

PRACTICE EXAM 4: 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. How is a serpentine belt with an automatic tensioner usually checked for correct tension?
 - A. By removing the tensioner and replacing it with a solid fixed pulley
 - B. By tightening the tensioner bolt until the belt no longer squeals at start
 - C. By checking the tensioner position mark and the belt condition, not by measuring deflection
 - D. By pressing the belt midway and measuring a fixed deflection with a ruler

2. A highway tractor completes a diesel particulate filter service that removed ash. What must the technician do before releasing the truck?
 - A. Raise the idle speed to burn the remaining ash away at idle
 - B. Change the DEF filter so the control module will learn the newly installed filter
 - C. Disconnect the batteries for ten minutes to clear the filter data
 - D. Reset the ash load value with the service tool

3. A tractor's steering is heavy at idle speed in a yard but normal at highway rpm. The reservoir fluid level is correct. What is a likely cause?
 - A. A slipping pump belt or a worn pump giving too little flow at idle
 - B. A cracked windshield washer bottle in the cab that leaks fluid onto the dash
 - C. A bent trailer landing gear leg on the left side

D. A dirty cab air filter restricting air to the heater

4. A technician explains the purpose of a quick release valve mounted near the front brake chambers of a tractor. Which statement is correct?

- A. It filters moisture from the air before the chambers on the front axle
- B. It raises service line pressure so the front brakes apply harder than the rears do
- C. It exhausts chamber air locally so the brakes release faster after the pedal is released
- D. It stores reserve air for the parking brake circuit on the steer axle

5. What is the main job of the spider gears in a drive axle differential when the truck turns a corner?

- A. They store the power from the engine until the truck exits the turn
- B. They let the wheels turn at different speeds while both receive torque
- C. They lock both axle shafts together so they turn at the same speed
- D. They reduce the engine speed before it reaches the driveshaft

6. A highway tractor's wiring harness catches fire near the dash while parked at a shop. Which extinguisher type is rated for an energized electrical fire?

- A. Class D dry powder metal-fire unit for magnesium
- B. Class K wet chemical extinguisher for cooking oils
- C. Class A pressurized water canister for wood fires
- D. Class C or multipurpose ABC dry chemical

7. A technician reads flashing codes from a trailer ABS lamp. What is the normal way to retrieve these codes?

- A. Follow the manufacturer's procedure, such as counting lamp flashes after a specific power-up sequence
- B. Remove the trailer tires and check the bead seat

- C. Replace the ABS module without reading anything first
- D. Disconnect the trailer brake line and watch the air gauge while pumping the pedal

8. A hydraulic cylinder with a piston area of 50 square centimetres is supplied with oil at 14 MPa. What extension force can it produce?

- A. 7 kN
- B. 35 kN
- C. 70 kN
- D. 140 kN

9. When jump-starting a truck from another vehicle, where should the final negative clamp be attached?

- A. To a clean engine ground away from the dead battery
- B. To the positive post of the booster battery as a backup
- C. To the fuel line near the injectors for a strong ground
- D. Directly to the negative post of the dead battery

10. A tractor with 600,000 km runs rough at idle, lacks power, and produces heavy soot. A scan tool shows the exhaust gas recirculation valve commanded closed but the position reads open. What is the likely cause?

- A. The fuel filter restriction is limiting fuel flow to the injection pump and rail
- B. The valve is stuck open from carbon buildup, flooding the intake with exhaust
- C. The turbocharger wastegate is stuck closed and overboosting the engine
- D. The DEF injector is clogged and cooling the exhaust stream

11. Water is dripping onto the passenger floor of a coach whenever the A/C is running. What is the likely cause?

- A. A heater core leak at the dash

- B. A low receiver-drier desiccant level
- C. A loose compressor drive belt
- D. A plugged evaporator drain tube

12. After replacing a tie rod end on a steer axle, what must the technician do before releasing the truck?

- A. Reset toe and lock the clamps
- B. Increase tire pressure by about 140 kPa (20 psi) to settle the joint in place
- C. Grease the drive axle slip yoke fitting on the rear driveshaft
- D. Replace the front shock absorbers in a matched pair

13. What does the foot valve (treadle valve) do when the driver presses the brake pedal?

- A. It dries the air before it flows to the front brake chambers
- B. It meters air to the service brake circuits in proportion to pedal travel
- C. It stores reserve air for the parking brake in each axle group
- D. It limits compressor output when the tanks reach cut-out pressure

14. A technician must judge clutch wear on a self-adjusting clutch in a long-haul tractor. Which approach is correct?

- A. Count the number of times the driver reports shifting each day
- B. Check the axle ratio tag on the differential carrier cover
- C. Measure the engine oil pressure at idle with the clutch pedal fully released and the engine warm
- D. Check the wear indicator or measure the release bearing position against the specified range

15. Why is a carbon monoxide alarm recommended in a sleeper cab that has a fuel-fired heater?

- A. The alarm reduces cab noise from the heater during the night
- B. The alarm monitors the engine oil pressure while the driver is asleep
- C. A leak in the exhaust or heater can fill the sleeper with a deadly, odourless gas

D. The alarm warns the driver when the sleeper berth mattress is wet

16. Why should a lead-acid battery not be left in a discharged state for a long time?

- A. The case will shrink and release acid vapour into the tray
- B. The terminals will fuse to the cables and prevent any removal
- C. The electrolyte will turn into water and stop conducting current
- D. Lead sulphate hardens on the plates and permanently reduces capacity

17. A technician inspects a removed turbocharger for shaft play. Which finding is normally acceptable?

- A. Oil film inside the turbine housing outlet, together with a bent shaft
- B. Radial shaft movement large enough that the compressor wheel can be felt brushing its housing when pushed by hand
- C. A very small axial endplay, with no radial play that lets the wheels touch the housing
- D. Visible blade damage in the compressor wheel from foreign object impact

18. On a battery-electric truck, how does a DC-DC converter help the vehicle's 12-volt system?

- A. It steps high-voltage battery power down to charge the 12-volt battery and run controls
- B. It raises the 12-volt battery voltage so that it can charge the traction pack
- C. It replaces the traction inverter during hard acceleration
- D. It converts motor AC output directly into brake air pressure

19. A tractor pulls toward one side while driving straight. The technician finds the left steer axle caster is less positive than the right. Which way will the truck pull?

- A. It will alternate between sides at each road crown
- B. Toward the left, the side with less positive caster
- C. Toward the right, the side with more positive caster
- D. It will not pull, because caster affects only steering return

20. A technician checks a slack adjuster installed on an S-cam brake. At roughly half stroke with the brake applied, what angle should the pushrod and slack adjuster arm make?

- A. About 45 degrees, to give the cam extra leverage at the start
- B. About 180 degrees, so the arm lies flat along the pushrod
- C. Any angle is acceptable if the brake chamber is a Type 30 style
- D. About 90 degrees, so braking force stays properly balanced through the stroke

21. After machining a flywheel for a new clutch, what must the technician confirm?

- A. That the ring gear teeth have been ground flat to reduce noise during engagement and wear
- B. That the flywheel is above its minimum thickness and its surface is flat with correct runout
- C. That the pilot bearing has been oiled heavily to keep it from squealing
- D. That the flywheel has been polished to a mirror finish for easier slip

22. What damage can a loose battery hold-down cause on a tractor?

- A. Vibration can damage the internal plates and shorten the battery life
- B. The alternator will shut down until the clamp is retightened
- C. The batteries will charge faster because of the movement
- D. The cables will carry less current because of the extra space

23. A technician finds the rubber ring of a crankshaft vibration damper separated, with the timing mark shifted. What is the risk if this is ignored?

- A. The fuel filter will bypass dirty fuel to the injectors at idle
- B. The air dryer will purge too frequently while the engine runs
- C. Torsional vibration can fatigue the crankshaft and damage gears and drives
- D. The turbocharger will receive too much oil pressure from the gallery

24. A technician reads an outside metric micrometer on a crankshaft journal. The sleeve shows 12 mm plus one half-millimetre line, and the thimble aligns at 23. What is the diameter?

- A. 12.23 mm
- B. 12.50 mm
- C. 13.23 mm
- D. 12.73 mm

25. Why should coiled trailer air lines be routed with enough slack but clear of the tires and fifth wheel?

- A. To allow turning without stretching or chafing the lines
- B. To increase the pressure delivered to the trailer reservoirs
- C. To keep the lines from freezing in cold weather overnight
- D. To prevent the glad hands from leaking air at idle speed

26. What is the purpose of a check valve in a hydraulic circuit?

- A. It cools the oil before it returns to the reservoir tank through the cooler
- B. It allows oil to flow one way only and blocks flow in the opposite direction
- C. It limits the pressure in the whole circuit to a safe value
- D. It changes the direction of oil flow to the cylinder ports

27. A technician wants to check kingpin wear on a steer axle. Which method is correct?

- A. Look at the colour of the grease at the grease fitting only
- B. Spin the tire quickly and watch for a wobble of the hubcap
- C. Lift the axle and measure vertical movement at the knuckle with a dial indicator
- D. Check the air pressure in the adjacent steer tire on the same axle with a gauge

28. A heavy-duty truck uses two 12-volt batteries in series for a 24-volt starting system. Compared with a 12-volt system delivering the same power, what is true about starter current?

- A. Starter current doubles, so larger cables are required for safe operation and proper fusing at the battery
- B. Starter current is about half, so smaller cables can carry it with less voltage drop
- C. Starter current falls to zero when the batteries are connected in series
- D. Starter current stays the same because voltage does not affect current

29. How can a technician check that a tractor's parking brakes hold?

- A. With the area clear, apply the parking brakes and gently try to move the truck in low gear
- B. Release the parking brakes and push the truck by hand to feel the drag
- C. Check only that the dash valve stays in the applied position
- D. Apply the parking brakes and hit the drums with a hammer to listen

30. A technician is asked why a heavy-duty manual transmission has two countershafts rather than one. What is the reason?

- A. The second shaft reduces the speed of the driveshaft automatically
- B. The second shaft is a spare that engages only after the first one breaks in service
- C. The second shaft acts as an additional clutch brake for the first
- D. The torque is split between two shafts, so each gear set carries half the load

31. Where does water collect in a fuel filter and water separator, and why?

- A. Inside the filter gasket, because rubber absorbs water over time
- B. Along the centre of the element, because fuel pushes it there
- C. At the bottom of the bowl, because water is denser than diesel fuel
- D. At the top of the housing, because water is lighter than diesel fuel

32. An A/C system shows very low suction pressure, even vacuum at times, and the evaporator outlet is warm. The thermal expansion valve is suspected. Which fault fits?

- A. The blower motor is turning too slowly and is cooling the filter
- B. The condenser fan is running too fast and cooling the refrigerant
- C. The expansion valve is stuck closed, starving the evaporator of refrigerant
- D. The expansion valve is stuck fully open and flooding the evaporator

33. A 24-volt auxiliary light bar on a highway tractor is rated at 300 watts. What current does it draw when operating normally?

- A. 8 amperes
- B. 7.2 amperes
- C. 25 amperes
- D. 12.5 amperes

34. A tandem axle tractor has new U-bolts on a spring pack after a rebuild. What is the correct practice after the first period of road use?

- A. Replace them again with a different grade of bolt after one week of service
- B. Recheck and retorque the U-bolts to specification, since new parts settle
- C. Leave them alone, because torque never changes after installation
- D. Loosen them one turn to allow the springs to move

35. Coolant drips steadily from the small weep hole on the water pump housing of a tractor engine. What does this indicate?

- A. The pump shaft seal is failing, so the pump needs to be replaced
- B. The charge air cooler is leaking coolant into the intake side
- C. The radiator cap is holding too much pressure for the cooling system
- D. The thermostat is stuck open and the engine is overcooling at idle

36. With the service brakes applied, air escapes steadily from the vent port of a spring brake chamber on the drive axle. What is the likely fault?

- A. A worn compressor piston ring set is passing oil into the air line during cycles
- B. A sticking air dryer purge valve is venting the supply tank
- C. A leaking service diaphragm in that chamber is passing air to the spring side
- D. A broken air governor spring is keeping the compressor loaded

37. A driver is learning to shift a non-synchronized heavy-duty manual transmission. Why is it necessary to match engine speed to gear speed during shifts?

- A. The clutch must remain fully engaged for every shift to protect the countershaft gears
- B. Constant-mesh gears lack synchronizers, so speeds must match for the dog teeth to engage
- C. The turbocharger needs a certain boost to engage the next ratio in the box
- D. The axle ratio changes during each shift unless the engine speed is matched

38. During a voltage drop test, 20 amperes flow through a cable and connection with a combined resistance of 0.025 ohm. What voltage drop should the meter show?

- A. 0.5 volt
- B. 0.8 volt
- C. 5.0 volts
- D. 1.25 volts

39. A driver says a cab door window will not open or close, and the switch clicks. What is the best first test?

- A. Replace the door glass and the regulator track as a set before any testing
- B. Check the engine coolant concentration at the surge tank
- C. Measure pushrod stroke at the nearest brake chamber
- D. Check for power and ground at the motor connector while pressing the switch

40. Why are tapered roller wheel bearing cones and cups replaced as matched sets?

- A. They must always be installed with grease from the same drum
- B. They are cut from one piece of steel and cannot be separated
- C. They wear together, so mixing worn and new parts causes early failure
- D. They are painted the same colour at the factory for identification

41. A used oil sample from a long-haul tractor shows lower viscosity than new oil and a low flash point. What is the most likely cause?

- A. Fuel dilution of the crankcase from a leaking injector or lift pump seal
- B. Excess silicon from a leaking air intake after the filter
- C. Coolant leakage into the oil from a failed head gasket
- D. Normal soot loading in oil from frequent idling in the yard or at the shop

42. A fleet runs a pre-2017 heavy-duty engine and the shop has a barrel of API FA-4 oil on the shelf. Which statement is correct?

- A. FA-4 should replace CK-4 in all engines to gain thicker protection
- B. FA-4 is limited to engines whose maker approves it; CK-4 is the safer choice here
- C. FA-4 is a universal replacement that is always backward compatible
- D. FA-4 and CK-4 differ only in colour and may be mixed freely in any ratio

43. Why should brake chamber and air line clearance be checked when a trailer suspension is fully compressed?

- A. The lines must be stretched tight to keep pressure steady
- B. The chambers need to be hot enough to boil away trapped moisture
- C. The suspension compresses the air in the brake chambers permanently
- D. Parts can contact the frame or tires and be damaged during heavy bumps

44. What is the purpose of a hydraulic reservoir breather cap?

- A. It adds pressure to the fluid so the pump never loses its prime
- B. It seals the reservoir tightly so no air can move in or out
- C. It cools the fluid by blowing air through the tank
- D. It lets air move in and out as the fluid level changes while filtering dust

45. A driver pulls the trailer supply valve out at the dash and the tractor's trailer air supply drops. What is the expected effect on the trailer?

- A. The trailer brakes release and the landing gear lowers
- B. The tractor protection valve opens and the tractor brakes release
- C. The trailer spring brakes apply, locking the trailer wheels
- D. The trailer ABS lamp goes out and the lights switch off

46. A technician is reviewing the operation of a transmission-mounted power take-off on a tractor used with a blower. Which condition is normally required before the PTO is engaged?

- A. The driveline must be at rest or engine speed low, following the maker's limits
- B. The engine must be turned off while the PTO shaft is engaged
- C. The air brake system must be drained to zero pressure first
- D. The vehicle must be travelling above 80 km/h to spin the gears up to speed

47. A circuit breaker on a marker light circuit trips and resets repeatedly when the lights are on. What does this usually indicate?

- A. The battery has too much resistance between its plates
- B. An overload or intermittent short
- C. The alternator is producing too little current at idle speed
- D. The breaker is working normally and needs no further diagnosis

48. A driver says a tractor's exhaust brake no longer slows the truck on a long grade, though the dash switch works. Which description best explains how an exhaust brake normally operates?

- A. It engages a friction clutch on the driveshaft to resist rotation
- B. It restricts exhaust flow to raise back pressure, so the engine works against exhaust
- C. It routes coolant through a heat exchanger on the transmission case
- D. It injects extra fuel to make the engine rev above its governed speed on grades

49. A technician is about to add compressor oil to an R-134a system. Which oil type is correct?

- A. Automatic transmission fluid, since it is thin and clean
- B. Mineral oil from the refrigeration unit service stock
- C. Standard engine oil from the shop for lubrication
- D. The PAG oil grade specified by the compressor maker

50. A technician must replace an air spring bellows on a drive axle. Which step is required for safety?

- A. Remove the bag while the engine runs to keep the air supply active
- B. Leave the bag fully inflated to hold the frame up while changing it
- C. Exhaust the suspension air and support the frame securely before removing the bag
- D. Cut the bag open first to release its pressure quickly

51. A battery-electric tractor shows reduced power on a hot day, and the scan tool reports high pack temperature. Which system should the technician inspect?

- A. The battery thermal loop
- B. The turbocharger actuator and the vane position sensor on the exhaust housing
- C. The engine oil filter and the oil pressure relief valve
- D. The diesel exhaust fluid tank and its heater element

52. An air tank is fitted with a safety valve. What is its main purpose, and at what typical setting does it open?

- A. It relieves excess pressure if the governor fails, usually near 1035 kPa (150 psi)
- B. It signals low pressure to the driver at about 415 kPa (60 psi) on the dash
- C. It limits pressure in the parking circuit to about 140 kPa (20 psi)
- D. It controls compressor cut-in pressure at about 690 kPa (100 psi)

53. What is the main purpose of the lock-up clutch in an automatic transmission torque converter on a highway truck?

- A. It pumps fluid to the retarder whenever the brake pedal is applied at highway speed
- B. It increases torque multiplication at low speed when starting a heavy load
- C. It disconnects the engine from the transmission to allow engine braking
- D. It locks the converter, removing slip to improve efficiency and reduce heat in cruise

54. How can a fuse be checked while it is installed in a powered circuit?

- A. Remove the fuse and bend its blade to see if it flexes freely
- B. Measure the battery voltage at the fuse box and assume the fuse is good
- C. Measure voltage at both sides of the fuse; voltage on only one side means it is open
- D. Measure resistance across the fuse with the circuit switched on

55. A tractor burns excessive fuel, and the engine fan runs loudly at highway speed in cool weather. The fan clutch will not disengage. What is the most direct effect of this fault?

- A. The alternator will stop charging the batteries whenever the fan is turning at speed
- B. The fan draws extra power continuously, causing higher fuel use and engine overcooling
- C. The air dryer will stop expelling moisture from the tanks
- D. The engine will overheat quickly because the fan stops turning

56. A tractor's drive axle tracks off-centre, and the technician finds the rubber bushings in a torque rod are badly worn. What is the effect?

- A. The transmission will skip gears under moderate throttle
- B. The engine coolant temperature will rise at highway speed and during long idling periods
- C. The air compressor will cycle on and off more frequently
- D. The axle can shift out of alignment

57. On the standard seven-way trailer connector, which wire colour is normally the stop lamp circuit?

- A. Red
- B. Black
- C. Brown
- D. Yellow

58. A shop collects used engine oil and spent coolant from several highway tractors. How should these fluids be handled?

- A. Spread them on the gravel lot to help control dust around the yard
- B. Keep them in separate labelled containers and send them to an approved recycler
- C. Pour both into one drum and tip the mix down the floor drain
- D. Burn them in the shop heater without any filtering or testing first

59. A refrigeration unit on a trailer shows high discharge pressure and poor cooling in hot weather. What should the technician inspect first?

- A. The trailer landing gear gearbox oil level and the crank handle
- B. The kingpin plate for wear on the underside
- C. The condenser coil and its airflow
- D. The tire pressure on the trailer axles

60. Which pump type is commonly used for simple, fixed-displacement hydraulic circuits on trucks?

- A. A variable swashplate piston pump

- B. A centrifugal water pump
- C. A diaphragm vacuum pump
- D. A gear pump

61. A technician installs a new wheel speed sensor on a drive axle. Which installation step helps set the correct sensor to tone ring gap?

- A. Hammer the sensor against the tone ring until it seats firmly
- B. Push the sensor in until it touches the tone ring, then let rotation set the gap
- C. Back the sensor off by one full turn after threading it in by hand slowly
- D. Fill the gap with thick grease to hold the sensor in position

62. After a valve body replacement, an automatic transmission shifts harshly. The mechanical work was done correctly. What should the technician do?

- A. Perform the manufacturer's reset or relearn of adaptive shift values with the service tool
- B. Remove the shift selector and clean the connector with solvent
- C. Replace the torque converter without testing the pump pressure
- D. Add more fluid to raise the level well above the full mark on the dipstick

63. A technician replaces a radiator cap with one rated at a lower pressure than specified. What is the expected result?

- A. The engine will run colder and fuel use will improve noticeably over time at highway speed
- B. The water pump will cavitate less and last much longer in service
- C. Coolant boils at a lower temperature and may be forced out as steam
- D. The thermostat will open earlier to correct the pressure difference

64. After coupling to a trailer, what is the best way to verify that the fifth wheel jaws have locked around the kingpin?

- A. Confirm that the glad hands are the same colour on both units
- B. Confirm the jaws are closed around the kingpin and the release handle is fully latched
- C. Look at the trailer landing gear to see if it is cranked fully up and clear
- D. Check that the trailer lights work at the rear of the box

65. A technician asks why the two wires of a J1939 data link are twisted together. What is the correct explanation?

- A. Twisting increases the current carrying capacity of both wires
- B. Twisting makes the network resistance exactly zero ohms
- C. Twisting helps cancel electrical noise picked up from nearby circuits
- D. Twisting allows the wires to stretch when the cab tilts forward

66. A combustion leak tester placed over the radiator filler changes colour while the engine runs. What does this confirm?

- A. The radiator cap is holding the right pressure in the system
- B. The oil cooler has too much oil flow passing through its core during idle
- C. The thermostat is stuck open and the engine is running cool
- D. Exhaust gas is entering the cooling system, suggesting a head gasket or cracked head

67. After relining the drum brakes on a tractor, which procedure is recommended before the truck returns to heavy service?

- A. Make a series of moderate stops to seat and burnish the new linings
- B. Apply the parking brake on the road to polish the new drums
- C. Leave the brakes unused for several days while the linings cure
- D. Make one full stop from highway speed to bed in the new linings

68. An automated manual transmission on a long-haul tractor will not shift, and the actuators operate on shop air. A scan tool shows low pneumatic supply pressure. What should the technician check?

- A. The cab heater control valve and the blend door motor behind the dash panel
- B. The trailer landing gear gearbox and its hand crank
- C. The windshield wiper linkage and the washer pump motor
- D. The air supply circuit to the transmission, including filter and line restrictions

69. A technician repairs a rusted cab panel after cutting out a section and welding in a patch. What step helps prevent the corrosion from returning?

- A. Coat the repair with brake cleaner to keep it free of rust
- B. Apply seam sealer and corrosion-resistant primer to the repaired and hidden surfaces
- C. Leave the bare weld exposed to let moisture evaporate from it
- D. Fill the seams with engine oil to keep the water out

70. A cab blower runs only on its highest speed setting. The motor and fuse test good. What is the most likely cause?

- A. A plugged air dryer on the brake system
- B. A weak fuel lift pump at the tank outlet
- C. A failed blower resistor block or speed control module
- D. A low refrigerant charge in the A/C system

71. A technician wants to see what conditions existed when an intermittent engine fault code first set. Which scan tool feature is most useful?

- A. Freeze frame data saved at fault set
- B. The vehicle identification number recorded by the ECM at the last key cycle
- C. The odometer value displayed on the instrument cluster
- D. The software version reported by the transmission module

72. A tractor has been coupled to a trailer, and the technician sees the kingpin resting on top of the fifth wheel jaws with a gap under the trailer plate. What does this indicate?

- A. The tractor is hitched high, so the kingpin has not entered the throat
- B. The trailer is overloaded on the drive axles and needs weight moved forward
- C. The fifth wheel is lubricated too well and needs wiping down
- D. The coupling is secure and the gap is normal for the plate

73. An engine cranks normally but will not start, and the scan tool shows a loss of synchronization between the crankshaft and camshaft speed signals. What should the technician inspect first?

- A. The trailer connector wiring and the clearance marker lamps
- B. Both position sensors, their connectors, and the tone wheel or reluctor for damage
- C. The cab air filter and the heater core hoses behind the dash panel on the passenger side
- D. The brake chamber pushrod stroke at the drive axle

74. A medium-duty truck with hydraulic brakes has a falling master cylinder reservoir level, though no external leaks are visible. What should the technician check next?

- A. The slack adjuster stroke on the drive axle brakes at each wheel end position
- B. The tractor protection valve at the trailer supply line
- C. The air governor setting at the compressor outlet
- D. The wheel cylinders and calipers for leaks, and the master cylinder for bypass

75. A tractor gives a chirping noise at low speed that repeats with each driveshaft revolution and fades at higher speed. What is the likely cause?

- A. A leaking air line on the driver-side drum brake chamber at the front axle
- B. A cracked windshield pillar that flexes at low vehicle speed
- C. A dry or worn universal joint that needs lubrication or replacement
- D. A broken radiator fan blade that taps the shroud periodically

76. While reassembling a cylinder head, a technician finds the manual calls for torque-to-yield head bolts. What must be done with the used bolts?

- A. Lightly oil them and torque them to the same value again
- B. Reuse them after cleaning them with a wire wheel at the shop
- C. Reuse them once if the threads look clean and undamaged
- D. Discard them and install new bolts, because they stretch permanently when tightened

77. A trailer's tail lamps are intermittently dead, and the seven-way connector pins on the trailer side show green corrosion. Which action helps most?

- A. Replace all the bulbs in the lamps with a higher wattage type to brighten them
- B. Clean the pins and socket, then apply dielectric grease to protect the connection
- C. Spray water on the connector to wash the corrosion out of it
- D. Increase alternator voltage to push current through the corrosion

78. In very cold weather a hydraulic system runs slowly and the pump whines when started. The fluid is thick. What is the best remedy?

- A. Warm the system gradually and use the cold-weather fluid grade the maker recommends
- B. Remove the return filter to let the oil move more easily through the circuit
- C. Run the pump at maximum pressure until the fluid thins out
- D. Add water to the reservoir to dilute the thick fluid

79. A solenoid is driven by a signal with a 75 percent duty cycle. What does this mean?

- A. The solenoid is off for 75 percent of each cycle
- B. The signal repeats 75 times each second without any change
- C. The signal is on for 75 percent of each cycle and off for the rest
- D. The solenoid receives 75 percent of battery voltage continuously

80. May radial and bias-ply tires be mixed on the same axle of a tractor?

- A. No, because their construction differs and affects handling, so use one type per axle

- B. Yes, as long as they are the same size and brand and the same tread depth
- C. Yes, because the road crown makes the difference unimportant
- D. Yes, if the bias-ply tires are on the right side only

81. On a J1939 fault code, what does the suspect parameter number (SPN) identify?

- A. The number of times the fault has occurred since it was cleared
- B. The module that sent the request for the code to the scan tool
- C. The specific parameter or component that has the fault
- D. The type of failure that occurred in the circuit or component

82. How should a voltmeter be connected to measure the voltage across a load?

- A. Between the load and the battery negative post only
- B. In series with the load, between the supply and the load
- C. With the circuit open so that no current is flowing in it
- D. In parallel with the load, across its two terminals

83. An air dryer on a tractor seems to exhaust air continuously from its purge port after the governor has unloaded the compressor. What is the most likely cause?

- A. A cracked brake drum is leaking heat into the dryer cartridge on the frame
- B. A leaking compressor discharge check valve or purge valve is bleeding supply air
- C. A restricted air filter on the engine intake is reducing boost pressure
- D. A worn fan clutch is keeping the fan on more often than needed

84. In a heavy-duty clutch, which part clamps the friction disc against the flywheel?

- A. The pressure plate
- B. The clutch brake
- C. The release bearing

D. The pilot bearing

85. Which type of DC fast-charging connector is the standard combined charging system plug used on most North American heavy and light electric vehicles?

- A. A hydraulic quick coupler from the PTO circuit on the tractor frame
- B. A twist-lock shore power plug used for block heaters only
- C. A seven-way trailer connector based on the J560 standard
- D. CCS1, based on SAE J1772

86. How should tire tread depth be measured on a drive tire?

- A. At the shoulder only using a ruler placed across the tire
- B. At several points across the tread using a depth gauge in the main grooves
- C. In the centre rib only using a coin placed in the groove
- D. On the sidewall using a gauge pushed into the tire marking

87. A tractor shows dust on the inside of the intake pipe after the air filter, and cylinder wear is excessive for the mileage. What is the likely path?

- A. The coolant surge tank is venting dust into the air filter housing at idle
- B. The oil filter bypass valve is introducing dust into the intake system
- C. A cracked intake hose or loose clamp is allowing unfiltered air into the engine
- D. A clogged fuel return line is pushing dirt into the combustion chamber

88. An A/C compressor cycles off intermittently on a hot day, and the high-pressure switch is tripping. What should the technician check first?

- A. The transmission output shaft seal for oil seepage at the rear housing
- B. The trailer landing gear lubricant and its gear teeth
- C. The washer fluid reservoir level and its pump flow

D. The condenser and condenser fan airflow

89. Which problem can a corroded engine-to-frame ground strap cause?

- A. High resistance in starting and charging circuits, shown as slow cranking
- B. Higher fuel pressure at the injector rail during idle
- C. Excess boost from the turbocharger at highway speeds
- D. A reduction in the rate at which the coolant flows

90. After a spring brake chamber repair, a technician leaves the power spring caged with the caging bolt. What is the result if the vehicle is returned to service this way?

- A. The ABS lamp stays on until the bolt is released again and the system is reset
- B. The parking brake on that wheel cannot apply, reducing parking and emergency braking
- C. The air system pressure rises above the safety valve setting
- D. The service brake on that wheel locks permanently on

91. A driveshaft vibrates and has a visible dent in the tube from a stone strike. What is the correct action?

- A. Straighten the dent with a hammer and run the shaft without balancing it
- B. Weld a patch over the dent to restore strength and leave it
- C. Replace or have the shaft rebuilt and balanced, because a dent upsets balance
- D. Ignore the dent if the vibration stops when the truck is loaded

92. A third-period apprentice keeps misreading a vernier caliper. Which mentoring approach is best?

- A. Demonstrate the reading, let the apprentice practise on known parts, then give specific feedback
- B. Hand over a printed chart and check back at the end of the week
- C. Tell the apprentice to ask the service writer to explain it later
- D. Take over the measuring until the apprentice becomes more confident

93. Why must the locking pins of a sliding fifth wheel be fully engaged before driving?

- A. So the trailer air lines remain coupled at all times on the road
- B. So the landing gear stays in its fully raised position
- C. So the fifth wheel cannot slide and upset weight distribution or separate
- D. So the tractor protection valve stays open while driving

94. In an open-centre hydraulic system, what happens to pump flow when the directional valve is in neutral?

- A. The flow is blocked and the pressure rises to the relief setting each time
- B. The flow is sent to the actuator at full pressure and speed
- C. The flow reverses and the pump runs backward in the circuit
- D. The flow passes through the valve and returns to the reservoir at low pressure

95. Which materials should be avoided when handling diesel exhaust fluid because the fluid is corrosive to them?

- A. High-density plastic tanks made for DEF
- B. Copper, brass, and zinc-plated fittings
- C. Stainless steel and approved plastic containers
- D. Clean polyethylene funnels and sealed caps

96. A drive tire has a puncture in the sidewall flex area. What is the correct repair advice?

- A. Do not repair it, because only tread-area punctures within limits may be repaired
- B. Weld the opening closed with a small rod to seal the hole
- C. Repair it with a plug only and return the tire to service at once
- D. Fill the hole with sealant and increase pressure by 70 kPa (10 psi)

97. A windshield wiper motor on a coach stops with the blades in mid-sweep each time it is switched off. Which part is the likely cause?

- A. A bad brake chamber diaphragm on the front axle
- B. A weak battery that can only turn the motor part of the way
- C. A low washer fluid level that prevents the blades from moving
- D. A worn or failed park switch or park contacts inside the wiper motor

98. What does a starter solenoid do when the key is turned to start?

- A. It increases battery voltage to a higher level for cranking
- B. It moves the pinion into mesh and closes heavy contacts to power the motor
- C. It supplies fuel pressure to the injectors until the engine runs
- D. It disconnects the alternator while the engine is cranking

99. A tractor pulls hard to the left during moderate brake applications and the driver-side lining is a different friction material from the right side. What is the likely reason for the pull?

- A. A faulty trailer connector is applying the trailer brakes on one side
- B. The fan clutch is applying drag only on the left wheel end
- C. Unequal friction between the two wheel ends is producing unbalanced braking force
- D. The alternator output is too high and is affecting brake apply force

100. Why should an automatic transmission not be shifted from neutral into gear at high engine speed?

- A. The axle ratio will change until the engine speed falls again
- B. The turbocharger will shut off until the shift selector is reset
- C. The sudden load can shock the clutches and damage the driveline
- D. The fluid will drain out of the pump when the engine speed rises

101. How should a spin-on oil filter be installed on a heavy-duty engine?

- A. Install it dry and tighten it as hard as possible with a strap wrench
- B. Leave the gasket dry and tighten the filter only by feel alone
- C. Fill the new filter with water to purge air before spinning it on
- D. Lightly oil the gasket, spin it on until it touches, then tighten the specified turn

102. A technician must replace a damaged terminal in a sealed weather-pack style connector. Which removal method is correct?

- A. Heat the connector with a torch until the plastic softens enough to move
- B. Release the terminal tab with the correct extraction tool and pull the wire back
- C. Cut the connector body away with a knife and rebuild the whole plug
- D. Pull hard on the wire from the front until the terminal tears out

103. A technician installs a hub-piloted wheel on a drive axle. Which statement about this wheel system is correct?

- A. The hub pilots and centres the wheel, and flange nuts are tightened in sequence
- B. The nuts should be tightened with the wheel off the ground only
- C. The wheel is centred by the brake drum rather than the hub
- D. The wheel studs centre the wheel, and nuts may be tightened in any order at all

104. An engine on a long-haul tractor starts hard, then runs poorly, and a technician suspects air is entering the fuel system on the suction side. Which method best confirms this?

- A. Replace the injectors without testing anything first and then road test the truck again
- B. Install a clear line near the filter and look for bubbles at running speed
- C. Loosen the high-pressure injection lines with the engine running
- D. Add extra fuel additive to the tank and watch the exhaust smoke colour

105. A cab's evaporator core freezes up on a long highway run, and airflow becomes weak. The cab air filter is clogged. How are these related?

- A. The filter has no effect, and the ice is caused only by the radiator
- B. A clogged filter adds heat to the evaporator, so ice forms under it
- C. The ice forms because the condenser is receiving too much air flow
- D. Low airflow lets the evaporator get too cold, so moisture freezes on the fins

106. A tractor's brakes release slowly after the first cold start at minus 30 degrees Celsius, and moisture is found frozen in a quick release valve. What is the best long-term fix?

- A. Service the air dryer and drain the tanks regularly, using an approved alcohol-free method
- B. Disconnect the air dryer so the system receives more air flow
- C. Add engine oil to the air tanks to stop water from freezing there overnight
- D. Raise the compressor governor pressure well above the original setting

107. An engine turns at 1,350 rpm through a transmission in direct drive (1:1). The axle ratio is 3.00 and the tires have a rolling circumference of 3.2 m. What is the road speed?

- A. 259.2 km/h
- B. 28.8 km/h
- C. 86.4 km/h
- D. 96.0 km/h

108. A coach has house batteries for its bunk heater and starting batteries for the engine. What does a voltage-sensitive isolator relay do in this setup?

- A. It converts 12 volts into 24 volts for the starter motor
- B. It disables the alternator whenever the engine speed exceeds idle
- C. It connects the banks while charging and separates them when the engine stops
- D. It raises alternator voltage whenever the heater is switched on in the bunk

109. A technician checks lubricant in an oil-lubricated steer axle hub through the sight window of the hub cap. What must be true when the level is read?

- A. The vehicle is on level ground and the oil is within the marked range
- B. The hub cap is removed and the bearing is filled until oil overflows at the top
- C. The hub is hot and the wheel is spinning at highway speed
- D. The vehicle is parked on a slope with the front axle raised

110. A technician sprays a high-pressure hydraulic fitting and a jet of fluid penetrates the skin of a finger, with little pain at first. What should happen next?

- A. Squeeze the wound to push the fluid back out of the finger
- B. Wash the area with soap, bandage it, and finish the job
- C. Apply a cold pack and wait to see if swelling develops
- D. Seek immediate medical treatment and tell the doctor the fluid involved

111. Why must a trailer's rear impact guard be inspected for cracks and loose mounts?

- A. It supports the landing gear when the trailer is parked
- B. It must stop following vehicles from under-riding the trailer in a collision
- C. It holds the trailer brake chambers in position on the rear axle
- D. It carries the weight of the load on the trailer floor

112. When should a hydraulic oil sample be taken for analysis?

- A. Immediately after a complete filter change and fluid flush
- B. From a dirty drain plug using an old container from the shop
- C. While the oil is warm and circulating, from a clean sampling port
- D. From the bottom of the reservoir after the oil has settled for a day

113. A diesel engine begins to run away after ingesting oil from a failed turbocharger seal. What is the correct emergency action if the engine will not shut off with the key?

- A. Pour cold water through the intake to cool the cylinders quickly
- B. Block the air intake or cut off its air supply from a safe position
- C. Open the throttle fully to burn the extra oil out of the engine at once
- D. Apply the trailer brakes and let the engine stall in gear naturally

114. On a very cold morning a tractor's intake air heater is not warming the air, and the scan tool shows no fault codes. What should the technician check first?

- A. The cab door switch and the interior courtesy lamp circuit on the driver side
- B. The tire pressure monitoring system battery in the wheel sensor
- C. The transmission fluid level and the filter condition
- D. The heater relay, fuse, and element

115. A tractor's rear brakes release slowly after each application, although the foot valve and the lines are clear. What component is a likely cause?

- A. A sticking relay valve exhaust or piston that is slow to release air
- B. A low coolant level in the cooling system surge tank on the radiator side
- C. A loose alternator belt that slips at high engine speed
- D. A cracked fuel filter housing on the engine side

116. Which three elements make up a simple planetary gear set in an automatic transmission?

- A. A clutch disc, a pressure plate, and a release bearing
- B. A pump rotor, a stator, and a turbine runner wheel
- C. A drive gear, a counter gear, and a reverse idler gear
- D. A sun gear, a planet carrier with pinion gears, and a ring gear

117. A tire technician finds that one tire of a dual pair is 70 kPa (10 psi) lower than its partner. What problem does this cause?

- A. The lower-pressure tire carries less load, so its partner is overloaded and wears or overheats
- B. Both tires wear evenly because the axle load is equal for each tire in the pair
- C. The higher tire runs cooler and lasts much longer than expected
- D. The lower tire gains extra traction without any damage

118. A technician must verify isolation between a high-voltage conductor and the chassis on an electric truck. Which method applies?

- A. A voltage reading with a basic meter across the contactor coil terminals
- B. A continuity beep test using the cab 12-volt test light and a clip
- C. An insulation resistance test using a rated tester on the de-energized circuit
- D. A resistance reading with a standard hand meter set to its lowest range

119. During a cylinder leakage test, a technician hears air hissing at the exhaust pipe with the piston at top dead centre on the compression stroke. What does that indicate?

- A. A leaking intake manifold gasket on the neighbouring cylinder
- B. A leaking exhaust valve on the cylinder being tested
- C. A cracked head with coolant leaking into the cylinder
- D. A worn piston ring set letting air into the crankcase

120. Which practice protects an electronic control module from static discharge during handling?

- A. Touch a bare metal ground first and avoid touching connector pins
- B. Blow compressed air across the connector pins before installation
- C. Handle the module while wearing synthetic gloves and shoes
- D. Rub the module on a wool cloth to remove any stored charge

121. A technician must remove a steering wheel on a truck equipped with a driver airbag. What is the correct precaution?

- A. Strike the airbag cover to test whether it moves freely under the steering wheel
- B. Leave the battery connected so diagnostic codes are preserved
- C. Disconnect the battery and wait the specified time
- D. Heat the airbag module to soften the retaining clips

122. A technician must dispose of a spring brake chamber with a good power spring. What must be done before disposal?

- A. Place the chamber in a hot oven for several hours to relax the spring
- B. Fully cage or release the spring energy following the manufacturer's procedure
- C. Cut the chamber open with a torch to let the spring relax slowly
- D. Drop the chamber from a height to unload the spring on impact

123. How should a greaseable universal joint be lubricated?

- A. Pump grease until the first cap starts to leak and then stop
- B. Spray penetrating oil on the cross and run the truck at speed
- C. Fill the joint with gear oil from the axle at each service
- D. Pump grease until fresh grease purges from all four bearing cap seals

124. A technician replaces one worn shock absorber on a drive axle. Which practice is recommended?

- A. Replace only the leaking one and leave the other one unchanged until it fails
- B. Replace shocks only when the frame bends under load
- C. Replace the shock on the steer axle to match the drive axle
- D. Replace shocks in pairs on the same axle

125. A highway tractor loses power only on long hot climbs. Boost pressure is normal, but intake manifold temperature is far above specification and the front of the charge air cooler is packed with bugs and debris. What is the correct repair?

- A. Clean the cooler fins and check hoses
- B. Install a larger radiator cap to increase cooling system pressure at highway speed
- C. Replace the fuel filters with a finer micron rating filter
- D. Raise the turbocharger boost setting to offset the heat

126. A driver finds the windshield fogging in cold, damp weather. The defrost mode uses the A/C compressor. Why does it help?

- A. The compressor heats the air directly with its discharge line
- B. The evaporator dries the air before reheating and sending it to the glass
- C. The compressor adds fluid to wash moisture from the cab air as it blows
- D. The compressor draws moisture from the air brake tanks

127. A technician reads 13.2 volts across a battery soon after it was charged. What should be done before judging its state of charge?

- A. Add distilled water to every cell and take the reading again immediately
- B. Charge it again at a high rate until the case becomes warm to touch
- C. Remove the surface charge by letting it rest or applying a brief load
- D. Replace the battery at once because that reading proves it has failed

128. A technician wants to know whether a known issue with a transmission control module has an approved fix. Which resource should be checked first?

- A. The last repair order written by a different shop for another truck
- B. The driver's recollection of the earlier symptoms
- C. A general internet forum thread about similar trucks
- D. The manufacturer's service bulletins

129. A trailer's stop lamps flicker whenever the brakes are applied, but other lamps work. The bulbs and the lamp sockets look good. What is the likely fault?

- A. A poor ground connection at the connector
- B. A worn pushrod on a trailer brake chamber at the axle on that side
- C. A cracked trailer tire sidewall on the left rear axle
- D. A low coolant level in the tractor's cooling system

130. What should be done before connecting hydraulic quick couplers?

- A. Spray both ends with water to wash dirt away from the couplers
- B. Wipe both ends clean and relieve any trapped pressure
- C. Heat the fittings so that they expand and connect more easily
- D. Connect them under full pressure to flush out any contaminants

131. What happens to normal service braking on a tractor if an ABS fault occurs?

- A. The affected wheel or system reverts to conventional braking without ABS control
- B. The service brakes stop working until the system is repaired
- C. The parking brakes apply automatically and hold the truck still
- D. The trailer brakes lock permanently until the fault is cleared

132. A technician explains how a hydraulic driveline retarder slows a truck. Which description is correct?

- A. Air from the brake tanks is forced through a heat exchanger beside the clutch
- B. Fuel is injected at high pressure into the exhaust manifold during each deceleration
- C. Fluid is shear-loaded between a rotor and stator, turning driveline energy into heat
- D. Electric current is sent through the starter to resist crankshaft rotation

133. A tractor's steer tires scrub against the frame on a full turn, and the technician finds the turning angle stops are out of adjustment. What is the correct action?

- A. Lengthen the drag link and leave the stops untouched

- B. Increase the tire pressure so the tires shrink away from the frame at full lock
- C. Adjust the stops to the specified turning angle so the tires clear the frame
- D. Remove the stops completely to give the wheels more freedom

134. A tractor derates power and a warning lamp comes on, though the coolant temperature gauge is normal. The scan tool shows a low coolant level code. What should the technician verify first?

- A. The tire pressure monitoring sensors in the rear wheels
- B. The actual coolant level and the level sensor
- C. The drive axle lubricant level and its viscosity grade at the carrier housing
- D. The air brake governor cut-out pressure at the compressor

135. How should a new terminal lug be attached to a heavy battery cable?

- A. Wrap the strands around the lug and cover them with tape
- B. Hammer the lug flat so it grips the strands of the cable
- C. Squeeze the lug with pliers until the cable feels tight enough
- D. Crimp the lug with the proper heavy-duty crimper and seal the joint

Practice Exam 4: Answer Key and Explanations

1. C — An automatic tensioner applies spring force, so correct tension is judged from the tensioner's wear or position indicator and the belt condition rather than by measuring deflection. Tightening bolts or locking the pulley defeats the tensioner. A worn tensioner or belt should be replaced when the marks show it is outside its working range.

2. D — After the filter is cleaned or replaced, the module still calculates ash loading from old data, so the service tool must reset it. Without the reset the truck may demand regeneration too often or derate. Ash does not burn off in regeneration, and disconnecting batteries does not reliably clear stored learned values.

3. A — Power steering pump flow depends on speed, so a worn pump or slipping belt may give enough flow at higher rpm but not at idle, leaving steering heavy in tight manoeuvring. Landing gear, washer bottles, and cab filters have no link to steering assist. The pump output and belt tension should be tested.

- 4. C** — A quick release valve vents chamber air right at the chamber instead of forcing it back through the long line to the foot valve, so the brake releases quickly. It does not raise pressure, store air, or remove moisture. Quick release valves on front axles are a simple way to cut release time.
- 5. B** — On a turn the outer wheel travels farther than the inner wheel, so the spider gears rotate on their shafts and allow the axle shafts to turn at different speeds while still sharing torque. They do not lock the shafts, reduce engine speed, or store power. A locked differential would scrub tires and strain the axle on turns.
- 6. D** — Energized wiring is a Class C hazard, so an ABC dry chemical unit is the shop standard because it is non-conductive. Water on a live harness risks shock and spreading the fire. Class K targets cooking oils and Class D is for combustible metals such as magnesium, so neither fits a dash fire.
- 7. A** — Many trailer ABS systems display codes by flashing the lamp in a pattern after a defined power-up or switch sequence, which the maker's manual explains. Disconnecting air lines, removing tires, or swapping the module without codes skips diagnosis. Reading codes locates the circuit or sensor at fault before parts are replaced.
- 8. C** — Force equals pressure times area. A pressure of 14 MPa is 14 million N per square metre, and 50 square centimetres is 0.005 square metres, so force is 70,000 N, or 70 kN. Unit errors by factors of ten, or halving the area, produce the other choices, which do not match the calculation.
- 9. A** — Batteries release hydrogen, so the last connection, which may spark, is made on a clean engine ground away from the dead battery rather than at its post. Connecting at the post invites ignition of gas, and the positive post would short the system. A fuel line is not a ground path and is dangerous to touch.
- 10. B** — A position reading that stays open while the command is closed shows a mechanical sticking valve, usually carbon. Excess exhaust in the intake displaces air, causing rough idle, soot, and low power. A DEF injector problem affects NOx control rather than combustion air, and a restricted filter would not create a valve position disagreement.
- 11. D** — The evaporator removes moisture from the air, and the condensate normally runs out through a drain tube, so a plugged tube lets water overflow into the cabin. A heater core leak shows coolant, which is not condensate, and a loose belt or desiccant condition would affect cooling rather than cause water on the floor. Clearing the drain restores flow.
- 12. A** — Replacing a tie rod end changes the effective length of the linkage, so toe must be reset and the clamps tightened correctly. Raising tire pressure, greasing a slip yoke, or replacing shocks does not restore toe. Incorrect toe quickly wears steer tires and makes the truck wander, so the check is required.
- 13. B** — The foot valve is a graduated control that sends air to the service circuits in proportion to how far the pedal is pressed, giving the driver feel for braking force. It does not store parking air, dry the air, or control compressor loading, since those jobs belong to the tanks, the dryer, and the governor respectively.
- 14. D** — A self-adjusting clutch keeps pedal free play constant, so wear is judged by the wear indicator or by the release bearing position, which moves toward the flywheel as the disc wears. Driver shift

counts, oil pressure, and axle ratio do not reflect friction material remaining. Replace the clutch if the reading is outside the stated range.

15. C — Carbon monoxide is a colourless, odourless gas produced by combustion, so a leak from a heater or exhaust can reach a sleeper unnoticed and cause serious poisoning. A detector gives warning that senses cannot. An alarm does not monitor oil pressure, reduce noise, or detect moisture, and the heater exhaust should be inspected regularly.

16. D — A discharged battery has lead sulphate on its plates, and over time it crystallizes into a hard layer that does not easily convert back, so capacity is permanently lost. The electrolyte does not turn into plain water, and cases and terminals do not shrink or fuse from discharge alone. Keeping batteries charged prevents sulphation.

17. C — Turbo bearings float on oil, so a trace of axial endplay is normal while radial play must be tiny so the wheels never contact the housing. Wheel rub, blade damage, or a bent shaft mean the unit is failed. Excess oil in the turbine outlet points to a seal or drain problem and also needs attention.

18. A — Electric trucks have no engine-driven alternator, so a DC-DC converter takes high-voltage DC from the traction battery and reduces it to the level needed to charge the 12-volt battery and power lamps and controls. It does not charge the traction pack from the small battery, make brake air, or replace the inverter.

19. B — Unequal caster makes the vehicle pull toward the side with less positive caster, because that side has less straight-ahead stability. Caster does influence tracking as well as steering return, and the pull is steady rather than alternating with crown. Setting both sides equal and within specification corrects the problem on this tractor.

20. D — The arm and pushrod should form roughly a right angle at half stroke so the effective lever length is greatest and braking force is even. A badly angled arm reduces torque and may require repositioning the adjuster on the cam shaft. Chamber size does not remove the need for correct geometry.

21. B — Material removed in machining reduces flywheel thickness and mass, so the technician must verify minimum thickness and that the face is flat with acceptable runout, otherwise the clutch may chatter or the flywheel may crack. A mirror finish or ground ring gear adds no benefit, and oiling a pilot bearing heavily can contaminate the disc.

22. A — A battery that is not clamped firmly vibrates on the road, which can crack plates and separators, short cells, and cause early failure, and it may also fracture the case or terminals. It does not shut down the alternator or speed up charging, and cable current depends on connections rather than battery movement. Hold-downs should be snug.

23. C — A damper absorbs torsional vibration from firing impulses, and a separated rubber ring leaves the crankshaft to twist and rebound, which can fatigue the crankshaft and wear gears and accessory drives. Oil pressure, air dryer purging, and fuel filter bypass do not depend on the damper. A shifted timing mark also gives false timing readings.

24. D — The sleeve gives 12 mm and the exposed half-millimetre line adds 0.50 mm, while thimble division 23 contributes 0.23 mm, so the total is 12.73 mm. Forgetting the half-millimetre line gives 12.23 mm, the usual reading mistake. Adding a full extra millimetre or ignoring the thimble produces the other values.

25. A — Coiled lines must extend and retract through every turn, so enough slack prevents stretching and pulling the glad hands apart, while clearance from the tires and fifth wheel prevents chafing and cuts. Routing does not stop freezing, boost pressure, or glad hand seals, and a worn line should be replaced before it fails and applies the emergency brakes.

26. B — A check valve uses a poppet or ball to pass flow one way and seal against reverse flow, which is how it holds a load or protects a pump. Pressure limiting is a relief valve's job, direction change is done by a directional control valve, and cooling is performed by an oil cooler, not a check valve.

27. C — With the axle unloaded, the technician measures vertical play at the knuckle with a dial indicator while lifting or prying under controlled conditions and compares it with specification. A wobble check does not isolate the kingpin, and tire pressure or grease colour alone cannot show wear. Excess play requires bushing or pin replacement.

28. B — Power equals voltage times current, so doubling the voltage allows the same power to be delivered with about half the current. Lower current means less voltage drop in the cables and less heat. Current does not stay the same at constant power, and a series connection does not remove current from the circuit.

29. A — A holding test applies the spring brakes and then gently attempts to move the truck in a low gear, in a clear area with safety precautions, to show the brakes can hold the vehicle. Pushing by hand or tapping drums proves nothing about holding force. A dash valve position shows control status but not brake effectiveness.

30. D — Twin countershafts divide the input torque between two gear paths, which lets the transmission carry high torque in a compact case with longer gear life. The second shaft is not a clutch brake, speed reducer, or backup. Both shafts always work together, which is why they must be timed correctly during reassembly.

31. C — Water is denser than diesel, so it settles at the bottom of the bowl where the drain valve lets the technician remove it before it can reach injectors. It would not rise to the top or sit in the centre. Gaskets do not store water, and regular drainage of the bowl is part of fuel system service.

32. C — A closed expansion valve restricts flow into the evaporator, so suction pressure falls into a vacuum and the evaporator warms because little refrigerant is available to absorb heat. A valve stuck open raises suction pressure and floods the evaporator. Condenser fan speed and blower speed do not create this specific pattern.

33. D — Current equals power divided by voltage, so 300 watts at 24 volts gives 12.5 amperes. The 25-ampere value comes from using 12 volts instead of 24, a common mistake on dual-voltage trucks.

Multiplying or inverting the numbers produces the other values and would lead to an incorrect fuse or wire choice for the circuit.

34. B — New springs and U-bolts settle under load, so clamp load can fall, which is why a retorquing after initial service is standard practice on a rebuilt tandem. Loose U-bolts allow the axle to shift and may break the centre bolt. Leaving them untouched or loosening them reduces clamp load and risks axle movement.

35. A — A weep hole is designed to let leakage past a failing shaft seal escape before it reaches the bearing, so steady dripping means the seal is worn and the pump should be replaced. A stuck thermostat does not leak from the pump, and a charge air cooler does not carry coolant. Cap pressure alone does not cause a weep.

36. C — Air from the spring chamber's vent during a service application shows the service diaphragm is torn or leaking past its seal. The chamber should be replaced as a unit. Dryer purge valves, compressor rings, and governor springs affect the supply side and do not cause air to appear at a specific chamber vent.

37. B — Without synchronizers the collar and gear must turn at nearly the same speed, so the driver floats or double clutches to match them and avoid gear clash. Shifting with the clutch engaged damages the teeth. The turbocharger and axle ratio play no part in engagement, so the technique itself prevents damage.

38. A — Voltage drop equals current times resistance, so 20 amperes through 0.025 ohm is 0.5 volt. The other options come from dividing instead of multiplying or from misplaced decimals. A drop of 0.5 volt on a power cable is already above the common guideline of a few tenths, so the connection would need to be cleaned or repaired.

39. D — A window that does not move needs a methodical electrical check, starting with voltage and ground at the motor connector when the switch is pressed, which separates a wiring or switch fault from a failed motor or regulator. Replacing glass or tracks without testing is guessing, and coolant or brake stroke checks are unrelated.

40. C — A cone and cup run together and wear into each other's surfaces, so installing a new cone in an old cup, or the reverse, gives poor contact, uneven loading, and early failure. They are separate parts, not one piece. Paint colour and a shared grease drum do not matter, so replacement as a set is standard practice.

41. A — Diesel in the crankcase thins the oil and lowers its flash point, which points to fuel dilution from a leaking injector, line, or pump seal. Coolant contamination shows as sodium, potassium, or glycol, and soot thickens oil instead. Silicon indicates dust entering the intake, and it would not reduce flash point.

42. B — FA-4 is a lower-viscosity oil designed for specific newer engines, so it must only go into engines the manufacturer approves it for. CK-4 is backward compatible with older engines. Calling

FA-4 universal is the trap, since a pre-2017 engine on a long-haul tractor could suffer wear from the thinner film at high temperature.

43. D — When the suspension reaches full travel, wheels and axles move close to the frame, so chambers, lines, and hoses can be pinched or struck. Checking clearance finds routing problems before damage occurs. Heat, line tension, and permanent air compression are not concerns, and tight lines would actually increase the risk of cracking at fittings.

44. D — As the fluid level rises and falls and the oil warms, air must move in and out of the reservoir, and a breather filters dust from that air so contaminants stay out. A sealed cap would cause vacuum or pressure problems, and the breather neither pressurizes nor cools the fluid. A plugged breather can starve the pump.

45. C — The trailer supply valve controls air to the trailer's reservoir and spring brakes, so exhausting that supply applies the trailer spring brakes. The trailer ABS and lighting are electrical and do not change. The tractor's own brakes and protection valve are not released by this action, so the trailer is parked.

46. A — PTOs use gear or clutch engagement, so the manufacturer limits when and at what speed they may be engaged, usually with the truck stationary and the engine at low rpm. High road speeds, drained brake air, and an engine that is off do not match any normal procedure and could damage the gear train or create a hazard.

47. B — A cycling breaker is protecting the wire from an overload or an intermittent short, so the technician must find the cause rather than fit a larger breaker. Normal circuits do not cycle. Low alternator output or internal battery resistance would dim lights across the truck instead of tripping one protected circuit.

48. B — An exhaust brake closes a valve in the exhaust path, raising back pressure so the pistons must push gas against resistance and the engine absorbs energy. It does not add fuel, and it is not a driveline clutch or a coolant device. Diagnosis would check air supply to the actuator and valve movement.

49. D — R-134a systems use PAG or POE oils compatible with the refrigerant, and the compressor maker specifies grade and quantity. Engine oil, mineral oil, and transmission fluid do not mix with R-134a and will not circulate or lubricate properly, which leads to compressor failure. Using the specified oil also avoids damaging seals.

50. C — The frame must be supported on stands and the suspension air exhausted so the bag can be removed without sudden movement. An inflated bag can release energy violently, and the tractor should never rely on air to hold the frame. Cutting the bag open is dangerous and unnecessary when the supply is simply exhausted.

51. A — Traction batteries are kept in a safe temperature range by a liquid thermal loop, so high pack temperature points to coolant level, pump operation, or restricted radiator airflow. A turbocharger, DEF tank, and engine oil system do not exist on a battery-electric truck, so they cannot explain a thermal derate.

52. A — The tank safety valve is a last-resort relief that opens if the governor or unloader fails and pressure keeps rising, commonly near 1035 kPa (150 psi). Low-pressure warnings and governor settings work at much lower pressure. Cut-in and cut-out are governor functions, not safety valve functions, so the other choices describe different devices.

53. D — At cruise the converter would slip and waste energy as heat, so the lock-up clutch ties the pump and turbine together and the drive becomes direct. This improves fuel economy and cools the fluid. Torque multiplication happens before lock-up, and the lock-up clutch has no role in retarder pumping or disconnecting the engine.

54. C — With the circuit powered, a voltmeter at both fuse terminals shows power on both sides for a good fuse, but power on only one side means the element is open. Measuring resistance on a live circuit is invalid and can harm the meter. Bending the blade proves nothing, and battery voltage elsewhere does not show the fuse condition.

55. B — A fan locked on consumes engine power all the time, which wastes fuel, causes noise, and can overcool the engine. A fan that fails to engage would cause overheating instead. The air dryer and alternator operate independently of the fan clutch, so those systems would not be directly changed by this fault.

56. D — Torque rods locate the axle, so worn bushings let it move out of position, which affects tracking and tire wear on a long-haul tractor. They do not control compressor cycling, coolant temperature, or transmission shifting. Replace the bushings, then check the axle alignment and thrust angle against the maker's specification before releasing the truck.

57. A — On the standard seven-way trailer connector, red carries the stop lamps, yellow and green carry the left and right turn signals, brown carries the tail lamps, and black carries the clearance or marker lamps. White is the ground and blue powers the auxiliary or ABS circuit. Knowing the code speeds tracing lamp faults.

58. B — Used oil and coolant are regulated wastes, so they are kept in separate labelled containers and handed to an approved recycler. Mixing them contaminates both streams and complicates recycling. Dumping fluids down drains, onto gravel, or into an unfiltered shop heater creates environmental and legal liability and exposes workers to harmful vapours and skin contact.

59. C — High discharge pressure in hot weather commonly comes from a dirty or restricted condenser or poor airflow, so the technician cleans the coil and checks the fan on the refrigeration unit. Landing gear oil, kingpin plates, and tire pressures are not part of the refrigeration circuit and would not affect head pressure.

60. D — Gear pumps are simple, robust, and low cost, and they deliver a fixed flow per revolution, so they are common in truck hydraulic circuits such as dump hoists. Variable piston pumps are used where flow control is needed, while centrifugal water pumps and diaphragm vacuum pumps are not suited to producing high hydraulic pressure.

61. B — Spring-clip sensors are pushed in until they contact the tone ring, and normal rotation then pushes them back to the right running gap. Hammering can damage the sensor or ring, and extra grease can foul the signal. Back-off turns apply to other designs, not to the clip-in style used on many drive axles.

62. A — Electronic automatics store adaptive values for clutch fill and shift timing, and these must be cleared or relearned after major hydraulic work so the controller matches the new parts. Overfilling causes aeration and does not solve harsh shifts. Replacing the converter without testing is guesswork, and solvents can damage connectors.

63. C — The cap sets system pressure, and each increase raises the coolant's boiling point, so a low-rated cap lets coolant boil early and lose volume. Overheating then follows under heavy load on a long grade. The thermostat responds to temperature rather than pressure, and lower pressure in fact worsens cavitation near the water pump.

64. B — A proper check includes seeing the jaws closed around the kingpin shank, the release handle fully latched, and a tug test against the trailer brakes. Landing gear height, lamp operation, and glad hand colour are separate pre-trip items and do not confirm a locked coupling. A bad coupling can separate on the road.

65. C — The CAN high and low wires carry opposite signals, and twisting makes both wires pick up the same interference so the receiver can subtract it. It does not raise current capacity, add stretch, or reduce network resistance to zero. Keeping the twist close to the connector during repairs preserves the noise rejection.

66. D — A block tester uses a chemical that changes colour when combustion gases are present in the coolant vapour, indicating a head gasket, head, or liner failure. A stuck thermostat or an adequate cap would not introduce combustion products. The finding needs confirmation by pressure testing and inspection before the engine is opened.

67. A — New linings need gradual burnishing, so a series of moderate stops allows them to seat against the drum surface with controlled heat. A single hard stop can glaze the lining or overheat the drum, and waiting does not seat them. Using the parking brake on the road is unsafe and does not burnish the service brakes.

68. D — Air-operated shift actuators depend on enough clean supply pressure, so the technician checks the transmission air feed, filter, and lines for restriction or leakage when the scan tool reports low pneumatic pressure. Cab heater controls, landing gear, and wiper linkages are not part of the shift system and cannot cause low supply.

69. B — Bare steel rusts quickly, so the repaired panel needs primer and sealer on both visible and hidden surfaces to seal out moisture. Leaving the weld bare invites rust, and brake cleaner and engine oil are not corrosion protection coatings and do not bond or stay in place. Cab panel repairs follow the maker's corrosion procedure.

70. C — Resistor-type blower controls reduce speed by adding resistance, and when the block burns out, only the high speed, which bypasses it, works. Low refrigerant charge, a plugged air dryer, and a weak fuel pump do not affect blower speed selection. Replacing the resistor block or module restores the lower speeds in the cab.

71. A — Freeze frame captures rpm, load, temperatures, and other parameters at the instant a fault sets, which shows the operating conditions and helps reproduce an intermittent problem. A VIN, an odometer value, or a software version identifies the vehicle and module but does not describe what was happening when the fault occurred.

72. A — A kingpin sitting on the jaws means the trailer plate has ridden up over the fifth wheel and the pin is not captured, which is a dangerous high hitch. The technician must pull clear and recouple correctly. Weight distribution and lubrication level do not explain a pin that is not in the throat of the fifth wheel.

73. B — The module needs both crank and cam signals to time injection, so sensor faults, connector damage, or a damaged reluctor can cause a no-start. Checking each signal with a scope or meter locates the fault quickly. Cab filters, brake stroke, and trailer lamps have no part in engine synchronization, so they are not tested first.

74. D — A hydraulic brake system that loses fluid without visible leaks may be leaking inside a wheel cylinder boot or past master cylinder seals, so those are the next checks. Air governor settings, slack adjusters, and tractor protection valves belong to air brake systems and cannot change a hydraulic reservoir level.

75. C — A rhythmic chirp tied to driveshaft rotation points to a U-joint with dry or worn bearings, so it should be inspected, greased, or replaced. A fan blade noise follows engine speed rather than driveshaft speed, and brake line leaks or windshield pillar flex do not produce a repeating chirp that fades with road speed.

76. D — Torque-to-yield bolts are tightened into their plastic range, so they stretch permanently and lose clamp reliability if reused. New bolts maintain the specified clamping force across the head gasket. Clean threads do not restore the lost elasticity, and re-oiling changes friction without correcting the stretch, so replacement is the rule.

77. B — Corrosion adds resistance and causes intermittent contact, so cleaning the terminals and sealing them with dielectric grease restores reliable connections. Water adds more moisture, higher wattage bulbs draw more current without fixing the contact, and raising system voltage risks other components. Connector repair comes first on this trailer plug and socket.

78. A — Cold oil is thick, which starves the pump inlet and causes cavitation, so the system should warm up gradually, and the fluid grade should suit the operating temperatures of a winter yard. Running at maximum pressure risks damage, water destroys lubrication, and removing the filter allows contamination without helping flow.

79. C — Duty cycle is the percentage of one cycle during which the signal is on, so 75 percent means on three quarters of the time and off for the remainder. It does not describe a steady voltage level or how many times the cycle repeats. A 25 percent duty cycle would be mostly off.

80. A — Radial and bias tires have different flexing behaviour, so combining them on one axle produces uneven handling and traction, and manufacturers advise against it. Size and brand do not remove the construction difference, and placing bias tires on one side or relying on road crown does not make the mix safe.

81. C — The SPN names the parameter or component involved, such as coolant temperature, while the failure mode identifier describes how it failed, such as voltage high or low. Occurrence count is a separate field, and the source address identifies the module. Reading both SPN and FMI together points to the circuit to test.

82. D — A voltmeter has high internal resistance and measures the potential difference between two points, so it is connected in parallel across the load terminals while the circuit operates. In series it would block current, and a meter connected to only one side of the load or with the circuit open would show no voltage drop across that load.

83. B — Continued exhaust after unloading shows system air is escaping back through the dryer, usually past a discharge check valve or a purge valve that does not seat. Engine intake restriction, fan clutch wear, and drum cracks do not connect to the air dryer circuit and would not create a continuous purge.

84. A — The pressure plate holds the friction disc against the flywheel with spring force, which carries engine torque into the transmission. The release bearing pushes the levers to disengage it, the pilot bearing supports the input shaft, and the clutch brake slows the input shaft for shifting at rest. Each part has a separate function in the assembly.

85. D — North America uses CCS1 for DC fast charging, which adds two direct current pins to the SAE J1772 connector. A seven-way trailer connector, a block heater plug, and a hydraulic coupler are unrelated to electric vehicle charging. Technicians should confirm the connector type and charging profile before connecting any vehicle.

86. B — Tread wears unevenly, so depth is measured with a gauge in the main grooves at several points across the tread to find the lowest reading and reveal alignment or pressure problems. Measuring at a single spot, on the sidewall, or with a coin can miss uneven wear and does not give a reliable number to compare with the legal minimum.

87. C — Dust downstream of the filter proves air is bypassing it, usually through a cracked hose, a loose clamp, or a damaged seal, and abrasive dust wears cylinders and rings quickly. Fuel return, oil bypass, and coolant tank vents do not connect to the intake path, so they cannot explain dust there.

88. D — A high-pressure switch trips when head pressure is excessive, often from a blocked condenser, poor airflow, or an overcharge, so the condenser and fan are first checks. Washer fluid, landing gear lubricant, and transmission seals are unrelated to the high side of the refrigerant circuit and cannot cause the compressor to cut out.

89. A — Engine ground straps carry heavy current, so corrosion adds resistance that causes slow cranking, dim lamps, and charging faults, which is why voltage drop testing the ground path is useful. Fuel pressure, turbo boost, and coolant flow are controlled by other systems and are not affected by the resistance of a frame ground strap.

90. B — A caged spring keeps the brake released, so that wheel loses its parking and emergency spring brake function. Caging is a temporary tool for towing or service and the bolt must be uncaged and stored before the truck returns to the road. The service brake and the ABS lamp are not directly affected.

91. C — A dent changes the mass distribution of the tube, so the shaft is out of balance and may fatigue. The shaft should be replaced or properly rebuilt and balanced. Hammering and welding without balancing leave the vibration and may weaken the tube further, and ignoring the dent risks a failed shaft at speed.

92. A — Effective mentoring follows demonstrate, practise, and feedback, and measuring known parts lets the apprentice see their own errors. Leaving a chart alone gives no correction, and doing the work for them blocks learning. Passing the job to a service writer ignores that the journey person is responsible for training in the trade.

93. C — A sliding fifth wheel is held by locking pins, and if they are not fully engaged it can shift during braking or acceleration, changing axle loads and risking separation of the coupling. The pins have no part in air line coupling, valve operation, or landing gear position. The driver or technician should confirm the pins are seated before moving.

94. D — An open-centre valve routes pump output through its centre passage back to tank when no function is selected, so the system pressure stays low and little heat is produced. In a closed-centre system flow is blocked or the pump destrokes. Flow does not reach actuators or reverse in neutral on this circuit.

95. B — Diesel exhaust fluid is a urea solution that attacks copper, brass, and zinc, so those metals should not be used in contact with it. Stainless steel and approved plastics are compatible, which is why DEF tanks, funnels, and containers are made from them. Using the wrong materials can contaminate the fluid and damage the SCR system.

96. A — Sidewalls flex continuously, and repairs there are not reliable, so a sidewall puncture condemns the tire. Only tread-area punctures within size limits may be repaired with a proper plug and patch combination. Sealant, extra pressure, or welding does not restore the tire's structure and creates a failure risk at highway speed.

97. D — Wiper motors use internal park contacts to keep power flowing until the arm reaches its rest position, so worn contacts leave the blades stopped partway across the glass. A weak battery would slow or stop the motor generally. Washer fluid level and brake chamber diaphragms are unrelated to the park circuit.

98. B — The solenoid is an electromagnetic switch that pushes the pinion into mesh with the flywheel and closes heavy contacts so the battery current reaches the starter motor. It does not raise voltage,

supply fuel, or disconnect the alternator. A clicking solenoid with no crank often points to low voltage or worn contacts.

99. C — Different friction materials generate different brake torque, so one side brakes harder and the vehicle pulls toward it during moderate applications. Linings should be matched across an axle. A trailer connector has no side-to-side effect on the tractor, and alternator output and fan clutch operation are unrelated to wheel-end braking torque.

100. C — Shifting into gear at high rpm applies full engine torque suddenly, which shocks the clutches, converter, and driveline and can break parts. The transmission fluid does not drain from the pump, the turbocharger is not controlled by the selector, and the axle ratio is fixed. Returning to idle before selecting a range avoids the harsh engagement.

101. D — A thin film of clean oil on the gasket lets it seat evenly, and tightening the specified fraction of a turn after contact seals the filter without crushing the gasket. Overtightening can damage the housing or make removal difficult, and a dry gasket can tear. Water must never be put inside an oil filter.

102. B — Sealed connectors hold terminals with small locking tabs, and the correct extraction tool releases the tab so the terminal can be withdrawn without damaging the cavity or seal. Pulling hard, cutting the housing, or heating the plastic distorts the body and ruins weather protection, which invites moisture and intermittent faults later in the harness.

103. A — Hub-piloted wheels are located by the hub spigot, with flange nuts tightened in a star sequence in stages to the specified torque so the wheel clamps evenly. Studs do not centre the wheel in this system, and the drum is not the locating part. Tightening order matters, and a retorque after the first run is recommended.

104. B — A clear sight line on the suction side lets the technician watch for bubbles, which show a loose fitting, a cracked line, or a leaking seal ahead of the pump. Loosening high-pressure lines while running is dangerous. Replacing parts without testing is guessing, and additives do not locate suction-side air leaks.

105. D — Air moving across the evaporator carries heat to the refrigerant, so when airflow drops the coil temperature falls below freezing and moisture turns to ice, which further blocks airflow. A clogged filter does not add heat, and condenser airflow and the radiator are separate. Replace the filter and check blower operation.

106. A — Frozen water in valves means too much moisture is reaching the system, so the dryer, cartridge, and tank draining must be maintained. Higher governor pressure does not remove water, oil in the tanks damages seals, and removing the dryer only adds more moisture. Alcohol evaporators are discouraged by many fleets due to seal and corrosion effects.

107. C — Wheel rpm is engine rpm divided by the overall ratio, 1,350 divided by 3.00 equals 450 rpm. Multiplying by 3.2 m gives 1,440 m per minute, or 86.4 km/h. Skipping the ratio produces the 259.2 km/h value, and multiplying where division belongs gives other results that do not match a realistic highway speed.

108. C — A voltage-sensitive relay closes when charging voltage appears, letting both banks charge, and opens when the engine stops so the house loads for the bunk heater cannot discharge the starting batteries. It does not boost voltage, convert it, or shut off the alternator. This arrangement protects the ability to start the engine.

109. A — A hub level is read with the axle level and the vehicle at rest so the oil settles and the window shows a true level against the marks. Reading at speed, on a slope, or filling to overflow gives false results and can overfill the hub. Overfilling can force oil past the seal and onto brake linings.

110. D — Fluid injection injuries can look minor yet cause tissue death, so the worker needs urgent medical care and the doctor should know the fluid type. Washing and bandaging delays treatment, and squeezing can spread fluid deeper. Waiting for swelling is dangerous because the damage develops under the skin quickly and silently.

111. B — The rear impact guard is designed to engage the front of a following vehicle and prevent it from sliding under the trailer, so cracked welds or loose mounts reduce that protection. It does not hold brake chambers, support landing gear, or carry floor loads. Damaged guards should be repaired or replaced to the maker's standard.

112. C — A representative sample comes from oil that is warm and mixed by circulation, taken through a clean port to avoid adding contaminants. Samples from the bottom after settling overstate dirt, and samples taken after a flush do not reflect the working system. A dirty plug or old container contaminates the sample and spoils the results.

113. B — A runaway engine burns its own lubricant, so fuel shutoff does nothing, and the only way to stop it is to cut off the air supply. This is done carefully from a safe position because the engine may fly apart. Water would hydraulically lock the engine, and opening the throttle makes the runaway worse.

114. D — Intake air heaters draw high current through a relay and fuse, so those and the power feed are checked first, followed by the element resistance. If the supply is good and the element is open, replace it. Transmission fluid, tire sensors, and cab lamp circuits are not part of the starting aid circuit.

115. A — A relay valve that sticks or has a restricted exhaust holds chamber air, so the brakes release slowly even though the control line is open. A fuel filter housing, coolant level, or alternator belt cannot hold brake air. The valve should be cleaned or replaced and the release time retested.

116. D — A simple planetary set has a sun gear at the centre, planet pinions mounted on a carrier, and an outer ring gear, and holding or driving different members changes ratio and direction. The other groups describe a manual gear train, a clutch, or a torque converter, which are different parts of a drive train and not a planetary gear set.

117. A — Dual tires share the load only when their pressures and diameters are matched. A lower-pressure tire deflects more and carries less, and the partner takes extra load and heat on the drive axle. Uneven pressures shorten tire life and can cause failure, so both tires are set to the same cold pressure.

118. C — Isolation is verified with an insulation resistance tester that applies a test voltage to the de-energized circuit and reads a very high resistance to chassis when the insulation is healthy. Ordinary

meters and test lights lack the rated voltage and range, and they can be unsafe near high-voltage cables. Technicians follow the manufacturer's procedure and use rated gloves.

119. B — Air escaping from the exhaust pipe means compressed air is passing the exhaust valve, so that valve is not sealing. Air at the intake points to the intake valve, bubbles in the coolant show a head or gasket leak, and air at the crankcase or oil fill points to rings. Locating the sound locates the fault.

120. A — Static can damage the sensitive circuits inside a module, so technicians discharge themselves by touching a bare metal ground and avoid touching connector pins. Rubbing with wool or wearing synthetic materials generates charge rather than removing it, and compressed air does not remove static and can blow moisture or dirt into the connector.

121. C — Airbag systems store energy that can fire a module unexpectedly, so the technician disconnects the battery and waits the maker's stated time before working near connections on the steering column. Leaving power connected, striking the cover, or heating the module is dangerous. The module should be handled according to the service manual.

122. B — A power spring stores enough energy to cause serious injury, so the spring must be safely caged or released before the chamber is discarded. Cutting, heating, or dropping the chamber can release the spring violently. The service life of spring brake chambers is limited and the safe disposal procedure is part of trade practice.

123. D — Greasing until fresh grease appears at all four caps shows that the cross and every needle bearing have received lubricant and that contaminants are being pushed out. Stopping at the first leak leaves some caps dry, and spray oil and gear oil do not stay in place or suit these bearings. A dry cap commonly causes failure.

124. D — Shocks wear together, so replacing one makes the damping unequal and causes uneven ride and tire wear. Pairs on the same axle are replaced together. Replacing a shock on a different axle does not balance the first axle, and frame bend is unrelated to shock replacement and should not be used as a trigger.

125. A — A blocked charge air cooler cannot remove heat from compressed intake air, so hot, less dense air reduces power on long climbs. Cleaning the fins and checking connections restores cooling. Raising boost adds even more heat, and fuel filters or cap pressure do not influence intake air temperature at all in this case.

126. B — In defrost mode the evaporator cools the air and condenses water out of it, and the heater core then warms the dried air before it reaches the glass, which clears fog faster than heat alone. The compressor does not heat the air or add fluid, and it has no connection to the brake system tanks.

127. C — Right after charging, a battery shows an inflated surface charge that fades within hours, so 13.2 volts is not a true state-of-charge reading. Letting it rest or drawing a short load removes it, and then open circuit voltage can be compared with the table. Adding water, replacing the battery, or charging again does not remove surface charge.

128. D — Technical service bulletins are the manufacturer's documented fixes for known issues, tied to model, serial range, and software level. Older repair orders from other shops and driver memory are incomplete evidence, and forum posts may be unverified or for a different configuration. Using the bulletin avoids repeating work and keeps the repair within warranty guidance.

129. A — Flickering lamps with good bulbs often point to a high-resistance ground, so the technician checks the white ground wire and its connections to the trailer frame and the connector. Coolant level, pushrod wear, and tire damage are not part of the lighting circuit and cannot create flicker when the brakes are applied.

130. B — Dirt on a coupler can enter the system and damage valves and pumps, so both ends are wiped clean first, and trapped pressure must be relieved so the coupler connects easily and safely. Water contaminates hydraulic oil, heating fittings can damage seals, and connecting under pressure is dangerous and can cause leaks or injection injury.

131. A — ABS is designed to fail safe, so when it detects a fault it turns on the warning lamp and the affected wheel or system returns to normal braking without anti-lock control. The service brakes do not shut off, the spring brakes do not apply automatically, and trailer brakes do not lock. The fault still needs to be repaired promptly.

132. C — A hydraulic retarder fills a chamber with fluid between a driven rotor and a fixed stator, and the fluid shear converts motion into heat removed by the cooling system. It does not use fuel injection in the exhaust, the starter, or brake air. Its capacity depends on fluid temperature and cooling capacity.

133. C — Turning angle stops limit axle movement so the tires clear the frame and the steering gear does not reach its internal end of travel. They are adjusted to the specified angle. Removing them risks damage, tire pressure has little effect on clearance, and lengthening the drag link changes steering geometry instead of the stop position.

134. B — A low-level derate comes from the level sensor circuit, so the technician first confirms the real coolant level and then tests the sensor, wiring, and connector. If level is correct, the sensor is suspect. Compressor governor settings, axle lubricant, and tire sensors are separate systems and cannot trigger a coolant level code.

135. D — A heavy cable lug needs a properly sized crimper that compresses the barrel evenly around all strands, followed by sealing, such as adhesive heat shrink, to keep moisture out. Pliers, taping, or hammering give uneven contact, high resistance, and heat. A poor lug connection also causes voltage drop and starting problems on a heavy-duty truck.