most likely cause?

- A. A low refrigerant charge in the cab air conditioning system
- B. Worn hinge pins or bushings allowing the door to sag
- C. A restricted fuel filter on the engine fuel supply line
- D. An overinflated steer tire on the driver's side of the axle

70. A technician is about to service a vehicle that uses R-1234yf refrigerant. Which statement is correct?

- A. It is fully interchangeable with R-134a recovery and charging equipment and hoses
- B. It is non-flammable, so it needs no special handling or equipment
- C. It can be vented to the air if the system is quite small
- D. It is mildly flammable, so dedicated service equipment is required

71. A truck has an intermittent loss of several dash gauges. Which method is best for finding the intermittent fault?

- A. Replace the instrument cluster immediately, then road test the truck
- B. Clear every stored code and wait for them to return
- C. Watch live data while wiggling the suspect harness and connectors
- D. Charge the battery on a slow charger for twelve hours

72. Truck tires are set to 724 kPa at 20 degrees Celsius in the shop. About how much will pressure fall when the temperature drops to minus 20 degrees Celsius, using 6.9 kPa for each 5.6 degrees?

- A. About 7 kPa
- B. About 140 kPa
- C. About 50 kPa
- D. About 25 kPa

73. An SCR system shows no diesel exhaust fluid dosing for the first minutes after a winter cold start. Which condition explains this normal behaviour?

- A. Dosing waits until exhaust temperature reaches roughly 200 degrees Celsius
- B. The DEF pump is disabled until the fuel tank is full
- C. The NOx sensors are switched off during all cold weather operation
- D. The tank heater cuts its power until engine oil pressure falls

74. A technician replaces worn linings on one drive axle wheel end. What must be done at the other end of that axle?

- A. Leave it alone because it is not worn out yet
- B. Reline it too so both ends brake equally with matching lining
- C. Remove one return spring on the new side to balance it
- D. Fit a smaller brake chamber on the newly relined side

75. An automated manual transmission will not complete gear changes, and the system air pressure is very low. What is the likely reason?

- A. The clutch disc has lost most of its friction material
- B. The transmission oil is too clean to lubricate the gears
- C. The driveshaft yokes are out of phase at the slip joint
- D. The shift actuators lack the minimum air pressure they need

76. A technician needs a replacement bolt but finds only one marked 10.9, while the original was marked 8.8. What is the correct decision?

- A. Use it, since its strength equals or exceeds the original
- B. Refuse it because metric bolt classes must always match exactly
- C. Use it only if it is also shorter than the original bolt
- D. Use it after heating it to relieve its brittleness first

77. A technician must repair a roll-up trailer door and finds the torsion spring wound under tension. What is the safest approach?

- A. Cut through the spring with a torch to release the tension
- B. Use winding bars and the maker's procedure to control tension
- C. Loosen the set screws and hold the spring steady by hand
- D. Heat the spring evenly with a torch until it relaxes

78. Why do many mobile hydraulic reservoirs use a desiccant breather?

- A. To pressurize the tank well above atmospheric pressure while running
- B. To increase the oil temperature quickly in cold weather starts
- C. To stop moisture entering as air moves in and out
- D. To remove aeration and foam from the oil returning to the tank

79. Which pin on a nine-pin heavy-duty diagnostic connector supplies battery positive?

- A. Pin A

- B. Pin C
- C. Pin D
- D. Pin B

80. A truck tire has a nail in the tread centre but no other damage. Which repair is acceptable?

- A. A rubber plug pushed in from the outside without removing the tire
- B. A patch placed over a puncture in the flexing sidewall area
- C. A thick rubber cement coating brushed over the hole from outside
- D. A plug-patch repair done from the inside after inspecting the casing

81. A technician must loosen a high-pressure line on a common-rail diesel after the engine has run. What should be done first?

- A. Loosen the line one turn and feel for spray with a bare hand
- B. Run the engine at idle speed while slowly loosening the line fitting
- C. Shut off and wait the specified time for rail pressure to fall
- D. Heat the fitting with a small torch first to soften the seat

82. At the nine-pin diagnostic connector, which pair of pins carries the J1939 CAN high and CAN low signals?

- A. Pins C and D
- B. Pins A and B
- C. Pins F and G
- D. Pins E and H

83. A technician lubricates S-cam shaft bushings and notices grease reaching the brake linings. What is the most likely cause?

- A. Normal cam rotation slowly drawing grease along the shaft to the shoes

- B. Over-greasing, or a failed shaft seal letting grease into the drum
- C. Water from the air tanks causing the grease to thin out
- D. A cracked brake drum releasing old grease that built up inside

84. A technician lubricates a driveshaft universal joint with a grease gun. When is the joint adequately filled?

- A. When the grease gun handle becomes noticeably hard to pull
- B. When fresh grease appears at all four bearing cap seals
- C. After exactly two full pumps of the grease gun on each cap
- D. When grease runs out of the nearby slip yoke dust cap

85. An electric truck's charge port is covered in ice and will not complete a DC fast charge handshake. What is the correct approach?

- A. Chip the ice out of the charge port with a metal screwdriver
- B. Pour hot water into the charge connector to melt the ice quickly
- C. Clear the ice using approved methods and inspect the port before charging
- D. Bypass the communication pins with a jumper so charging can start anyway

86. A technician finds a tire valve with no cap and a slow leak. What is the main purpose of the valve cap?

- A. It controls tire pressure by venting any extra air out slowly
- B. It regulates the temperature of the tire as the wheel heats
- C. It holds the wheel balance weights in place on the rim
- D. It keeps dirt and moisture out and acts as a backup seal

87. During injector return-flow testing, one injector returns about five times as much fuel as the others. What does this indicate?

- A. Excessive internal leakage from a worn injector
- B. A restricted fuel return line leaving the cylinder head
- C. Normal variation in the injector nozzle spray hole size
- D. An overly rich air-fuel mixture at the intake

88. Which component is commonly found on the low-pressure side of an air conditioning system that uses an orifice tube?

- A. A receiver-drier mounted on the high side of the system
- B. A thermal expansion valve at the evaporator inlet port
- C. An accumulator, which protects the compressor from liquid refrigerant
- D. A sight glass fitted on the compressor discharge hose

89. A multiplexed body controller drives the marker lights, and one lighting circuit does not work. Which first step is most efficient?

- A. Command the output with the scan tool and watch its current
- B. Replace the whole body controller module before doing any other testing
- C. Rewire the lighting circuit using a standard relay and a separate fused feed
- D. Replace every marker lamp bulb on the entire vehicle and retest

90. Air continues to escape from the treadle valve exhaust port after the pedal is released. What is the most likely cause?

- A. A frozen purge valve on the air dryer under the cab floor
- B. A worn valve seat or plunger O-ring inside the treadle valve
- C. An overfilled wet tank holding too much condensed water inside
- D. A weak spring inside the tractor protection valve body

91. A technician removes a universal joint from a driveshaft yoke. Which method should be used?

- A. Heat the yoke with a torch until it glows red hot
- B. Strike the yoke ears repeatedly with a heavy steel hammer until loose
- C. Cut through the cross with an abrasive wheel and pull the caps
- D. Press the bearing caps out with a suitable press and tool set

92. After attaching the regulator, a technician opens the acetylene cylinder valve for oxy-fuel cutting. How far should it normally be opened?

- A. Fully open, the same way as the oxygen cylinder valve
- B. Only a quarter turn, then wait for line pressure to build
- C. Fully open, then back it off about half of a turn
- D. About one and a half turns, wrench left on the valve

93. A technician cranks down a trailer's two-speed landing gear after unloading, with no load on the legs. Which speed should be used?

- A. High speed, because no load is on the gear
- B. Low speed, to avoid damage
- C. Neither, since the gear is unloaded
- D. Low speed, with the crank held at a slant

94. A directional control valve solenoid coil on a hydraulic circuit burns out repeatedly. Which cause should be investigated?

- A. Low oil viscosity in the tank caused by summer hot weather operation
- B. A stuck spool, or low voltage leaving the armature unseated
- C. A clogged breather cap on the reservoir that starves the pump
- D. A cylinder rod that is slightly scored near the rod seal end

95. A truck engine suddenly loses its crankshaft position signal while running, but the camshaft signal is present. What is a common result?

- A. The engine always shuts down immediately every single time it occurs
- B. Fuel rail pressure rises until the pressure limiter valve opens
- C. It may keep running on the cam signal, or run reduced
- D. The starter motor engages automatically to restart the engine again

96. A technician fills an oil-lubricated hub after a seal job. What is the correct fill level?

- A. To the fill mark on the hub cap
- B. Completely full to the top of the hub cap
- C. Until oil starts to flow out of the axle breather
- D. Only a thin film of oil over the bearing rollers

97. A diesel-fired sleeper heater shuts down with a flame-out fault shortly after starting at minus 25 degrees Celsius. Which check is most appropriate?

- A. Replace the tractor's alternator and test the main charging cables
- B. Check fuel supply, combustion air, exhaust blockage, and the glow element
- C. Flush the whole engine cooling system and replace the thermostat
- D. Change the drive axle lubricant and replace the axle breather

98. With power off, a technician measures 40 ohms between CAN high and CAN low on a truck. What does the reading most likely indicate?

- A. A CAN low wire shorted to battery positive at the harness
- B. Normal network resistance for a healthy bus with two terminators
- C. Extra terminators on the bus, with several 120-ohm resistors in parallel
- D. An open circuit in the CAN high wire near the controller

99. A technician soaps the joint of a brake chamber while an assistant holds the service brakes applied. Bubbles form around the clamp ring. What does this mean?

- A. The brake is working normally and the bubbles are only soap foam
- B. The slack adjuster is overlubricated and is pushing grease out
- C. The air dryer desiccant is saturated and passing moisture on
- D. The diaphragm or clamp ring leaks, so the chamber needs service

100. A truck engine runs and the transmission turns, but the truck does not move, and one drive wheel spins freely. What is the most likely cause?

- A. A worn clutch brake inside the transmission input shaft area
- B. A seized slip yoke on the main driveshaft assembly
- C. A leaking air dryer purge valve on the supply side
- D. A broken axle shaft on the free-spinning side

101. A technician considers using starting fluid on a diesel with a working intake grid heater on a cold morning. Why must it be avoided?

- A. It thickens the engine oil and prevents any further cranking
- B. Ether can ignite violently on a hot grid, damaging the engine
- C. It raises the cetane number permanently once in the tank
- D. It slowly dissolves the coating on the glow plug over time

102. During cranking in cold weather, the engine controller resets and the dash goes dark, though the battery tests fine. What is the most likely cause?

- A. Overcharging from the alternator when the engine is at idle
- B. A thermostat stuck open and letting the engine run cold
- C. High resistance in the controller's feed or ground drops voltage
- D. Excess boost pressure from a stuck turbocharger wastegate actuator

103. A technician replaces a unitized wheel hub assembly on a tractor. What is the correct way to set the bearings?

- A. Torque the axle nut to specification, with no end-play adjustment
- B. Adjust the end play with a dial indicator and a spanner
- C. Tighten the nut until the hub is hard to turn by hand
- D. Back the nut off by one flat after it has seated

104. A coolant temperature sensor circuit opens and the module reads minus 40 degrees Celsius on a warm engine. What is a likely result?

- A. The engine immediately shuts down because of a false overheating alarm
- B. The thermostat opens far too late in the warm-up cycle
- C. Fan runs continuously and the engine runs rich as if cold
- D. The DPF performs forced regenerations far more often than normal

105. A technician replaces an A/C compressor on a bus. How much new oil should be added to the system?

- A. A full bottle of oil, whatever quantity was drained out
- B. The manufacturer's specified amount, adjusted for oil lost with parts
- C. None at all, because the refrigerant system is a sealed unit
- D. Engine oil to match the level of the old compressor

106. On a coach, the primary air gauge falls with each brake application while the secondary gauge stays steady, and the primary tank cannot recover. What does this indicate?

- A. A primary circuit leak that the protection valve has isolated
- B. A failed one-way check valve on the secondary tank inlet line
- C. A seized slack adjuster on the axle served by the primary circuit
- D. Normal compressor loading and unloading behaviour near the cut-in pressure

107. A drive axle ring gear has 43 teeth and the pinion has 10 teeth. What is the axle ratio?

- A. 3.73 to 1
- B. 5.20 to 1
- C. 0.23 to 1
- D. 4.30 to 1

108. A technician must catch a brief voltage dip lasting a few milliseconds on a sensor circuit. Which multimeter feature is most helpful?

- A. Continuity beeper
- B. Min/max recording mode
- C. Diode test mode
- D. Resistance range

109. Before mounting a wheel on a hub, a technician finds rust and paint build-up on the hub face. What should be done?

- A. Add a layer of paint to fill the uneven areas
- B. Mount the wheel and then add extra torque to the nuts
- C. Clean the mating surfaces down to bare, flat metal
- D. Grease the mating surfaces to prevent any more rust

110. Diesel fuel spilled on a shop floor ignites near a parts washer. Which extinguisher class is required to fight this fire?

- A. Class B, for flammable liquids such as diesel
- B. Class A, designed for ordinary combustibles like wood and paper
- C. Class D, designed for combustible metals such as magnesium or titanium
- D. Class C, designed for fires involving energized electrical wiring only

111. A technician plans to weld on the frame of a refrigerated trailer with foam insulated walls. Which precaution is most important?

- A. Weld with the refrigeration unit running to keep it cool
- B. Wet the insulation with light oil to prevent ignition
- C. Weld only on the roof panels, well away from the side walls
- D. Shield or remove the insulation and disconnect the unit's electronics

112. When should the fluid level of a hydraulic reservoir be checked on a machine with large cylinders?

- A. With the cylinders fully extended in every case without exception
- B. With the cylinders in the manufacturer's specified position, usually retracted
- C. While the pump runs at full relief pressure with hot oil
- D. Only when the oil has become boiling hot after long use

113. When wheel slip is detected on an icy road, how does the ABS and traction controller typically reduce the effect of engine braking on drive wheels?

- A. It requests the engine retarder be disabled over the data link
- B. It adds air pressure to the drive axle spring brakes
- C. It increases injector pulse width to overpower the engine retarder
- D. It automatically locks the inter-axle differential when wheels slip

114. A technician adjusts the headlamps on a tractor. Which condition is required for an accurate aim?

- A. Vehicle parked on a slope, with a loaded trailer attached
- B. Tires deflated by about half to improve contact with the floor
- C. Vehicle on a level floor, tires correctly inflated, and unloaded
- D. Headlamps adjusted while the vehicle is slowly rolling forward

115. A Type 30 brake chamber has an effective area of 30 square inches. About how much pushrod force does it produce at 80 psi application pressure?

- A. 3,000 pounds of force

- B. 1,200 pounds of force
- C. 80 pounds of force
- D. 2,400 pounds of force

116. A drive axle's ring gear shows pitting and wear, but the pinion looks good. What must be done?

- A. Replace the ring and pinion together as a set
- B. Replace only the ring gear because the pinion looks good
- C. Replace only the pinion and keep the worn ring gear
- D. Reuse both gears after lightly polishing the worn teeth by hand

117. A technician lubricates a tie rod end that has a boot. How much grease should be applied?

- A. Pump until grease flows freely out from under the boot
- B. Pump until the boot begins to swell slightly, then stop
- C. Skip greasing altogether because the boot is already sealed
- D. Add one full tube of grease to each fitting

118. Why should a technician treat a parallel hybrid truck as potentially live even when it is quiet and the engine is off?

- A. The 12-volt battery alone runs the drive wheels at low speed
- B. The air brake compressor can drive the traction motor directly
- C. It can start automatically, and high voltage may remain live
- D. The cab heater keeps the whole transmission warm while parked

119. A technician pressure tests a 103 kPa (15 psi) radiator cap, and it holds only about 55 kPa (8 psi). What is the correct action?

- A. Keep the cap and add a pressure additive to the coolant
- B. Reduce the coolant concentration to compensate for the weak cap

- C. Fit a thicker radiator hose to reduce the expansion
- D. Replace the cap, since it cannot hold pressure

120. A 12-volt heated seat element draws 7.5 amperes. How much energy does it use in 20 minutes of operation?

- A. 90 watt-hours
- B. 1,800 watt-hours
- C. 2.25 watt-hours
- D. 30 watt-hours

121. A technician is asked to replace a steering wheel airbag module. What must be done before disconnecting the connector?

- A. Leave the battery connected so the memory is kept
- B. Tap the module with a hammer to discharge it
- C. Disconnect the battery and wait the manufacturer's specified time
- D. Short the connector pins together to drain the charge

122. After installing new linings on a tractor, a technician is asked how to burnish them. Which method is recommended?

- A. Make a series of moderate stops, with cooling time between them
- B. Make several hard, wheel-locking stops in a row without cooling
- C. Drag the brakes lightly for several kilometres on level road
- D. Soak the hot drums in cold water before each stop

123. An exhaust brake butterfly valve sticks partly closed while the engine is under load. What symptoms are expected?

- A. Excess boost pressure and unusually cold exhaust gas at idle

- B. Power loss, high back pressure, and black smoke
- C. Improved fuel economy and noticeably lower coolant temperature at load
- D. Reduced engine oil pressure that appears only at idle speed

124. A technician sees a drive tire worn heavily down the centre of the tread while the shoulders look fine. What is the most likely cause?

- A. Overinflation pushing the centre against the road
- B. Underinflation, which overloads the shoulders of the tread
- C. Excess toe angle set on the steer axle tires
- D. Loose wheel nuts on the drive axle hub assembly

125. Why should engine coolant never exceed about 70 percent glycol in an extremely cold climate?

- A. Glycol above that level turns to a gel at operating temperature
- B. The water pump seal would swell and fail
- C. Heat transfer and freeze protection both decline above that concentration
- D. The thermostat will no longer open at all

126. An A/C compressor clutch does not engage, and gauges show equal low pressures of about 150 kPa on both sides at 20 degrees Celsius ambient. What is the most likely cause?

- A. A plugged cabin air filter restricting airflow to the cab
- B. Very low refrigerant charge, so the low-pressure switch opens
- C. A stuck blend door in the heater box
- D. A seized engine cooling fan clutch on the radiator

127. When should distilled water be added to a flooded battery that has low electrolyte?

- A. Before any test, filled to the top of the case
- B. Only when the battery has been completely discharged flat and cold

- C. Never, because adding any water would dilute the acid permanently
- D. After charging, unless plates are exposed, then cover them first

128. A micrometer with a 75 to 100 mm range is about to measure a 90 mm journal. What must the technician do before taking the reading?

- A. Check zero against a 75 mm standard and clean the measuring faces
- B. Oil the anvil faces lightly so the spindle turns smoothly
- C. Tighten the thimble firmly by hand until it can no longer turn
- D. Compare the reading with a worn caliper to confirm the size

129. A trailer's landing gear is stuck in the retracted position on a cold morning, and the gearbox is dry. What is the best repair?

- A. Heat the legs with a torch to free the screw
- B. Strike the legs repeatedly with a heavy hammer to free them
- C. Lubricate with the specified grease and check for bent legs
- D. Add engine oil into the sealed landing gear gearbox

130. What is the role of a priority valve in a truck hydraulic system that powers both steering and an auxiliary function?

- A. To limit the maximum operating temperature of the whole system
- B. To feed steering first and pass the remaining flow on
- C. To filter fine metal particles from the oil returning to tank
- D. To store pressurized oil in reserve for emergency steering use

131. A wheel cylinder leaks fluid onto the linings of a medium-duty truck's hydraulic drum brake. What is the correct repair?

- A. Clean the soaked linings with brake solvent and reinstall them

- B. Replace the cylinder and the contaminated linings, then bleed the system
- C. Add brake fluid to the reservoir and monitor the level
- D. Seal the leak with a new rubber boot and nothing else

132. A coolant-cooled hydraulic driveline retarder reduces its braking effect while descending a long grade, and the coolant level is found low. Why?

- A. The retarder oil turns to gel in warm air
- B. The transmission neutral switch has stuck in the open position
- C. The air governor cut-out pressure has risen too high
- D. The retarder derates itself when cooling capacity falls

133. A truck wanders at highway speed, and the technician finds loose steering gear mounting bolts and a small crack in the frame bracket. What is the correct repair?

- A. Repair the bracket, then torque the mounting bolts
- B. Add washers beneath the loose bolts and retighten them
- C. Tighten the bolts and ignore the small bracket crack
- D. Weld a plate over the entire frame rail section

134. A technician reinstalls connecting rod bearing caps after inspection. What must be verified before tightening them?

- A. The cap is slightly oversize to allow for heat expansion
- B. The cap bolts are lubricated with heavy grease only
- C. Cap and rod numbers match and face together
- D. The bearing shells are lightly filed to fit the journal

135. What is the typical resting voltage of a fully charged AGM battery after it has rested several hours?

- A. About 11.8 volts, a deeply discharged battery

- B. About 12.2 volts, roughly half charged
- C. About 14.4 volts, a charging voltage
- D. About 12.8 to 13.0 volts

Practice Exam 7: Answer Key and Explanations

1. **D** — The reading was taken 22.3 degrees below the reference temperature, which is four 5.6-degree steps, so four times 0.004 equals 0.016. Subtracting that from 1.250 gives 1.234. Adding the correction would give 1.266, and ignoring it leaves 1.250, which overstates the true state of charge of a cold battery. A cold battery therefore needs correction.
2. **A** — Resistance equals voltage squared divided by power, so 120 squared is 14,400 and dividing by 1,500 gives 9.6 ohms. The 12.5 figure is the current in amperes, not resistance. An open element reads infinite resistance, and a reading far below 9.6 ohms points to a shorted element that will trip a protected outlet.
3. **C** — Castle nuts are tightened to the minimum torque and then advanced to the next slot to fit the cotter pin, never backed off, since reducing torque risks the joint working loose. A new pin is always used. Leaving the nut unpinned or reusing a pin leaves no safe retention for a steering component.
4. **B** — Frozen lines mean water is reaching the system, and the air dryer is meant to remove it. A spent desiccant cartridge, a leaking purge valve, or an inoperative dryer heater lets moisture through. Alcohol only lowers the freezing point temporarily, and changing the line material or governor setting does nothing to remove the water itself.
5. **C** — Cold gear oil can be stiff enough to drag the input shaft and countershaft, so the transmission tries to turn when the clutch partly engages. This usually fades as the oil warms, and synthetic lubricant or a block heater helps. A burned disc, overheated pilot bearing, or bent driveshaft would not appear only in extreme cold.
6. **A** — Section 8 of a 16-section safety data sheet covers exposure limits, engineering controls, and the gloves, eye protection, and respirators needed for the product. Section 4 only tells you what to do after an exposure, so it cannot replace the PPE guidance a technician needs before opening the washer concentrate container.
7. **D** — In the common seven-way arrangement, white is ground, black is marker, yellow and green are turn signals, red is stop, brown is tail, and blue is auxiliary, often feeding the trailer ABS. Confusing the pin functions leads to wrong test results, so knowing the colour code speeds diagnosis. Check the blue pin with a meter first.

8. A — Cold oil is very viscous, so the pump cannot draw it in fast enough and cavitates. The noise fades as the oil warms. Warming the system at low pressure and using the correct viscosity oil prevent damage. An overfilled reservoir or hot return oil does not match the cold-only symptom.

9. B — A discharged battery's electrolyte can freeze, and charging a frozen battery can cause internal damage or an explosion from hydrogen. It must thaw fully, then be inspected for case damage before any test or charge. Jump starting or fast charging adds stress to a frozen cell, and adding water only lowers the electrolyte strength further.

10. D — Cloud point is the temperature where paraffin wax first forms visible crystals, and those crystals clog a filter well before the fuel stops flowing. Flash point concerns vapour ignition and cetane number concerns ignition delay, so neither explains a winter plugging problem. The fix is replacing the filter and moving to a winter blend or additive.

11. C — A blower that runs only on high speed bypasses the resistor pack or control module that supplies the lower speeds, so that component has likely failed. The compressor clutch, heater core hose, and receiver-drier do not control blower speed, so replacing them would not restore the missing lower speeds. Test the resistor and its connector for heat damage.

12. D — Steering return depends on caster and on free movement of the linkage and kingpins. Binding joints or too little caster make the wheels reluctant to straighten, and the effort rises. Fuel pressure, clutch bearings, and brake chamber air have no effect on the geometry and friction that return the wheel.

13. A — Air dryers use a thermostatically controlled electric heater around the purge valve to prevent freezing. If the cartridge is new, the next logical check is power at the heater connector and the element's resistance. The discharge line, treadle valve, and tractor protection valve have no heating function, so they cannot explain a frozen purge valve.

14. C — The release bearing spins against the clutch fingers only when the pedal is pressed, so noise limited to that condition points to it. Noise that disappears when the pedal is pressed would involve transmission components turning under the clutch, and axle or wheel bearings keep making noise regardless of the pedal position.

15. B — Rubber seals bond to the door frame when wet and frozen, and prying tears them. Warm air thaws them without harm, and silicone seal lubricant afterward stops water from bonding. Boiling water can crack glass and refreeze, and petroleum oil attacks rubber, so neither solves the problem safely. Silicone also keeps the rubber supple in extreme cold.

16. C — A battery that is not secured vibrates heavily on rough roads, which loosens active material from the plates and can short cells. Hold-downs should be snug without cracking the case. Hold-down tightness does not alter charging voltage, freezing temperature, or starter current, so only the mechanical damage explains the failure here.

17. A — Blow-by gas must leave the crankcase through the breather. When ice blocks the outlet, pressure builds and exceeds what the rear main seal and dipstick tube can contain, pushing oil out.

Cooling system and lift pump pressures are separate circuits and do not pressurize the crankcase, so clearing and insulating the breather is the correct repair.

18. B — Low temperatures reduce the battery's available capacity, and the heaters for the cabin and the battery pack use energy from the same pack. Together these cut range noticeably. Motors work well in the cold, and tires lose pressure rather than gain it, so neither explains the range loss. Preheating the pack while plugged in helps preserve range.

19. D — Included angle is built into the axle, so it should stay constant even when camber adjusts. If it is out of specification, the spindle or beam is likely bent from impact. Tire pressure and shock condition change ride and wear, not the angle between the axis and the wheel, and a pedal bushing has no connection.

20. C — A wet tank safety valve is the last protection against excess pressure, set near 1,034 kPa. It lifts only if the compressor keeps pumping past the normal cut-out near 860 kPa, which points to a faulty governor or unloader. Leaking purge valves and overstroked chambers lower pressure or waste air, but they never push it above cut-out.

21. D — The bell housing positions the transmission input shaft in line with the crankshaft, so excessive bore or face runout bends the shaft in operation and damages the pilot, input bearings, and clutch. Oil pressure, fuel economy, and spring brake release have no link to this alignment, so the housing must be corrected before reassembly.

22. B — On some alternators the warning lamp supplies the small starting current to the field winding. A burned-out bulb breaks that path, so the alternator never excites and does not charge until the circuit is restored. The lamp does not sense battery voltage, filter ripple, or switch the regulator off, so replacing the bulb restores operation.

23. A — Cold cylinder walls keep some injected fuel from igniting fully, so a brief white cloud of vapour is normal and fades as temperatures rise. A coolant leak would produce lasting white smoke, falling coolant level, and a sweet smell. Steady coolant and fast clearing therefore point to normal cold-start behaviour, not an internal engine fault.

24. D — DEF is a urea and water mix that freezes near minus 11 degrees Celsius, but freezing does not harm it once it thaws. Warm the drum gently indoors, never with a flame, and never add water, because dilution would push the urea concentration away from the required 32.5 percent and trigger SCR faults.

25. A — A suspension that holds pressure only while connected to supply air has a leak downstream of its check valve, so soap testing the air springs, fittings, and valve lines locates it. A slack adjuster and clutch have no connection to suspension air, and a glad hand leak affects the supply line, not the suspension reservoir.

26. C — Hydraulic power in kilowatts equals flow in litres per minute times pressure in bar divided by 600, so 40 times 150 divided by 600 gives 10 kilowatts. The 6 figure results from using megapascals without conversion, and 60 and 0.6 are factor-of-ten mistakes. The engine must supply more than this to cover losses.

27. B — Stop holes at the ends of a crack relieve stress so it cannot continue growing, and a staggered reinforcing plate spreads load without creating a new stress point. Drilling flanges weakens a heat-treated rail, and welding without stop holes lets the crack grow. Sealant does not restore any strength to the metal.

28. D — After starting, the solenoid must release and the pinion retract from the ring gear. A hung solenoid or a failed drive that keeps the pinion engaged makes the starter grind at engine speed and can destroy the gear. Battery voltage, flywheel temperature, or key wear do not hold the pinion in mesh.

29. B — ABS controllers set voltage faults when the supply drops below their operating threshold, which a weak battery and slow cranking can cause. Once the battery is charged, the code can be cleared and the lamp should go out. Magnets do not weaken from cold, and a backwards relay valve would show up as a braking problem, not a lamp.

30. A — A non-synchronized gearbox has no synchronizer rings, so the driver must match shaft speeds, which is done by double clutching, or by float shifting. Forcing the lever grinds gears, and the clutch brake only slows the input shaft when starting from rest, so it cannot help with shifts on the move.

31. C — An electrical heater needs power, so the logical first test is checking voltage at the relay output while it is commanded. That divides the circuit into a control side and a heater side. Air filters, thermostats, and coolant flushes have no connection to an electrical grid heater, and swapping parts before testing is the mistake the exam penalizes.

32. B — Air trapped in the heater core blocks coolant flow, producing gurgling noises and cold air. Bleeding the system at the high point per the procedure restores circulation. The blower, refrigerant charge, and blend door are not involved, since the symptom started with the coolant service. Follow the maker's fill and bleed procedure on that cab heater circuit.

33. A — A voltage drop test measures loss in cables and connections under load, and about 0.5 volt total on the positive side is a common limit. Larger drops waste voltage that should reach the starter and slow cranking, especially in the cold. The other values are far above normal, and a reading across the whole battery would be system voltage.

34. C — New spring leaves and seat surfaces bed in under load, which can reduce clamp load on the U-bolts even though torque was correct at installation. Retorquing at the recommended interval keeps the pack tight. Loose U-bolts can shift the axle, break the centre bolt, and cause alignment trouble. Retorque intervals appear in the suspension maker's service literature.

35. D — The number before the W grades how readily the oil flows when cold, and a lower number means better cold cranking and quicker pumping. The second number, 40, describes viscosity at operating temperature. The W stands for winter, not weight, and it has nothing to do with additive content or with gear oil classifications.

36. B — Stability systems compare steering angle, yaw rate, and lateral acceleration to wheel speeds, and a new module needs its references taught through a calibration routine. A battery reset or driving

alone cannot teach the sensors' zero positions. The wheel speed sensors are not the cause, so replacing them first wastes time and parts.

37. A — Interlock pins or plates block the other shift rails while one is moved, so two gears cannot lock the shafts together and break the transmission. They do not influence oil level, clutch pedal play, or shaft speed. A missing or worn interlock can allow double engagement and severe damage. Check detent springs during any teardown.

38. D — Starters draw several hundred amperes and heat quickly, so cranking is limited to short bursts of about 15 to 30 seconds, followed by a rest. Longer cranks can overheat the windings and drain the battery. One-second bursts will not start the engine, and battery voltage alone does not protect the starter from heat damage.

39. C — Seat belt webbing carries crash loads, and cuts or fraying reduce its strength unpredictably. A damaged belt must be replaced as an assembly with the manufacturer's approved part. Trimming, taping, or washing does not restore strength, and a belt that fails in a crash cannot be repaired after the fact.

40. A — Torque rods locate the axle front to back and take drive and brake torque, so worn bushings let the axle move out of line, which scrubs tires and may cause dog tracking. They have no effect on brake air pressure, engine temperature, or clutch free play, so replacement restores alignment.

41. D — Fuel in the crankcase thins the oil, lowers its flash point, and weakens the film that separates bearings from journals, which accelerates wear. Higher viscosity or a rising base number is the opposite of what happens. Long idling at low load and leaking injector seals are common causes, so both should be investigated.

42. C — Effective mentoring follows explain, demonstrate, observe, and feedback, which keeps safety in front and lets errors be corrected while they are still small. Leaving a beginner alone with a brake job exposes both the apprentice and the customer to risk, and no reliable skill transfer happens without observed practice and specific feedback.

43. B — The upper coupler plate transfers all the coupling load to the kingpin, so a cracked plate is a structural defect that can fail without warning. The trailer must be removed from service until a qualified repair is done. Paint, grease, or an unspecified weld hides or aggravates a failure. Welding over a crack is not an approved repair.

44. C — ISO 4406 reports solid particle counts per millilitre at three sizes, as code numbers on a scale where each step doubles the count. Lower numbers mean cleaner fluid. It does not describe viscosity, water content, or acidity, so it is the main way to judge hydraulic oil cleanliness. Technicians compare the result with the component maker's target code.

45. D — Glazed linings from overheating lose friction, and the drums often carry matching hardened or heat-checked surfaces. Replacing the linings and resurfacing the drums within wear limits restores friction. Grease would reduce friction further, and spacers or light sanding cannot repair a glazed surface, so these choices could make stopping distances longer.

46. B — A PTO gear that meshes too tightly or too loosely with the transmission gear whines when engaged. The backlash is measured and set per the specification, using shims or gaskets as directed. Clutch travel, coolant level, and air dryer condition are unrelated to gear noise that occurs only with the PTO engaged.

47. A — Corroded terminals cannot be cleaned reliably, so damaged terminals and seals are replaced and the connector resealed. A thin film of dielectric grease helps keep moisture out. Conductive paste can bridge adjacent circuits, tape does not seal pins, and penetrating oil can swell seals and attract dirt, so none of these gives a lasting repair.

48. A — A sweet smell and rising oil level mean coolant is entering the lubrication system, and the oil cooler core separates coolant from oil under pressure, so it is the first suspect. A cap or thermostat leak would lose coolant externally, and the fuel filter housing has no coolant passages, so neither explains rising oil level.

49. C — The evaporator removes moisture from the air as it cools it, and the dried air is then reheated by the heater core, so the windshield clears faster. The compressor does not warm the air, lower blower current, or raise idle speed. Some systems also use the compressor in defrost to reduce window fogging.

50. D — Rubber or elastomer bushings should be tightened at normal ride height so they are neutral in service. If tightened with the suspension hanging, they are twisted in operation, which shortens their life and changes ride height. Rust, torque value, and bolt cooling are unrelated to the reason for loading the springs.

51. B — A cold pack cannot take much charging current safely, so the controller limits regeneration and relies more on friction brakes until the pack warms. This is a normal protection. Frozen pads, inverter overcharging, and compressor load do not cause a regeneration limit that appears only in cold conditions. Regeneration returns to normal as the pack warms in use.

52. D — New pads are thicker than worn ones, so the adjuster that tracks wear must be wound back to give the caliper room to fit over the rotor. Skipping that step can damage the caliper or leave the pads dragging. Lubricating friction surfaces removes braking force, and tank pressure and wheel studs are unrelated to the procedure.

53. C — Fine dust is normal, but large slivers and chips mean a gear tooth, bearing race, or synchronizer is breaking up inside the case. The transmission should be opened and inspected before it fails on the road. Oil level, condensation, and filling errors do not produce chunks of steel, so they cannot explain the debris found.

54. B — In the American wire gauge system, a lower number means a thicker conductor, so 10 AWG is the largest of these and has the lowest resistance, allowing more current without overheating. Higher gauge numbers such as 14, 18, and 20 are progressively thinner, and using them on high-current circuits would cause excessive voltage drop and heat.

55. A — After heavy load the turbo housing is red-hot, and an instant shutdown stops oil flow, so oil in the bearing housing cokes and blocks passages. A cool-down idle of three to five minutes lets oil carry heat away. Revving only adds heat, and spraying water would crack the hot housing.

56. B — A trailer's weight pressing on the lock jaws makes the release stiff. Setting the landing gear or easing the tractor back against the kingpin takes pressure off so the handle moves freely. Hammering can break the mechanism, pulling forward under load can damage the kingpin, and removing grease would increase wear.

57. D — The suspect parameter number identifies the signal or component, here coolant temperature, and the failure mode identifier tells how it failed, with 3 meaning voltage above normal or shorted high. The code does not carry part numbers, occurrence counts, or software versions, although a separate occurrence counter is shown on most tools.

58. A — Snow and ice can compress or slide under a concentrated load, so stands must sit on a rigid base spreading the weight over firm, level ground. A steel plate does that. A jack alone can bleed down, and loose gravel shifts, so neither gives the stable support required before anyone goes beneath a loaded axle.

59. C — Power line carrier communication sends data over the existing ABS power wire, letting the tractor read trailer ABS faults and show them on the dash. It uses no radio link, air pulses, or clearance lamp circuit. A damaged power wire can stop both the ABS and the data signal. Check that wire's voltage and condition first.

60. D — Open-center valves pass pump flow straight to the tank when no function is selected, so the system runs at low pressure and wastes little energy. A blocked flow would be a closed-center design with a pressure-compensated pump. The accumulator is not the main path, and cylinders do not move in neutral.

61. B — With brakes released the supply side holds air, so the loss that appears only on application must be on the service side, downstream of the treadle valve, such as a chamber diaphragm, hose, or fitting. The compressor line, tank supply, and governor line stay pressurized in both conditions, so a loss there would show during the released test.

62. C — Grades raise transmission load and heat, and the cooler must remove it. A restricted cooler, kinked line, or poor coolant flow lets the fluid overheat only when heat output is high. Engine oil pressure, steering gear wear, and battery condition do not affect the transmission's heat rejection, so the cooler circuit should be flow tested.

63. A — At idle, an open EGR valve routes a large share of inert exhaust gas into the intake, leaving too little oxygen for stable combustion, so the engine runs rough and may stall. The valve adds exhaust, not fresh air, and it does not raise boost or alter fuel pressure, so replacing or cleaning the valve is the repair.

64. B — Pintle hooks and lunette eyes are rated for tow weight and tongue load, and the eye diameter must fit the hook jaw so there is no excess play or point loading. Using mismatched sizes or unrated parts can lead to separation. Paint colour and welding do not change the rating or the fit.

65. C — Replacement modules are often blank or carry a generic file, so they must be programmed with the engine's calibration, customer parameters, and any security data using the manufacturer's tool. Waiting with the battery off does not install software, and injectors and throttle stops are unrelated to a calibration mismatch. Calibration must match the engine build.

66. A — A parked regeneration raises engine speed and injects fuel to burn soot off while the vehicle sits still, and it needs a warm engine, brake set, neutral, and a clear area around the exhaust. It cannot run with the engine off, and the filter stays installed. Low coolant temperature would prevent the strategy from starting.

67. D — Bleeding begins at the longest line to push air out ahead of the fluid, so the farthest wheel is normally first and the closest one is last. Using whichever wheel is convenient can leave air trapped in longer lines. Manufacturers may specify a different order for split or proportioning systems, so the service manual remains the final authority.

68. A — Controllers protect the transmission after a serious fault by restricting shifts to one or two gears, allowing the driver to travel to a service facility. The fault code identifies the problem. Lock-up, neutral safety, and retarder modes are separate functions that do not limit the transmission to a single gear because of a sensor fault.

69. B — A heavy door is supported by its hinges, and worn pins or bushings let it sag, which changes latch alignment and makes the door rub. Replacing worn parts and adjusting the door restores the fit. Air conditioning charge, fuel filters, and tire pressure do not affect door position. Check hinge bolts and the latch striker alignment afterward.

70. D — R-1234yf is classified as mildly flammable, so recovery and charging equipment must be designed for it, and mixing it with other refrigerants contaminates the supply. It is not interchangeable with R-134a tools and fittings. Venting refrigerant is against environmental rules, whatever the system size. Recovery cylinders and hoses are also marked for each refrigerant to prevent cross contamination.

71. C — Intermittent faults often come from chafed wires or loose pins, so watching live data and wiggling harness sections reveals the exact spot where the signal drops. Replacing the cluster without a test may not cure the fault, clearing codes erases evidence, and extended charging has no effect on a harness defect.

72. C — The 40-degree change equals about 7.1 steps of 5.6 degrees, and each step lowers pressure by 6.9 kPa, so the loss is about 50 kPa. The 7 kPa figure counts only one step, and 140 kPa overstates the drop. Pressure should be checked cold and adjusted in winter, since underinflation raises heat and wear.

73. A — Urea injected into a cold exhaust forms crystalline deposits instead of ammonia, so the control module delays dosing until exhaust temperature rises to about 200 degrees Celsius. That makes the delay normal, not a fault. The NOx sensors stay installed and active, and the DEF pump is not tied to fuel level or oil pressure.

74. B — Brakes are serviced in axle sets, because mismatched lining thickness or friction material gives unequal braking force, causing pull and uneven wear. Relining both ends with the same material keeps

the brakes balanced. Modifying springs or fitting smaller chambers changes the design, and leaving the other end alone invites the very imbalance a technician must avoid.

75. D — Many automated transmissions use air-operated clutch and shift actuators that need a minimum supply pressure to move, so the controller inhibits shifts when pressure is too low. Building system pressure restores operation. Friction material, oil cleanliness, and yoke phasing do not prevent actuators from moving. A gauge reading should be taken before suspecting actuators or the controller electronics.

76. A — A metric property class tells tensile strength, and a higher number such as 10.9 exceeds the original 8.8, so it is an acceptable replacement if size and thread match and torque follows the specification. Never substitute a weaker class, and never heat a bolt, since heating alters its heat treatment and strength.

77. B — A wound torsion spring stores large energy that can cause serious injury if released suddenly. Correct winding bars and the manufacturer's procedure allow a controlled release. Cutting, heating, or hand-holding a spring is dangerous and can cause a violent release of stored energy. Use rated winding bars and keep hands clear of the winding cone.

78. C — As the oil level changes, outside air enters the tank, and humid air in cold weather deposits water in the oil. A desiccant breather dries the incoming air. Water causes corrosion, foaming, and breakdown of the fluid. The breather does not pressurize the tank, heat the oil, or remove entrained air.

79. D — In the standard nine-pin heavy-duty connector, pin A is ground and pin B is battery positive, while pins C and D carry CAN high and CAN low. Confusing these can lead to wrong readings, so a technician should confirm power and ground at the connector first before assuming the scan tool or vehicle network is at fault.

80. D — Tread-area punctures within the repairable zone are repaired from the inside, with the tire dismounted and inspected so the damage and the liner are treated. External plugs alone are not accepted, and sidewall injuries cannot be repaired since the flexing sidewall will not hold a patch. Cement alone cannot seal an air-pressure hole.

81. C — Common-rail systems hold very high pressure after shutdown, and a fine jet can cut through skin and ignite. The manufacturer's wait time lets rail pressure decay, and a rag or gauge, never a hand, is used to check for leaks. Loosening a line on a running engine or heating a fitting adds the hazards the rule prevents.

82. A — J1939 data uses pin C for CAN high and pin D for CAN low. Pins A and B are ground and battery, and pins F and G typically carry the older J1587 data link. Knowing these locations allows quick resistance and voltage checks at the connector without back-probing at the modules.

83. B — Cam bushings must be greased only to the specified amount, because a worn seal or too much grease can push lubricant along the shaft into the drum and contaminate the linings. Contaminated linings lose friction and must be replaced. Cam motion does not draw grease into the drum, and cracked drums or water do not cause this symptom.

84. B — A universal joint's four caps share one grease passage, so grease must purge past each seal to show that all needle bearings received fresh lubricant. Counting pumps or feeling resistance can leave a cap dry. Grease on the slip yoke belongs to a different lubrication point and does not confirm the joint's lubrication.

85. C — The charge port includes communication pins that confirm safe connection before high power flows, so ice and moisture can block the handshake or create a hazard. Clearing it with approved methods and inspecting it is correct. Metal tools can damage pins, hot water adds moisture, and bypassing communication is unsafe.

86. D — A valve cap seals the stem opening against dirt, ice, and moisture, and it acts as a secondary air seal if the valve core leaks slightly. It does not vent pressure, control temperature, or secure balance weights. A missing cap on a winter truck can let water freeze in the core and cause leaks.

87. A — Return flow equals fuel that leaked past the injector's internal clearances, so one unit returning several times the rest has worn parts and wastes rail pressure, causing hard starting and rough running. A restricted return line would affect all injectors similarly, and variation of that size is never normal, so the injector should be replaced.

88. C — Orifice tube systems use an accumulator after the evaporator to keep liquid from reaching the compressor, while expansion valve systems use a receiver-drier on the high side. The expansion valve is a different metering device, and a sight glass is a diagnostic aid, not the protective component. Always replace the accumulator whenever the system is opened for major repairs.

89. A — Multiplexed systems control outputs electronically, so commanding the output with the scan tool shows whether the module drives it and how much current flows. This separates module faults from wiring or lamp problems. Replacing the module or all the bulbs may waste time, and adding a relay bypasses the design.

90. B — The treadle valve exhaust should be silent with the pedal released. A steady leak there means the inlet seat or plunger seal is not closing, so supply air is passing through to exhaust. A purge valve and wet tank belong elsewhere in the system, and the tractor protection valve does not connect to the treadle valve's exhaust port.

91. D — A press with the correct sockets pushes the caps out without damaging yoke bores. Heating a yoke alters its heat treatment, and hammering the ears can crack them or distort the bores, which ruins the new joint. Cutting the cross with an abrasive wheel risks marring the bores and creates debris.

92. D — Acetylene valves open only about one and a half turns, and the wrench stays on so the gas can be shut off fast in an emergency. Oxygen valves are opened fully to seat the back-seal. Acetylene above 103 kPa (15 psi) becomes unstable, so the regulator working pressure must also stay under that figure.

93. A — Two-speed landing gear is geared high for fast movement with no load and low for lifting a loaded trailer with less effort. Using high speed with no load saves time and wear. Using low speed unloaded takes much longer and offers no benefit, so the shift is made based on load.

94. B — A solenoid that cannot move the spool draws high current and overheats, and low voltage can leave the armature unseated and do the same. Checking spool movement and supply voltage finds the cause. Oil viscosity, a clogged breather, and a scored rod do not directly overload the coil. Measuring coil current confirms whether the electrical side is overloaded.

95. C — Engine controllers use cam and crank signals as backups. With the crankshaft sensor lost, many modules keep the engine running from the camshaft signal, sometimes with reduced power, though starting may take longer. Instant shutdown is not universal, and neither fuel pressure nor starter operation is controlled by the lost sensor in this way.

96. A — Oil-lubricated hubs have a marked fill level so bearings run partly submerged without churning and without pressing on the seal. Overfilling raises seal pressure and temperature and causes leaks, while underfilling starves bearings. Oil flowing from the breather means serious overfilling, and a thin film provides too little lubrication. Check the level again after a short drive.

97. B — Fired heaters need fuel, air for combustion, a clear exhaust, and an ignition element that lights the flame. A blocked intake or exhaust, a weak glow pin, or a low fuel supply all cause flame-outs in the cold. The alternator, engine cooling system, and axle lubricant are not part of the heater's combustion process.

98. C — A healthy J1939 network has two 120-ohm terminators in parallel, giving about 60 ohms. A reading of 40 ohms matches three 120-ohm resistors in parallel, meaning an added or incorrectly fitted terminator. An open wire would raise the reading toward 120 ohms, and a short would give near zero. Checking with the power off avoids false readings.

99. D — A soap test with the brakes applied shows leaks under pressure, and bubbles at the clamp ring point to a leaking diaphragm or poorly seated clamp. The chamber must be repaired or replaced. A healthy chamber produces no bubbles, and desiccant or slack adjuster lubricant has no connection to leaks at that location.

100. D — Through an open differential, torque goes to the wheel with the least resistance. A broken axle shaft leaves one side free to spin, so power does not reach the road and the truck stays put. A clutch brake or slip yoke problem would prevent all rotation to the axle, and an air dryer leak does not influence drive.

101. B — Starting fluid is extremely flammable, and a hot intake heater can ignite it prematurely, causing a backfire into the intake or engine damage. Engines with grid heaters or glow systems already have a cold-start aid. It does not alter oil thickness or cetane, so using it provides risk without any benefit.

102. C — A module that resets only during cranking is losing its supply voltage in that moment, which suggests a corroded or loose power or ground connection that drops voltage as cranking current flows. Overcharging, thermostat position, and boost do not affect supply voltage in this way, so a voltage drop test is the proper diagnostic step.

103. A — Unitized hubs contain pre-set bearings, so the only step is to tighten the axle nut to the specified torque, which clamps the assembly and sets the preload. Traditional adjustment methods, such as watching end play or turning the hub, are for adjustable tapered bearing hubs. Backing off the nut would ruin the preload.

104. C — An open sensor circuit reads the coldest possible value, so the module assumes the engine is frozen, enriches fuel, and may hold the fan on. The fault is in the electrical reading, not actual overheating, so the engine continues to run. The thermostat is mechanical and is not controlled by the reading in this way.

105. B — A compressor holds a specific oil charge, and the system total must match the specification. Oil that was drained from the old compressor or removed components is replaced in the proper quantity. Too much oil reduces cooling, and none starves the compressor. Engine oil does not mix with refrigerant and must never be used.

106. A — Dual circuits keep each tank separate so a leak in one does not drain the other. A primary gauge that keeps falling while the secondary holds steady means the leak is in the primary circuit, which should be found by soap testing. Normal compressor behaviour would refill the tank, and a slack adjuster cannot lower tank pressure.

107. D — Axle ratio equals ring gear teeth divided by pinion teeth, so 43 divided by 10 equals 4.30. The 3.73 figure belongs to a 41-tooth ring and 11-tooth pinion. The inverse, 0.23, would suggest an overdrive. Higher numerical ratios give more torque multiplication but reduce highway speed at a given engine rpm.

108. B — The min/max function stores the lowest and highest values seen during a test period, so a short dip that a display would miss is captured. The continuity beeper and resistance range require the circuit to be unpowered, and diode test mode checks semiconductors, so none of those can capture a live voltage dip.

109. C — Wheel clamp load depends on solid metal contact. Paint, rust, or scale compresses and loosens over time, so nuts lose torque and studs can break. The faces must be cleaned flat. Adding paint or grease creates a softer layer, and extra torque does not repair the contact or may overload studs.

110. A — Burning diesel is a flammable liquid fire, which needs Class B agent. The common shop dry chemical ABC unit covers it, applied at the base of the fire with a sweeping motion. Class A water-based agents can spread burning fuel, and Class D is for metals such as magnesium, so neither is the right choice here.

111. D — Foam insulation can burn and release toxic fumes, and the refrigeration unit's controller can be damaged by welding current. The insulation must be shielded or removed from the area and the electronics disconnected. Running the unit during welding adds risk, and oil is flammable. Fire protection and ventilation should also be arranged before any cutting or welding starts.

112. B — Cylinders hold different volumes of oil depending on their position, so the reservoir level changes with extension. The manufacturer specifies the position for a correct reading, often retracted.

Checking at full pressure or with boiling oil gives false readings and risk of burns. A wrong reading can cause overfilling or a pump starved of oil.

113. A — On slippery pavement a compression brake can overbrake the drive axle and cause wheel lock or jackknifing. The ABS and traction controller communicates over the J1939 data link and asks the engine controller to turn the retarder off. It does not send air to spring brakes or lock a differential, and fuel pulse width is not used to counter retarding.

114. C — Headlamp aim depends on vehicle attitude, so the vehicle must be level, on correctly inflated tires, and in its normal unloaded condition. A slope or trailer load tilts the beam, and deflated tires lower the vehicle, so aim would be wrong. Aiming is done at rest, using a screen or an optical aimer.

115. D — Force equals pressure times effective area, so 80 psi acting on 30 square inches gives 2,400 pounds. The 3,000-pound figure would need 100 psi, and 1,200 pounds uses an area of only 15 square inches. Lever length in the slack adjuster then multiplies this pushrod force into brake torque at the cam.

116. A — Ring and pinion gears are lapped as a matched pair at the factory, so replacing only one disturbs the tooth contact pattern, causing noise and early failure. The set should be installed as a pair, with the pattern and backlash checked. Polishing worn teeth does not restore the hardened surface or the geometry.

117. B — A grease fitting on a sealed joint should be filled just until the boot begins to swell, which ensures lubrication without splitting the boot. Over-greasing can rupture the boot and let water in. Sealed joints still need service when fitted with a grease fitting, and a full tube would burst the boot.

118. C — Hybrid systems can restart the engine or energize the traction system without warning, and high-voltage components stay live until the system is shut down and isolated. Following the procedure before work protects the technician. The 12-volt battery, compressor, and cab heater do not drive the vehicle. Lockout of the high-voltage system is required before any hands-on work.

119. D — A cap that vents at half its rated pressure lowers the coolant boiling point and lets coolant boil over under load, so it must be replaced with the specified rating. Additives and dilution cannot restore pressure, and a thicker hose does nothing for the cap valve. Cap pressure is a simple, quick test worth doing on every overheating complaint.

120. D — Power equals voltage times current, so 12 volts at 7.5 amperes is 90 watts. Twenty minutes is one third of an hour, so the energy used is 30 watt-hours. The 90 figure is just the power, and 1,800 reflects a mistake of multiplying by minutes instead of converting minutes to hours.

121. C — Airbag systems keep reserve energy for some time after power is removed, so the battery is disconnected and the specified wait observed before touching the connectors. Hammering a module or shorting pins can set off the inflator unexpectedly, and leaving the battery connected keeps the system live, creating a risk of injury.

122. A — Burnishing matches the lining to the drum surface, and the recommended method is a series of moderate stops with cooling time so heat does not glaze the new material. Hard locking stops or long

dragging create excess heat, and soaking drums in water can crack them. Following the lining maker's burnish procedure reduces early fade.

123. B — A valve that fails to open fully acts as an exhaust restriction, raising back pressure, reducing airflow, causing poor combustion, and producing black smoke with less power. Boost does not rise, and fuel economy gets worse, not better. Oil pressure is unaffected, so the valve and its actuator should be inspected and freed.

124. A — Excess inflation makes the tread crown bulge, so the centre carries most of the load and wears first. Underinflation does the opposite and wears the shoulders, and toe causes feather wear on steer tires. Loose nuts cause wheel wobble and stud damage, not even centre wear, so the pressure policy needs correction.

125. C — Freeze protection peaks near 60 to 70 percent glycol, and beyond that the freeze point rises while heat transfer drops, so the engine runs hotter. Too little glycol invites freezing, and too much makes cooling worse. Glycol does not gel at normal temperatures and has no direct effect on the thermostat opening point.

126. B — With almost no refrigerant, pressures sit low and the low-pressure switch opens to protect the compressor, so the clutch will not engage. The leak must be found and repaired before recharging. A cabin filter, blend door, and engine fan do not cause equal low static pressures. Adding refrigerant without repairing the leak only wastes charge and harms the environment.

127. D — Electrolyte expands during charging, so cells are filled after charging to the proper level to avoid overflow. If the plates are exposed beforehand, a little water is added to cover them first, so they are not damaged in charging. Filling to the top or never adding water would either spill acid or leave the plates damaged.

128. A — Larger micrometers are checked against a setting standard at the bottom of their range, here 75 mm, after wiping the measuring faces clean, because dirt or a zero error ruins every later reading. Tightening hard stretches the frame and distorts results, and a ratchet or friction thimble gives consistent measuring pressure instead.

129. C — A dry gearbox and cold weather make the screw and gears bind, so lubrication with the specified grease is needed, along with a check for bent legs and damaged parts. Torches can weaken the steel and hammers can bend legs, and engine oil does not give the right lubrication for the gearing.

130. B — A priority valve gives the steering circuit the flow it needs and passes surplus flow on to the other functions, so steering is never starved by a heavy auxiliary demand. It does not control temperature, filter oil, or act as an accumulator. Without it, a heavy hoist demand could starve the steering and make control difficult.

131. B — Brake fluid soaks into friction material and cannot be cleaned out, so contaminated linings must be replaced along with the leaking cylinder. The hydraulic circuit must be bled afterward to remove air. Topping up fluid ignores the leak, and a boot cannot stop a failed cup seal inside the cylinder.

132. D — Retarders convert vehicle energy to heat that is carried away by coolant, so the controller reduces braking effect if coolant temperature rises or the level is low. This protects the retarder and engine. Oil gel, a neutral switch, or governor cut-out do not cause a gradual derate while descending a grade.

133. A — The steering gear must be rigidly anchored, because movement lets the geometry change and the truck wanders. A cracked bracket must be repaired or replaced before the bolts are torqued, since tightening a cracked part will not hold. Washers do not fix movement, and welding a plate over the rail could create stress points.

134. C — Rod caps are machined with the rod as a matched pair, so mismatched numbers or a reversed cap leave the bore out of round, which ruins bearing clearance. Torque is applied per the procedure with the specified lubricant. Bearing shells are never filed, and no cap is deliberately oversize, so alignment marks matter most.

135. D — A fully charged AGM battery rests near 12.8 to 13.0 volts, slightly higher than a flooded battery. A reading of 12.2 volts indicates about half charge, 11.8 volts is heavily discharged, and 14.4 volts is a charging voltage that would only appear while the battery is being charged, not at rest.