# PRACTICE EXAM 17: RED SEAL 310S SIMULATION (125 QUESTIONS)

1. A technician is performing a complete interior detail and HVAC evaporator cleaning service inside a closed vehicle. The chemical cleaner's SDS specifies adequate ventilation is required. The most appropriate action is:

A. Open one window slightly and continue work

B. Use a small fan to circulate cabin air

C. Open doors and windows fully, run shop ventilation, and verify SDS respiratory PPE

D. Hold breath during application and complete work quickly

2. A vehicle returns with a brake pulsation complaint after recent pad replacement. To verify the rotor's lateral runout against the manufacturer's specification of less than 0.05 mm, the technician should:

A. Use a feeler gauge between caliper and rotor

B. Use a tape measure at the rotor's outer edge

C. Estimate the runout visually as the rotor rotates

D. Mount a dial indicator to the knuckle, rotate the rotor by hand, and read total deviation

3. A customer requests a safety inspection certificate but several findings (worn brake pads at 1 mm, frayed seat belt webbing, inoperative low beam) would cause the vehicle to fail. The customer offers an additional cash payment to pass the inspection. The technician must:

A. Decline the inspection certificate, document failures, provide written report, offer required repairs

B. Accept the payment to maintain customer relationship

C. Pass the vehicle conditionally with verbal warning

D. Pass brakes and seat belt, fail only the headlight

4. A technician finds an unlabeled spray bottle in the shop's parts cleaner area. The most appropriate action is:

A. Use the contents based on its smell and color

B. Refuse to use the unlabeled bottle, dispose through hazardous wa ste, replace with WHMIS-labeled container

C. Apply a generic "cleaner" label and continue use

D. Pour the contents into the shop drain

5. A second-year apprentice is using an impact wrench to install wheel lug nuts at maximum torque. The journeyperson should:

A. Stop the apprentice, explain why impact wrenches overstress studs, demonstrate hand-thread plus calibrated torque wrench

B. Allow the apprentice to continue since the wheels are tight

C. Tell the apprentice to use a longer extension bar

D. Wait for the customer to complain about wheel issues

6. A coworker has suffered a chemical splash to the eyes while servicing a battery. The first-aid response is:

A. Apply ice to the affected eye

B. Drive the coworker to the hospital immediately without rinsing

C. Move to eye wash station, flush both eyes with tepid water for 15 minutes, call emergency services

D. Apply a clean cloth over the eyes to absorb the chemical

7. Provincial environmental regulations governing automotive shops require:

A. Pour used oil down the shop drain

B. Collect used fluids in labeled containers, dispose through licensed handlers with manifests

C. Burn waste fluids in a barrel behind the shop

D. Mix all waste fluids before disposal

8. A repair order serves as a legal document that must include:

A. Only the customer's name and phone number

B. Only the vehicle's VIN and license plate

C. Only the parts replaced

D. Customer info, vehicle ID, complaint, work scope, parts, labor, tech ID, date, customer acknowledgment

9. A vehicle is on a two-post hoist and the technician needs to remove the transmission. The proper procedure is:

A. Lift the vehicle and begin removal immediately

B. Place wood blocks under the transmission for support

C. Engage hoist mechanical safety locks, position transmission jack with cradle, support engine separately

D. Have a second technician hold the transmission during removal

10. A 6-cylinder engine shows compression readings of 165, 168, 170, 92, 167, 169 psi. Cylinder 4 wet test (oil added) raises pressure to 145 psi. The most likely cause is:

A. Worn piston rings on cylinder 4

B. Failed head gasket between cylinders 3 and 4

C. Burnt exhaust valve on cylinder 4

D. Cracked cylinder head over cylinder 4

11. A 3-year-old vehicle (within powertrain warranty) presents with a check engine light and DTC P0011 (camshaft position timing over-advanced). The technician should:

A. Replace the variable valve timing solenoid immediately

B. Replace the timing chain assembly under warranty

C. Refer the customer to the dealer without diagnosis

D. Search the manufacturer's TSB and recall database for this VIN, perform published diagnostics, refer to dealer for warranty

12. An engine overheats only at highway speeds but operates normally at idle and low speeds. The most likely cause is:

A. A stuck-open thermostat

B. A partially blocked radiator core restricting airflow at high speed

C. A failed water pump impeller

D. Low engine oil level

13. Technician A says low compression on one cylinder with a wet test that does not raise pressure indicates a valve issue. Technician B says low compression on one cylinder with a wet test that does raise pressure significantly indicates worn rings. Who is correct?

A. Only Technician A is correct

B. Only Technician B is correct

C. Both technicians are correct

D. Neither technician is correct

14. An engine displaces 3.0 L with a 9.5:1 compression ratio. The total volume of one cylinder at BDC is approximately:

A. 250 $cm^3$

B. 500 $cm^3$

C. 838 $cm^3$

D. 1500 $cm^3$

15. A vehicle's heater produces only lukewarm air at idle but hot air at higher RPM. With the heater control set to MAX HEAT and blend door confirmed in correct position, the most likely cause is:

A. A failed blower motor

B. A blocked cabin air filter

C. A leaking heater core

D. Air pockets trapped in the cooling system or a partially restricted heater core

16. A returnless port-fuel-injection system uses each of the following EXCEPT:

A. An in-tank fuel pump

B. A mechanical pressure regulator on the rail with a return line to the tank

C. A PCM-controlled regulator integrated with the in-tank pump module

D. A fuel pressure sensor providing PCM feedback

17. A scope on a coil-on-plug primary signal shows a clean 12 V trigger pulse from the PCM but no spark at the plug. The most likely cause is:

A. A failed ignition coil with open secondary or burnt internal driver

B. A failed crankshaft position sensor

C. A failed PCM

D. An open primary harness

18. A turbocharged vehicle returns with the customer reporting "blue smoke at startup." The technician finds oil residue in the intercooler and a wet compressor housing. The most likely cause is:

A. A failed PCV system causing crankcase pressure

B. A blown head gasket

C. A failed turbocharger seal allowing oil into the compressor side

D. Worn piston rings on multiple cylinders

19. A vehicle stores DTC P0401 (EGR insufficient flow). With the engine running, scan tool commanded EGR opening produces no change in MAP reading. The most likely cause is:

A. A failed MAP sensor

B. A clogged EGR passage, stuck EGR valve, or carbon-restricted port

C. A failed PCM

D. A failed catalytic converter

20. A vehicle's OBD-II readiness monitor shows the catalyst monitor "not ready." After a drive cycle, the monitor still reports "not ready." The technician should:

A. Replace the catalyst preventively

B. Replace the O2 sensors preventively

C. Clear the codes and recheck without further action

D. Verify manufacturer drive cycle conditions were met, then investigate monitor enable criteria failures

21. A vehicle presents with white exhaust smoke, coolant loss without external leaks, and engine oil that appears milky on the dipstick. The technician should perform:

A. A compression test only

B. A vacuum gauge test only

C. Cylinder leakage test, chemical block test, coolant pressure test, and borescope cylinder inspection

D. An oil pressure test

22. An apprentice asks why timing belt service requires replacing the water pump, tensioner, and idler at the same time even if they appear functional. The journeyperson should explain:

A. Components share service interval and labor access; replacing together prevents a second teardown for related failure

B. The manufacturer requires it

C. The new belt will not fit with the old water pump

D. Only the belt needs replacement; the apprentice is incorrect

23. A direct-injection vehicle stores DTC P0301 (cylinder 1 misfire) at idle but runs normally at higher RPM. Spark plug, coil, and injector swap testing isolate the issue to cylinder 1. The most likely cause is:

A. A failed PCM

B. Worn rings on cylinder 1

C. A failed crankshaft position sensor

D. Carbon buildup on the intake valve restricting airflow at idle

24. A diesel vehicle's DPF differential pressure reads 35 kPa at idle (spec is less than 5 kPa at idle). Active regeneration cycles have not reduced the pressure. The most likely cause is:

A. A failed DPF differential pressure sensor

B. A loaded DPF with soot and ash beyond regen capacity, requiring service or replacement

C. A failed turbocharger

D. Low engine oil level

25. A coolant pressure test holds 13 psi for 5 minutes with no visible external leaks and no pressure drop. The customer reports occasional coolant level reduction and the radiator cap was replaced last month. The next diagnostic step is:

A. Replace the radiator preventively

B. Replace the water pump preventively

C. Perform a chemical block test to identify internal head gasket leakage

D. Drain and refill the coolant

26. A pre-purchase inspection reveals the catalytic converter has been removed and replaced with a straight pipe. The technician must:

A. Document the missing catalyst, inform customer of emissions non-compliance, recommend compliant catalyst installation

B. Ignore the modification since the customer is pre-purchase

C. Sell the customer a replacement without documentation

D. Replace the catalyst without informing the customer

27. During engine teardown, the technician measures cylinder bore at the top (most worn area), middle, and bottom. Readings are 86.05 mm, 86.03 mm, and 86.01 mm respectively. The specified maximum taper is 0.05 mm. The cylinder requires:

A. No action; the readings are within spec

B. Boring and oversize pistons due to combined taper and out-of-round wear concerns

C. Replacement of the entire engine block

D. Honing only to clean the surface

28. Technician A says a turbocharger should be allowed to idle for 30 seconds before shutdown after high-load operation to allow oil to continue cooling the bearings. Technician B says synthetic oil is preferred for turbocharged engines because it resists coking at the high turbo bearing temperatures. Who is correct?

A. Only Technician A is correct

B. Only Technician B is correct

C. Neither technician is correct

D. Both technicians are correct

29. A scope on a crankshaft position sensor signal shows the expected waveform at idle, but as engine RPM increases the amplitude drops significantly and the signal becomes erratic. The most likely cause is:

A. A failed PCM input

B. A wiring open in the signal harness

C. Reluctor wheel damage, rust, or excessive sensor air gap reducing signal amplitude at high RPM

D. A failed ignition coil

30. A vehicle returns three weeks after a fuel pump replacement with the same no-start condition. Fuel pressure tests at 0 psi during cranking. The technician should:

A. Verify pump electrical supply and command, inspect new pump and tank for contamination causing repeat failure

B. Replace the fuel pump again immediately

C. Replace the fuel filter only

D. Tell the customer the issue is unrelated

31. A 4-cylinder engine running at 2400 RPM completes how many combustion events per second?

A. 10

B. 20

C. 40

D. 80

32. A vehicle stores DTC U0100 (lost communication with PCM). With the ignition on, the scan tool cannot communicate with the PCM but communicates with all other modules. The most likely cause is:

A. A failed gateway module

B. PCM power supply, ground fault, or failed PCM itself with network otherwise intact

C. A failed instrument cluster

D. A failed transmission control module

33. A modern vehicle's HS-CAN bus typically operates at:

A. 500 kbit/s with two twisted wires and 120 Ω terminators at each end

B. 9600 bit/s using serial communication

C. 100 Mbit/s using Ethernet protocol

D. 19.2 kbit/s, the same as LIN bus

34. After replacing a transmission control module, the vehicle stores DTC U0101 (lost communication with TCM) and the transmission operates in failsafe limp mode. The most likely cause is:

A. A failed replacement module from the supplier

B. A wiring fault from the replacement

C. New module requires VIN, calibration file, and learn procedure programming via OEM scan tool

D. A failed gateway module

35. Technician A says a CAN bus resistance measurement of 60 Ω across CAN-H and CAN-L (with all modules powered off) indicates two healthy 120 Ω terminating resistors in parallel. Technician B says a reading of 120 Ω indicates one terminator has failed open. Who is correct?

A. Only Technician A is correct

B. Only Technician B is correct

C. Neither technician is correct

D. Both technicians are correct

36. A vehicle stores DTC P0420 (catalyst efficiency below threshold). Scan tool data at steady cruise shows the upstream O2 sensor switching normally between 0.1 V and 0.9 V, while the downstream O2 sensor signal closely mirrors the upstream sensor's switching pattern. The most likely cause is:

A. A degraded catalyst with reduced oxygen storage capacity

B. A failed upstream O2 sensor

C. A failed downstream O2 sensor

D. A failed PCM

37. When performing a module reprogramming event, the technician should:

A. Disconnect the battery before starting

B. Connect battery support charger, use J2534 with correct calibration file, do not interrupt the procedure

C. Use any J2534 device without specific software

D. Disconnect non-essential modules during programming

38. OBD-II Mode 06 data on a vehicle shows the catalyst monitor test result at 0.92 with a specification limit of 0.95 (lower numbers indicate better performance, where 1.00 is the failure threshold). The interpretation is:

A. The catalyst has failed and must be replaced immediately

B. The catalyst is operating normally with no concern

C. The catalyst is approaching the DTC threshold and may set P0420 in coming months

D. The data is corrupted and should be ignored

39. A vehicle's body modules and chassis modules communicate normally on separate sub-buses, but communication between them through the gateway module is intermittent. Scan tool can access both sub-buses through their respective DLC pins. The most likely cause is:

A. A failed gateway module

B. A failed PCM

C. A failed instrument cluster

D. A weak battery

40. A vehicle returns after recent tire rotation with the TPMS warning light illuminated. Scan tool shows all four sensor IDs but the wheel positions are incorrect. The technician should:

A. Replace the failed sensor

B. Replace the TPMS receiver module

C. Drive the vehicle for 20 minutes to allow auto-relearn

D. Perform manufacturer TPMS relearn procedure with activation tool or drive cycle

41. OBD-II Mode 09 retrieves:

A. Real-time sensor data

B. Vehicle Information data including VIN, calibration ID, CVN, and in-use performance ratios

C. Stored DTCs only

D. Freeze frame data only

42. Technician A says a parasitic draw exceeding 80 mA after module sleep indicates a module not entering low-power mode. Technician B says voltage drop testing at each module's ground terminal can identify corrosion or poor connections causing intermittent network faults. Who is correct?

A. Only Technician A is correct

B. Only Technician B is correct

C. Both technicians are correct

D. Neither technician is correct

43. Compared to traditional point-to-point wiring, a CAN-based vehicle network architecture provides:

A. Reduced wiring weight, simplified diagnostics through standardized scan tool access, software-based feature expansion

B. Higher cost and complexity with no benefits

C. Reduced reliability due to bus dependency

D. Faster speed at the expense of fewer features

44. A vehicle returns after recent clutch replacement with the customer reporting "the clutch grabs hard and chatters at takeoff." The most likely cause is:

A. A worn pilot bearing

B. Air in the hydraulic system

C. A misadjusted master cylinder pushrod

D. Oil contamination of the clutch disc from a rear main or input shaft seal leak

45. A CVT transmission requires fluid replacement using:

A. Any ATF compatible with friction modifiers

B. Manufacturer-specific CVT fluid with friction characteristics for belt and pulley materials

C. Standard engine oil

D. Gear oil rated for manual transmissions

46. When measuring driveline operating angles, the vehicle must be:

A. At curb weight on a level surface

B. On a hoist with the wheels hanging free

C. Loaded with maximum cargo weight

D. With the driveshaft removed from the vehicle

47. A limited-slip differential requires specific fluid because:

A. Limited-slip differentials run hotter than open differentials

B. Standard gear oil is too thick for the clutch packs

C. Friction-modifier additives are required for clutch pack operation without chatter

D. Limited-slip differentials cannot use synthetic fluids

48. A vehicle returns one month after CV axle replacement with clicking noise during turns on the same side as the replacement. The technician should investigate:

A. The opposite side CV joint

B. The wheel bearing on the same side

C. The brake caliper on the same side

D. The replacement axle for snap ring engagement, spline seating, and axle nut torque

49. A vehicle stores DTC P0741 (TCC stuck off). Scan tool shows the PCM commanding TCC apply but no change in input/output RPM ratio. The most likely cause is:

A. A failed wheel speed sensor

B. A failed TCC solenoid, restricted hydraulic apply circuit, or worn TCC friction

C. A failed transmission temperature sensor

D. A failed transmission position sensor

50. Technician A says a U-joint vibration is typically felt at constant speed and increases with road speed in a fixed RPM relationship. Technician B says a tire-related vibration changes with vehicle speed but is independent of engine RPM. Who is correct?

A. Only Technician A is correct

B. Both technicians are correct

C. Only Technician B is correct

D. Neither technician is correct

51. A vehicle produces a whine on deceleration only (not on acceleration), with the whine pitch changing with road speed. The most likely cause is:

A. A worn wheel bearing

B. A worn axle bearing

C. Improper ring-pinion contact pattern (coast side wear) or worn pinion bearings

D. A worn carrier bearing

52. A transmission service should follow:

A. The aftermarket service interval published by quick-lube chains

B. A universal 50,000 km interval for all vehicles

C. Replacement of transmission fluid at every oil change

D. The manufacturer's published interval, procedure, fluid spec, and capacity

53. A vehicle's manual transmission has difficulty engaging 3rd gear, grinds when shifting into 3rd, but shifts smoothly into all other gears. The most likely cause is:

A. A worn clutch disc

B. Worn 3rd gear synchronizer assembly — ring, sleeve, or struts

C. Low transmission fluid

D. A failed shift fork on all gears

54. A U-joint with rust streaks visible at the bearing cap seals indicates:

A. Internal bearing wear and lubricant loss from water intrusion and dried grease

B. Normal aging of an otherwise functional joint

C. Recent grease service that has not yet been cleaned

D. A manufacturing defect requiring warranty claim

55. A 4WD vehicle binds during low-speed turns on dry pavement (driveline windup). The vehicle has full-time 4WD without a center differential. The technician should:

A. Replace the transfer case fluid

B. Diagnose the front and rear differentials

C. Explain that full-time 4WD without center differential requires slippery surfaces; advise 2WD on dry pavement

D. Replace the transfer case clutch packs

56. A hydraulic clutch system pedal is soft and the clutch does not fully disengage. After bleeding produces no improvement, the most likely cause is:

A. A failed clutch disc

B. Worn synchronizer rings

C. A failed pressure plate

D. Internally leaking master or slave cylinder bypassing piston seal

57. A vehicle's pinion angle has been altered by suspension modification (lifted suspension). The technician should:

A. Measure operating angles, calculate U-joint differences, install pinion shims or rotate axle housing to spec

B. Ignore the angle change; the vehicle will adapt

C. Install a longer driveshaft

D. Replace the U-joints with larger units

58. When installing a new CV axle, the axle nut torque is:

A. Hand-tight only

B. Manufacturer-specified torque, typically 150–300 Nm plus an angle

C. Maximum impact wrench setting

D. The same as the wheel lug nut torque

59. A vehicle's manual transmission "pops out" of 4th gear during acceleration. The most likely cause is:

A. Low transmission fluid

B. A worn clutch disc

C. A failed clutch release bearing

D. Worn 4th gear teeth, shift fork wear, engagement teeth wear, or detent spring

60. A vehicle's automatic transmission delays engagement when shifting from PARK to DRIVE or REVERSE (3–5 seconds before forward/reverse movement). The most likely cause is:

A. A failed input speed sensor

B. A failed output speed sensor

C. Low fluid, worn forward clutch pack, leaking pump seal, or worn pressure regulator

D. A failed PCM

61. Technician A says a charging system voltage of 13.2 V at 2000 RPM with electrical load applied indicates the alternator is failing to maintain rated output. Technician B says a healthy charging system should produce 13.8–14.6 V across all conditions including idle with load. Who is correct?

A. Both technicians are correct

B. Only Technician A is correct

C. Only Technician B is correct

D. Neither technician is correct

62. A battery measures 12.6 V open-circuit but loaded testing shows voltage dropping to 8 V under 50% CCA load for 15 seconds. The interpretation is:

A. The battery is fully charged and healthy

B. Open-circuit voltage is adequate but loaded testing reveals failed cells; battery requires replacement

C. The charging system has failed

D. The starter motor is drawing excessive current

63. Both headlamps suddenly stop working simultaneously while driving at night. The technician should:

A. Replace both bulbs

B. Replace the headlamp switch

C. Replace the headlamp wiring harness

D. Check the headlamp fuse, relay, and master headlamp circuit

64. A vehicle's A/C system blows warm air on a hot day. Manifold gauges show low side 75 psi and high side 130 psi (both abnormal — low side high, high side low). The most likely cause is:

A. Refrigerant overcharge

B. A blocked condenser fan

C. A failed compressor not creating pressure differential

D. A blocked expansion valve

65. A vehicle's right rear taillight does not work. The technician finds 12 V at the socket but no ground signal. The fault is:

A. An open ground circuit between socket and chassis ground preventing current return

B. A failed bulb

C. A failed brake light switch

D. A failed bulb socket internal contact

66. A vehicle's battery requires recharging every 7–10 days despite the alternator testing within specification. The most likely cause is:

A. A defective new battery

B. A failed starter motor

C. Cold weather affecting normal operation

D. A parasitic draw exceeding normal 50 mA after module sleep

67. A vehicle's heater produces only cool air. Scan tool shows the blend door commanded full hot and at correct position 100% hot. Engine reaches operating temperature normally. The most likely cause is:

A. A failed compressor clutch coil

B. A restricted heater core, low coolant, or stuck heater control valve

C. A failed blower motor

D. A failed evaporator

68. A scope on the alternator output shows AC ripple voltage of 1.5 V peak-to-peak (spec is less than 0.5 V) with one missing hump in the rectified pattern. The most likely cause is:

A. A failed diode in the alternator's rectifier bridge

B. A weak battery

C. A failed voltage regulator

D. A loose alternator belt

69. A vehicle in cold weather (-20°C) cranks slowly and the dome light dims significantly during cranking. The battery's open-circuit voltage is 12.4 V. The most likely cause is:

A. A failed alternator

B. A failed starter

C. Cold-weather battery capacity loss combined with cold oil increasing cranking resistance

D. A failed PCM

70. A customer reports headlamps illuminate when the engine is running but dim significantly when the brake pedal is pressed. The most likely cause is:

A. A failed alternator

B. A failed headlamp switch

C. A failed brake light switch

D. A poor battery ground connection or undersized ground cable causing voltage drop under load

71. A vehicle with stop-start technology fails to perform automatic engine stops. Scan tool shows the system inhibited and reports the reason as "battery condition." The technician should:

A. Disable the stop-start feature

B. Test battery state of health, verify IBS calibration, replace battery if degraded, reset BMS

C. Replace the BCM

D. Replace the starter motor

72. A stop-start equipped vehicle requires:

A. An AGM or EFB battery matched to manufacturer specification

B. A standard flooded battery of any size

C. A gel-cell battery

D. A lithium-ion battery in all cases

73. An A/C compressor failure from a refrigerant starvation condition is identified. The repair must include:

A. Replacing only the compressor

B. Replacing the compressor and refrigerant only

C. Replace compressor, receiver-drier or accumulator, flush lines, refill oil to specification

D. Replacing the compressor and condenser only

74. Before evacuating an A/C system for service, a refrigerant identifier reads "Unknown — 22% air, 78% R-134a." The technician should:

A. Continue with recovery using standard equipment

B. Add R-134a refrigerant to dilute the air

C. Recover using R-22 equipment

D. Use a dedicated contaminated-refrigerant recovery machine or refer to a specialized service

75. A heated seat operates initially but stops heating after 10 minutes. The seat temperature sensor PID shows the seat reaches 38°C and the system commands the element off. The interpretation is:

A. The heating element has failed

B. The system is functioning correctly — sensor limits element temperature and cycles off at target

C. The seat temperature sensor has failed

D. The control module has failed

76. After replacing a power window motor on a vehicle with auto-up function, the new motor operates manually but auto-up does not work and pinch protection is non-functional. The technician should:

A. Replace the BCM

B. Perform window initialization so BCM learns motor current and travel range

C. Replace the window switch

D. Disconnect the battery for 30 minutes

77. A rear defroster has one broken grid line in the middle of the window. The repair is:

A. Replace the rear window glass

B. Replace the entire defroster grid

C. Apply conductive paint across the break after surface preparation and cure

D. Disable the defroster permanently

78. After replacing a headlamp assembly, the technician should:

A. Drive the vehicle to verify aim by eye

B. Adjust by visual estimation only

C. Use a tape measure to align with the original assembly

D. Use a headlamp aim kit at 7.6 m from a vertical target with vehicle at curb weight

79. An alternator's output cable voltage measures 13.2 V at idle, dropping to 12.6 V with headlamps and rear defroster on. Battery voltage at the posts reads 13.0 V at idle and 12.4 V with the same load. The most likely cause is:

A. A failed alternator

B. Voltage drop in alternator output cable, B+ terminal, or charging system wiring

C. A failed battery

D. A failed voltage regulator

80. Technician A says A/C low-side gauge reading 70 psi and high-side gauge reading 120 psi at idle on a hot day indicates a failed compressor. Technician B says these readings indicate refrigerant overcharge. Who is correct?

A. Only Technician A is correct

B. Only Technician B is correct

C. Both technicians are correct

D. Neither technician is correct

81. An LED headlamp module fails. The customer asks whether an aftermarket LED retrofit can be installed in a halogen housing on her older vehicle as a cheaper alternative. The technician should:

A. Install the retrofit immediately

B. Decline all retrofit work

C. Explain optical mismatch and glare risk; recommend OEM-spec halogen or proper OEM LED retrofit

D. Install any LED bulb that physically fits

82. A vehicle's HVAC produces reduced airflow with a musty odor. The technician should first:

A. Replace the blower motor

B. Replace the evaporator

C. Replace the HVAC control module

D. Inspect and replace the cabin air filter for reduced airflow and musty odor

83. A customer's vehicle requires a jump start after sitting for 5 days. The vehicle has stop-start technology with an AGM battery. Before charging, the technician should use:

A. An AGM-compatible smart charger at AGM voltage profile with temperature compensation

B. Any 12 V trickle charger

C. A high-current boost charger at maximum setting

D. Connection to a running vehicle for 30 minutes

84. A vehicle's brake pedal sinks slowly to the floor when held under steady pressure with the engine running. No external leaks are visible. The most likely cause is:

A. Air in the brake hydraulic system

B. Internally leaking master cylinder with fluid bypassing piston seal

C. A failed brake booster

D. Worn brake pads

85. A vehicle returns one week after brake pad replacement with brake pulsation felt through the steering wheel during moderate braking. The most likely cause is:

A. The new pads are defective

B. Air in the brake hydraulic system

C. A failed caliper piston seal

D. Excessive rotor lateral runout from improper mounting, unchecked runout, or improper torque

86. A vehicle stores DTC C0035 (Left Front Wheel Speed Sensor) and the ABS warning light is on. Scan tool data shows wheel speed reading 0 km/h on the left front while the vehicle is moving. The technician should:

A. Replace the ABS module

B. Replace the wheel hub bearing

C. Inspect LF wheel speed sensor, tone wheel, air gap, and sensor wiring

D. Replace the ABS valve assembly

87. A vehicle returns after winter tire installation with the TPMS warning light on. The TPMS sensors from the summer tires were not transferred. The technician should:

A. Install new TPMS sensors on winter tires (or transfer from summer), then perform manufacturer relearn

B. Disable the TPMS system in the BCM

C. Wait for the warning light to clear automatically

D. Replace the BCM

88. A vehicle produces a clunking noise from the front suspension when going over speed bumps but no symptoms during normal driving. The most likely cause is:

A. A failed shock absorber

B. Worn sway bar end links, ball joints, or strut mount bearings

C. A failed wheel bearing

D. A failed power steering pump

89. A vehicle pulls to the right after a wheel alignment. Alignment specifications are within range on both sides. The most likely cause is:

A. A failed alignment machine

B. The customer's complaint is unfounded

C. The vehicle requires a different brand of tire

D. Cross-camber or cross-caster within spec, road crown effect, or tire conicity

90. A vehicle has a steering wheel shimmy at 100 km/h that disappears at higher and lower speeds. The most likely cause is:

A. Worn tie rod ends

B. A failed power steering pump

C. Wheel imbalance producing speed-specific vibration at resonance

D. A failed alignment

91. A vehicle's brake pedal remains soft after standard pedal-bleeding of all four wheels. The vehicle has ABS. The technician should:

A. Perform ABS bleed procedure cycling ABS valves with scan tool to release trapped air

B. Replace the master cylinder

C. Replace the brake hoses

D. Bleed the system again with greater force

92. A vehicle with a McPherson strut suspension uses the strut to:

A. Steer the vehicle through driver inputs only

B. Function as both upper steering pivot and shock absorber/spring mount in a single assembly

C. Provide all powertrain support

D. Replace the function of all control arms

93. Ceramic brake pads differ from semi-metallic pads in the following ways:

A. Ceramic pads have lower friction and shorter life

B. Ceramic pads cost less and produce more dust

C. Ceramic pads always perform better in all conditions

D. Ceramic pads produce less dust, run quieter, and last longer; semi-metallic handle heavier braking and high heat

94. A vehicle with electric power steering (EPS) stores DTC C2200 (steering assist motor performance) and the steering wheel becomes very heavy. The technician should:

A. Replace the steering rack

B. Replace the battery

C. Diagnose EPS motor circuit, perform manufacturer procedure for this DTC, check related codes

D. Replace the steering wheel

95. A vehicle's tires show cupping wear on the front but normal wear on the rear. The most likely cause is:

A. Tire rotation is overdue

B. Worn front shock absorbers or struts causing saw-tooth cupping pattern

C. A failed alignment

D. Over-inflated tires

96. A vehicle has one brake that drags hot after driving, with the other three wheels operating normally. The technician finds the caliper releases correctly when the bleeder is opened. The most likely cause is:

A. An internally collapsed brake hose acting as a one-way valve trapping pressure at the caliper

B. A seized caliper piston

C. A failed master cylinder

D. A failed brake booster

97. A vehicle has a humming noise that changes pitch when turning. The noise pitch decreases when turning left and increases when turning right. The most likely cause is:

A. A worn right front wheel bearing

B. A worn left rear wheel bearing

C. A failed power steering pump

D. A worn left front wheel bearing loaded during right turns

98. A vehicle's ride is harsh and bouncy with no shock damping evident over bumps. Visual inspection shows oil on the shock bodies. The technician should:

A. Replace only the shock with visible oil

B. Add fluid to the shock through the body

C. Replace shocks in axle pairs to maintain matched damping

D. Replace all four shocks regardless of condition

99. A vehicle's right front tire shows wear concentrated on the center of the tread. The most likely cause is:

A. Chronic over-inflation causing tire crown and center tread contact

B. Chronic under-inflation

C. Worn ball joints

D. A failed wheel bearing

100. Technician A says brake fluid should be replaced every 2 years regardless of vehicle mileage. Technician B says brake fluid moisture content of 3% or more is the trigger for fluid replacement. Who is correct?

A. Only Technician A is correct

B. Both technicians are correct

C. Only Technician B is correct

D. Neither technician is correct

101. When installing wheels after tire service, the lug nuts should be torqued:

A. To maximum impact wrench setting

B. In any sequence to manufacturer's specification

C. Sequentially around the wheel to manufacturer's specification

D. In a star pattern to manufacturer torque with calibrated wrench after hand-threading

102. A vehicle's steering wheel is off-center after recent suspension work. The steering rack and tie rod adjustment are correct per the alignment machine. The most likely cause is:

A. A failed power steering pump

B. A failed steering rack

C. SAS zero-point calibration required with the wheels straight ahead

D. A worn steering wheel hub

103. A pre-purchase inspection reveals tires with adequate tread (5 mm) but a DOT date code of 1815. The current year is 2026. The technician should:

A. Document tires over 11 years old, recommend replacement regardless of tread depth

B. Approve tires for continued service since tread is adequate

C. Replace only one tire

D. Drive the vehicle to test the tires

104. A vehicle's ABS warning light is illuminated with no DTCs stored. Brake system operation appears normal in non-emergency stops. The technician should:

A. Replace the ABS module preventively

B. Test ABS with manufacturer diagnostic procedure, run self-test, verify wheel speed data on road test

C. Disconnect the ABS warning light bulb

D. Replace the brake fluid

105. A tire sidewall reads "215/55R17 94H." The "94" designates:

A. The tire's pressure rating

B. The tire's aspect ratio

C. The tire's load index corresponding to maximum 670 kg per tire from a published table

D. The tire's speed rating

106. A vehicle with hydraulic power steering has a moaning noise that worsens with steering input. Fluid level is correct. The most likely cause is:

A. A failed steering rack

B. Air trapped in the power steering system

C. Worn tie rod ends

D. Pump wear, low pressure output, or contaminated fluid

107. Before disconnecting any airbag harness connector, the technician must:

A. Turn ignition off, disconnect negative battery, wait manufacturer-specified time for capacitor discharge

B. Apply 12 V to the airbag connector

C. Drain the brake fluid first

D. Turn the ignition on for 5 minutes

108. A vehicle has been involved in a collision that deployed the driver's airbag and seat belt pretensioner. The seat belt assembly:

A. Can be reset using a scan tool procedure

B. Must be replaced as a complete assembly since pretensioner is a single-use pyrotechnic device

C. Can be field-rebuilt by replacing the gas generator

D. Operates normally after airbag deployment

109. During collision repair, structural panel dimensions must be verified by:

A. Visual inspection alone

B. Customer satisfaction with appearance

C. Comparison with a similar undamaged vehicle

D. Measuring at manufacturer-designated control points with tram gauge, laser, or similar tool

110. A vehicle owner reports water in the front floor area of a sunroof-equipped vehicle. The technician should first:

A. Inspect and clear sunroof drain tubes for blockage by leaves, dirt, or insect debris

B. Replace the sunroof seal

C. Replace the windshield

D. Apply silicone sealant to the sunroof

111. A replacement power mirror with memory positions, blind spot indicators, and auto-dim functions is installed. After installation, the basic mirror movement functions but memory positions do not save, blind spot indicators do not work, and auto-dim is inoperative. The technician should:

A. Replace the mirror with a basic non-integrated unit

B. Disable the non-working features

C. Configure through scan tool to program memory positions, blind spot zones, auto-dim, verify functions

D. Drive the vehicle 100 km for self-calibration

112. A new clock spring assembly is shipped with a locking pin or alignment mark indicating the spring's centered position. During installation, the technician must:

A. Remove the locking pin before installation

B. Confirm wheels straight, install with pin in place, install steering wheel, then remove pin

C. Rotate the clock spring lock-to-lock to test

D. Apply lubricant to the clock spring ribbon

113. A customer's seat belt webbing has visible fraying near the buckle. The technician must:

A. Apply fabric repair tape to the frayed area

B. Trim the frayed section

C. Cover the area with reinforcement webbing

D. Replace the entire seat belt assembly since webbing damage may fail under crash load

114. When installing a replacement body panel with manufacturer-specified panel bonding adhesive, the technician must:

A. Prepare surfaces, mix components within pot life, apply specified bead, clamp for full cure period

B. Apply any household epoxy in any amount

C. Skip the adhesive and use only mechanical fasteners

D. Use the adhesive without surface preparation

115. After a front-end collision repair, the SRS warning light illuminates. Scan tool reports DTC B1008 (driver's airbag deployment loop fault). The most likely cause is:

A. A failed SRS module

B. The driver's airbag was deployed and the new airbag not installed or connector not seated

C. A failed crash sensor

D. A failed clock spring assembly

116. A vehicle's sunroof opens but does not close fully. Scan tool shows the sunroof motor current is normal during the close operation. The most likely cause is:

A. A failed sunroof motor

B. A failed sunroof switch

C. Anti-pinch detection, glass alignment, seal drag, or threshold recalibration needed

D. A failed BCM

117. Before performing any service that requires contact with HV components, the technician must:

A. Wear standard work gloves

B. Disconnect the 12 V battery only

C. Drive the vehicle until the HV battery is empty

D. Turn vehicle off, remove key/fob, remove MSD, wait discharge time, verify zero voltage with Cat III/IV DMM

118. Class 0 (1000 V) HV insulating gloves require:

A. Visual inspection, air-trap inspection by rolling the gauntlet, and replacement per service interval or damage

B. Annual replacement regardless of condition

C. Replacement only when the gloves fail to fit

D. Use only when temperatures exceed 30°C

119. HV cables on hybrid and EV vehicles are universally colored:

A. Red, indicating positive supply

B. Black, matching chassis ground

C. Orange, the universal HV warning color recognized worldwide

D. Green, indicating ground reference

120. A scan tool reads cell module voltages on a hybrid HV battery. Three of 20 modules read significantly lower than the others (3.2 V vs 3.7 V on healthy modules). The most likely cause is:

A. Normal battery operation; no action required

B. Cell-level failure or imbalance in three modules; module-level replacement addresses the failed cells

C. A failed BMS controller

D. A failed inverter

121. During EV deceleration with the accelerator pedal released:

A. Traction motor operates as generator (regenerative braking), returning energy to HV battery

B. Friction brakes engage immediately at full force

C. Motor disengages mechanically from the wheels

D. Motor reverses direction to slow the vehicle

122. An EV in North America using a CCS-1 charging connector receives:

A. AC charging only

B. DC charging only

C. Only Tesla proprietary charging

D. AC charging on J1772 portion plus DC fast charging through two additional pins below it

123. After replacing a damaged HV cable, the technician must verify insulation integrity by:

A. Visual inspection only

B. Testing with HV insulation tester (megger) at 500 V or 1000 V DC; healthy reads over 100 MΩ

C. Using a standard DMM in continuity mode

D. Applying battery voltage to test for current flow

124. When verifying voltage absence on a hybrid/EV HV system, the multimeter must be:

A. A standard household DMM rated for 120 V AC

B. A test light rated for 12 V DC

C. A Cat III/IV-rated DMM with 600 V or 1000 V rating for HV transient survival

D. A continuity tester

125. A customer reports significant range reduction on a recent EV during cold weather. The technician should:

A. Explain that cold-weather range loss is normal physics; mitigate with preconditioning, seat/wheel heat, tire pressure

B. Replace the HV battery

C. Replace the inverter

D. Replace the climate control module

# Practice Exam 17: Answer Key and Explanations

1. C — Adequate ventilation per the SDS requires more than partial window opening for cabin chemical work. Opening all doors and windows, running shop ventilation to direct air across the cabin, and following SDS-specified respiratory PPE prevents inhalation exposure during the application period; partial ventilation leaves the technician working in concentrated vapors.

2. D — A dial indicator with the base mounted to the steering knuckle reads lateral runout directly as the rotor rotates. The total deviation reading compares to the 0.05 mm specification; tape measures and feeler gauges lack the precision required to detect runout values that cause pedal pulsation.

3. A — Falsifying a safety inspection certificate is fraud and exposes the technician and shop to license suspension, criminal liability, and downstream collision-liability claims. Documenting failures honestly, providing a written report, and offering the necessary repairs is the only ethical and legal path; the cash offer does not change this obligation.

4. B — WHMIS regulations require all controlled products to be properly labeled with hazard identification and accompanied by an SDS. An unlabeled container cannot be safely handled, stored, or disposed of, so the contents must go to hazardous waste through proper channels and the container replaced with a WHMIS-compliant labeled equivalent.

5. A — Maximum impact wrench application overstresses lug studs (causing stretch and eventual failure) and produces inconsistent torque that can leave wheels loose or studs broken. Demonstrating hand-thread, snug with impact at low setting, then final-torque with a calibrated torque wrench in star pattern is the journeyperson's responsibility to pass on proper technique.

6. C — Chemical exposure to the eye requires immediate continuous flushing with tepid water for at least 15 minutes to dilute and remove the chemical before it damages the cornea. The eye wash station is designed specifically for this exposure; driving the patient or applying ice delays critical irrigation time and worsens injury severity.

7. B — Provincial environmental regulations classify used oil, antifreeze, batteries, and refrigerants as hazardous waste requiring labeled containers, compliant secondary containment, and disposal through licensed waste handlers with documented manifests. The manifest chain creates the legal record proving compliance and provides traceability if contamination is later identified.

8. D — A complete repair order documents customer info, vehicle ID, complaint, authorized work scope and price, parts and labor records, technician identification, completion date, and customer acknowledgment of the work. This documentation serves as the legal contract between shop and customer, is required for warranty claims, and is the technician's protection in any subsequent disputes.

9. C — Engaging the hoist's mechanical safety locks prevents accidental vehicle drop, a transmission jack with the proper cradle controls the heavy transmission descent, and supporting the engine separately prevents the engine from dropping when the transmission is unbolted. Each element addresses a specific failure mode that has caused fatal shop injuries when omitted.

10. A — A wet test that significantly raises compression (here from 92 to 145 psi) confirms worn piston rings: the oil temporarily fills the gap between rings and cylinder wall, restoring compression sealing. Valve issues or head gasket failures show little or no wet test improvement, since oil cannot seal valve faces or breached gasket surfaces.

11. D — Within powertrain warranty, the appropriate path is to search the manufacturer's TSB and recall database for this specific VIN and DTC, perform the published diagnostic procedure, and refer the customer to the dealer if a warranty-covered fault is confirmed. Performing unauthorized repairs voids warranty coverage and exposes the shop to liability for repairs the manufacturer would otherwise have funded.

12. B — Highway-speed-only overheating points to insufficient heat rejection at high heat load. A partially blocked radiator core restricts airflow precisely when the engine produces the most heat; at idle, the lower heat load is within the partial radiator's capacity. Thermostat or water pump faults typically produce symptoms across all speeds.

13. C — A wet test that does not raise pressure indicates oil cannot seal the failure point — pointing to a valve issue, head gasket, or cracked component (oil cannot seal these surfaces). A wet test that does raise pressure indicates rings — oil temporarily fills the ring-to-cylinder gap. Both technicians describe correct diagnostic principles.

14. C — Approximately 838 $cm^3$. Each cylinder's swept volume is $3000 \div 4 = 750$ $cm^3$. With a 9.5:1 compression ratio, clearance volume is $750 \div 8.5 \approx 88$ $cm^3$, so total BDC volume is $750 + 88 = 838$ $cm^3$. Compression ratio is defined as the ratio of total cylinder volume at BDC to clearance volume at TDC.

15. D — Air pockets in the cooling system reduce coolant flow through the heater core at low circulation speeds; at higher RPM, increased pump output overcomes the restriction. A partially restricted heater core produces the same pattern — both match the RPM-dependent symptom, and cooling system bleeding or heater core flush addresses the root cause.

16. B — A returnless port-injection system eliminates the mechanical fuel rail regulator and return line. The PCM controls fuel pressure through the in-tank pump module's integrated regulator, with feedback from a fuel pressure sensor. The mechanical rail regulator with return line is the legacy returning system, not returnless.

17. A — A clean 12 V trigger pulse confirms PCM and wiring are functional, isolating the fault to the coil itself: open secondary winding, burnt internal driver, or shorted internal components. Replacement of the failed coil restores spark; further upstream diagnosis would waste time when the primary signal is already confirmed correct.

18. C — A failed turbocharger seal (typically the compressor-side oil seal) allows engine oil to enter the compressor side. The oil pools in the compressor housing and intercooler during shutdown, then burns off as blue smoke at startup. The wet compressor housing and oil residue in the intercooler are diagnostic for this failure.

19. B — A commanded EGR opening that produces no change in MAP reading indicates exhaust gas is not actually entering the intake. This points to a clogged EGR passage, stuck EGR valve, or carbon-restricted port — all preventing flow despite the valve appearing to operate. Cleaning or replacing the affected component addresses the actual fault.

20. D — Drive cycle conditions must be verified against the manufacturer's specific requirements (engine temperature, vehicle speed, time at cruise, etc.); if conditions were met and the monitor still won't run, enable criteria failures (sensor faults, related DTCs blocking the monitor) prevent execution. The proper sequence diagnoses why the monitor isn't running before any parts replacement.

21. C — White exhaust smoke, coolant loss without external leaks, and milky oil are classic head gasket failure symptoms. Cylinder leakage test (listening for air in the cooling system), chemical block test (combustion gases in coolant), coolant pressure test, and borescope cylinder inspection together confirm the diagnosis and identify the affected cylinder(s) before disassembly.

22. A — The timing belt, water pump, tensioner, and idlers share the same service interval and access labor. Replacing all together captures the labor investment once; replacing only the belt and leaving worn related components ensures a return visit when the next component fails, costing the customer more in labor than the bundled service.

23. D — Carbon buildup on direct-injection intake valves restricts airflow most noticeably at idle, where intake velocity is lowest and small restrictions have proportionally larger effect. At higher RPM, increased airflow overcomes the restriction. The cylinder-specific isolation (after swap testing) and the RPM-specific symptom together point to this fault.

24. B — DPF differential pressure at idle of 35 kPa (versus specification of less than 5 kPa) far exceeds the threshold for normal soot loading. Active regen cycles failing to reduce the pressure indicates ash accumulation beyond what regen can address — typical at high mileage. DPF service or replacement is required.

25. C — A static pressure test that holds 13 psi without visible drop rules out external leakage but does not detect internal head gasket leakage. A chemical block test detects combustion gases in the cooling system and confirms head gasket failure even when static pressure holds; this is the appropriate next step after the static test passes.

26. A — A missing catalytic converter makes the vehicle non-compliant with provincial emissions regulations and fails safety/emissions inspection in many jurisdictions. The technician's role is to document the finding, inform the customer of the regulatory consequences, and recommend installation of a compliant catalyst; this protects the customer's purchase decision and the technician's professional standing.

27. B — Combined taper of 0.04 mm and the typical accompanying out-of-round wear commonly produce a cylinder that won't properly seal new standard rings. Boring to an oversize and installing matching pistons restores correct cylinder geometry for new ring sealing; honing alone leaves the wear pattern and the rings won't seat to the worn surfaces.

28. D — Both principles are correct. Idle-down before shutdown allows oil to continue flowing through the hot turbo bearings, preventing oil coking on the bearing surfaces. Synthetic oil's higher thermal stability resists coking and breakdown at the elevated bearing temperatures of turbocharged operation, further protecting the turbo.

29. C — A scope signal that drops in amplitude and becomes erratic at higher RPM points to reluctor wheel damage (rust, debris, or runout) or excessive sensor air gap. At idle the signal is adequate, but at higher RPM the increased switching speed combined with marginal signal quality produces erratic readings. Correction requires cleaning or replacing the affected component.

30. A — A repeat fuel pump failure three weeks after replacement signals an unaddressed root cause. Verifying pump electrical supply (voltage and ground), pump command from the control module, and inspecting the new pump for failure and the tank for contamination identifies what damaged the new pump. Replacing the pump again without finding the cause produces a third failure.

31. D — 80 combustion events per second. At 2400 RPM, the engine completes 40 revolutions per second. In a 4-stroke engine, each cylinder fires once per two revolutions; with 4 cylinders, the engine produces $(4 \times 40) \div 2 = 80$ power strokes per second.

32. B — Loss of communication with one specific module while the rest of the network functions normally indicates the fault is at that module — its power supply, ground, or internal circuitry — not the network bus. Verifying PCM power and ground before replacing the module addresses the most common cause efficiently.

33. A — HS-CAN operates at 500 kbit/s with two twisted wires (CAN-H and CAN-L) and 120 Ω terminating resistors at each end of the bus. The differential signaling and termination together provide the noise immunity needed for reliable communication in the vehicle's electrically harsh environment.

34. C — A new replacement module ships generic and requires VIN programming, calibration file installation, and any required learn procedures before it can communicate normally with the network. Until programmed, the module reports as missing from the bus and the affected system operates in failsafe limp mode. The OEM (or J2534) scan tool is required for the programming.

35. D — Two healthy 120 Ω terminators in parallel measure 60 Ω, confirming both terminators are present and intact. If one terminator fails open, only the remaining 120 Ω measures across the bus. Both technicians describe correct diagnostic facts about CAN bus terminating resistance.

36. A — A healthy catalyst's oxygen storage capacity smooths the downstream O2 sensor signal, holding it at a steady mid-range voltage while the upstream sensor switches. When the downstream sensor mirrors the upstream switching pattern, oxygen storage has been lost — the catalyst is degraded and is the cause of P0420.

37. B — Module reprogramming requires stable supply voltage throughout the procedure; voltage instability corrupts the new calibration. Connecting a battery support charger maintaining 13.5–14.5 V, using a J2534-compatible interface with the manufacturer software and correct calibration file, and not interrupting the procedure are all required for successful programming.

38. C — A Mode 06 result of 0.92 with a 0.95 specification limit (where 1.00 is the failure threshold) indicates the catalyst is approaching the DTC threshold and may set P0420 in coming months as efficiency continues to degrade. The customer can be informed of preventive replacement options or scheduled monitoring at upcoming services.

39. A — Working sub-buses with intermittent cross-bus communication isolates the fault to the gateway module that routes messages between buses. Each sub-bus carries traffic correctly on its own segment, but cross-bus messages fail when the gateway's routing function intermittently fails. Gateway diagnosis with the manufacturer's procedure confirms the diagnosis.

40. D — Incorrect wheel positions after rotation require the manufacturer's TPMS relearn procedure, which updates the receiver's sensor-to-position mapping. The activation tool wakes each sensor in a specific wheel order, or the vehicle's auto-relearn drive cycle executes the relearn through normal operation. Either method restores correct wheel position display.

41. B — OBD-II Mode 09 retrieves Vehicle Information including VIN, calibration ID, CVN (calibration verification number), and in-use performance ratios. This data is used to verify the correct PCM calibration is installed (matching VIN and CVN) and to demonstrate emissions monitor execution for inspection purposes.

42. C — Parasitic draw exceeding 80 mA after the manufacturer's sleep timer expiration points to a module that has not entered sleep mode, kept awake by a stuck input or internal fault. Voltage drop testing at module grounds identifies poor ground connections that cause intermittent communication faults. Both technicians describe valid diagnostic approaches.

43. A — CAN architecture reduces wiring weight and complexity by sharing a common bus, simplifies diagnostics through standardized scan tool access to all modules, and supports software-based feature additions without new wiring. The architecture has been the standard for over 20 years specifically because of these benefits.

44. D — Clutch grab and chatter after recent replacement points to disc surface contamination, typically from a leaking rear main engine seal or transmission input shaft seal. Even small amounts of oil on the friction surface produce the grab/chatter symptom and require disc replacement plus addressing the leak source — typically necessitating a second clutch teardown.

45. B — CVT fluid has unique friction characteristics matched to the belt and pulley materials; substituting ATF or other fluids produces accelerated wear of these components and may void warranty. The manufacturer-specific CVT fluid is the only correct service fluid for a CVT transmission.

46. A — Driveline operating angles change with suspension position; measurements taken with the vehicle raised or unloaded produce incorrect angles. Curb weight on a level surface places the suspension at its design operating position, producing the angles the U-joints actually experience during driving.

47. C — Limited-slip differentials contain clutch packs that require friction-modifier additives to function smoothly. Without friction modifier, the clutches grab and release abruptly (stick-slip), producing chatter on turns and accelerating clutch wear. The specific friction characteristics of LS-rated gear oil prevent this.

48. D — A clicking noise on the same side as a recent axle replacement points to installation issues: insufficient snap ring engagement in the differential, incorrect spline seating, or insufficient axle nut torque. These can produce clicking before full failure; the comeback inspection focuses on the recent installation rather than unrelated components.

49. B — A commanded TCC apply with no change in input/output RPM ratio indicates the converter clutch is not engaging mechanically despite the electrical command. The fault lies in the apply path: TCC solenoid, restricted hydraulic apply circuit, or worn friction surface. Bidirectional commands plus pressure testing identify which.

50. B — U-joint vibrations relate to driveshaft RPM (which scales with vehicle speed) and appear at constant speeds. Tire-related vibrations relate to wheel speed (independent of engine RPM through the gear ratios) and originate at the contact patch. Both technicians describe correct vibration diagnostic principles.

51. C — Deceleration-only whine points to the coast side of the ring gear and pinion. Wear on the coast side of the gear teeth (or worn pinion bearings affecting only the coast loading) produces noise

specifically during deceleration when the wheels drive the gears. Acceleration loads the drive side and is silent on a coast-side-worn gear set.

52. D — Manufacturer-published service intervals match the transmission's design and fluid chemistry, while procedure (drain-and-refill vs power flush) is selected based on the transmission type. Aftermarket intervals from quick-lube chains often don't match the manufacturer's specification and can cause damage or void warranty.

53. B — A specific gear's grinding and difficult engagement, with other gears shifting smoothly, isolates the fault to that gear's synchronizer assembly — ring, sleeve, or struts. Synchronizers are gear-specific; wear typically affects one gear at a time, with 3rd often the first because of its frequent use.

54. A — Rust streaks at the bearing cap seals form when grease has dried out or been displaced by water intrusion, allowing moisture to contact the bearing surfaces. This indicates internal bearing wear and lubricant loss — the joint is approaching failure even though no looseness may be felt yet, and replacement is required.

55. C — Full-time 4WD without a center differential or viscous coupling locks the front and rear axles together. On dry pavement, the front and rear cannot speed-differentiate during turns, producing driveline windup that binds the transmission and damages driveline components. The vehicle is designed for slippery surfaces only; 2WD operation on dry pavement is the correct procedure.

56. D — Soft pedal with incomplete disengagement that bleeding doesn't resolve points to internal hydraulic bypass. The master or slave cylinder's piston seal is leaking internally — fluid bypasses the seal during pedal application, preventing full apply pressure from reaching the slave. No external leak is visible because the fluid stays inside the cylinder.

57. A — Altered pinion angle from suspension modification requires measurement of new operating angles, calculation of U-joint angle differences, and correction (pinion shims or axle housing rotation) to bring operating angles within the manufacturer's specification (typically less than 3°). Ignoring the change produces U-joint vibration and accelerated wear.

58. B — The CV axle nut is torqued to the manufacturer's specification (typically 150–300 Nm plus an angle on modern vehicles), securing the axle to the wheel hub. Over-torque damages the pre-set sealed wheel bearing; under-torque allows axle loosening. The torque is significantly higher than wheel lug nut torque because of the different fastener function.

59. D — A gear that pops out under load indicates loss of full engagement — caused by worn gear teeth, shift fork wear allowing the gear to walk back, worn synchronizer engagement teeth that don't lock, or a worn detent spring/ball that cannot hold the shift rail. Each is a wear failure of a specific component; transmission disassembly identifies which.

60. C — Delayed engagement (3–5 seconds before forward/reverse movement) indicates slow pressure buildup at engagement. Low fluid, worn forward clutch pack, leaking pump seal, or worn pressure regulator all cause inadequate apply pressure at the moment of shift. Fluid level check is the starting point, then pressure testing identifies the specific cause.

61. A — A healthy charging system produces 13.8–14.6 V across operating conditions including idle with load; 13.2 V at 2000 RPM with load is below this range and indicates insufficient charging. Both technicians describe the same correct fact from different angles — the 13.2 V reading falls outside the expected output range.

62. B — Open-circuit voltage of 12.6 V indicates the battery has charge but does not verify capacity. The load test reveals failed cells or internal resistance that prevents the battery from maintaining voltage under load. A battery can show full open-circuit voltage while having lost most of its CCA capacity — load testing is the definitive diagnosis.

63. D — Simultaneous failure of both headlamps from one moment to the next is highly unlikely to be two coincident bulb failures. The common circuit elements — fuse, relay, or master headlamp circuit feed — are the probable failure point. Checking fuse, relay, and circuit feeds before replacing bulbs efficiently isolates the actual fault.

64. C — A healthy A/C compressor creates a pressure differential between low and high sides (typically 30–50 psi low / 200–300 psi high). Readings of 75/130 indicate the compressor is not pumping — low side stays high (suction not pulling down), high side stays low (no compression). Compressor failure or internal valve issues are the diagnosis.

65. A — Voltage present at the socket but no current flow points to an open ground circuit. Without a return path to chassis ground, current cannot flow through the bulb regardless of supply voltage. Inspecting the ground wire from socket to chassis identifies the broken connection — typically corrosion or a broken ring terminal.

66. D — A battery that requires recharging every 7–10 days with a functional charging system indicates a parasitic draw exceeding the normal 50 mA after module sleep. A current clamp on the negative cable after the manufacturer's sleep timer expiration identifies the offending circuit through the fuse-pull isolation method.

67. B — Correct blend door position and normal engine temperature isolate the fault to the coolant flow path to the heater core. A restricted heater core, low coolant level, or a stuck heater control valve all prevent hot coolant from reaching the heater core despite the blend door being correctly positioned for heating.

68. A — AC ripple of 1.5 V peak-to-peak (versus specification less than 0.5 V) with a missing hump in the rectified pattern is the signature of a failed diode in the rectifier bridge. The missing hump corresponds to the diode that is no longer conducting. Alternator replacement is the standard repair when ripple is excessive.

69. C — A battery at 12.4 V (75% SoC) at 25°C delivers approximately 60% of rated CCA at -20°C, and cold engine oil produces significantly higher cranking resistance. The combination produces slow cranking and visible voltage drop (dome light dimming). The battery may test marginal in summer but inadequate in winter.

70. D — Headlamps that dim significantly when brake lights activate point to a high-resistance ground path. The added current draw of brake lights produces voltage drop across the resistance, dimming all electrical loads sharing that ground. Inspecting the negative battery cable and main chassis ground connections identifies the corrosion or undersized cable.

71. B — Stop-start inhibit due to battery condition indicates the BMS has determined the battery cannot reliably support stop-start cycles. Conductance testing for state of health, verifying IBS calibration, and replacing degraded batteries with the manufacturer-specified type (AGM or EFB) plus BMS reset restores function. Disabling the feature loses the fuel-economy benefit.

72. A — Stop-start systems repeatedly deep-cycle the starter battery, conditions that destroy standard flooded batteries quickly. AGM (Absorbed Glass Mat) or EFB (Enhanced Flooded Battery) construction tolerates the repeated cycling and is required by the manufacturer for stop-start vehicles. Using a standard flooded battery causes premature failure.

73. C — A compressor failure from refrigerant starvation distributes metal debris through the system. Replacing only the compressor leaves the contamination to destroy the new compressor. The proper repair: replace the compressor, replace the receiver-drier or accumulator (which captures debris and moisture), flush the lines and components where possible, and refill oil to specification.

74. D — Contaminated refrigerant (air, mixed refrigerants, or unknown contaminants) cannot be recovered with standard equipment without cross-contaminating clean refrigerant stocks. A dedicated contaminated-refrigerant recovery machine, or referral to a specialized service, is the proper handling. Mixing contaminated refrigerant into clean recovery equipment damages it and corrupts the recovered refrigerant inventory.

75. B — Heated seats include a temperature sensor that limits element temperature to a safe maximum (typically 35–40°C) to prevent burns and seat damage. The system cycling off at 38°C and back on as the seat cools is the design intent. The user perceives "stopped heating" when the system is in fact maintaining target temperature correctly.

76. B — The window initialization procedure teaches the BCM the new motor's normal current draw and travel range; without it, auto-up and pinch protection cannot function safely. The procedure (window fully down with switch held, then fully up with switch held, then ignition cycle) takes one minute and restores the lost features.

77. C — Conductive paint formulated for defroster repair restores broken grid lines for under $20 in materials. Surface preparation, masking, application, and cure period produce a permanent repair. Glass replacement is wildly excessive for a single broken grid line that can be repaired in place.

78. D — A headlamp aim alignment kit at the manufacturer-specified distance (typically 7.6 m / 25 ft) from a vertical aiming target with the vehicle at curb weight on a level surface establishes the correct beam pattern position. Visual estimation cannot achieve the precision required for legal compliance and oncoming-traffic safety.

79. B — The 0.2 V difference between alternator output (13.2 V) and battery posts (13.0 V) at idle, increasing with load, indicates resistance in the charging system wiring. Voltage drop testing along the cable, B+ terminal, and connections identifies the high-resistance point. Replacing the alternator without addressing the cable wastes the repair.

80. A — Equalized pressures (low 70, high 120) at idle on a hot day show the compressor is not creating the normal pressure differential — the compressor has failed. Refrigerant overcharge produces high pressures on both sides (e.g., low 60, high 400), not equalized; only Technician A's diagnosis matches the readings.

81. C — Halogen housings are optically designed for halogen bulbs' specific filament position and beam pattern. LED retrofits in halogen housings typically scatter light, create glare for oncoming traffic, reduce the driver's effective forward visibility, and may be illegal. Recommending OEM-spec halogen replacements or a proper OEM LED retrofit is the safe and legal alternative.

82. D — A clogged cabin air filter reduces airflow and accumulates organic material producing a musty odor. Filter inspection and replacement is inexpensive, takes minutes, and resolves both symptoms; this is the highest-probability, lowest-cost first diagnostic step before considering blower motor, evaporator, or control module issues.

83. A — AGM batteries require an AGM-specific charging profile (typically 14.4–14.8 V absorption with temperature compensation). Standard flooded-battery charging profiles overcharge AGM batteries, causing electrolyte loss and reduced capacity. An AGM-compatible smart charger preserves the battery and is the only correct choice for AGM service.

84. B — A brake pedal that creeps to the floor under steady pressure with no external leak indicates fluid bypassing internally past the master cylinder's piston seal. The fluid does not leave the cylinder but flows around the seal under pressure, allowing the pedal to sink. Master cylinder replacement is the repair; the internal bypass cannot be field-rebuilt reliably.

85. D — Pulsation through the steering wheel during moderate braking points to excessive rotor lateral runout. Common causes after pad service include debris between rotor and hub (creating a high spot), failure to verify runout during the service, or rotor warping from improper torque sequence on the wheel lug nuts. Inspection identifies which.

86. C — A wheel speed reading of 0 km/h while the vehicle moves isolates the fault to the LF sensor circuit, not the ABS module (which is reading the data correctly and reporting it as missing). Inspection of the sensor for damage, the air gap, the tone wheel for contamination, and the sensor wiring for opens or shorts identifies the specific failure point.

87. A — Sensors not transferred to the winter tires must be installed (new sensors) or transferred from the summer tires, then the manufacturer's relearn procedure executed so the receiver recognizes the four sensor IDs in correct wheel positions. Disabling TPMS in the BCM is not a legitimate fix and may not be possible in many vehicles.

88. B — Clunking over speed bumps with normal driving symptoms absent points to components that contact normally but produce noise under the high-rate compression/extension of impacts. Sway bar end links, ball joints, and strut mount bearings all produce this pattern; inspection with the suspension at curb height identifies which has play.

89. D — Cross-camber or cross-caster differences within spec can still cause pull, road crown effect (cant in the road surface causes right pull), and tire conicity (internal ply variations make the tire pull one direction). Rotating the front tires side-to-side: if the pull changes direction, tire conicity is the cause; if not, alignment or road crown is responsible.

90. C — A vibration appearing only in a narrow speed band (resonance) at 100 km/h points to wheel imbalance. The imbalance produces centrifugal force at one specific rotational frequency that excites the suspension's resonant frequency in that band. Dynamic wheel balancing on a quality balancer corrects both static and couple imbalance and resolves the symptom.

91. A — Air can become trapped in the ABS modulator that pedal bleeding alone cannot reach. The scan tool's ABS bleed procedure cycles the modulator valves during bleeding, releasing the trapped air. This procedure is required after master cylinder service, ABS service, or any time air may have entered the modulator section.

92. B — A McPherson strut combines the upper steering pivot and the shock absorber/spring mount in a single assembly. This eliminates the separate upper control arm of an SLA suspension while integrating suspension and steering function into one unit. The design saves space and weight but means strut replacement affects steering geometry.

93. D — Ceramic pads produce less brake dust, run quieter, and have longer life under normal driving than semi-metallic. Semi-metallic pads handle heavier braking duty and higher temperatures better, making them appropriate for towing or aggressive driving. The customer's usage profile determines which is the better match.

94. C — DTC C2200 (steering assist motor performance) requires diagnosis of the EPS motor circuit, manufacturer-published procedure for this specific code, and checking related DTCs (battery condition, communication, or SAS) that may cause cascading faults. Replacing the steering rack without diagnosis often replaces a functional component while leaving the actual fault.

95. B — Front-only cupping wear (irregular saw-tooth pattern) develops when the shock or strut cannot control wheel motion, allowing the tire to skip across the pavement. Worn front shocks/struts produce front-only cupping while the rear (with functional dampers) wears normally. Shock replacement plus tire rotation addresses both root cause and consequence.

96. A — Caliper releases when the bleeder is opened, isolating the trapped pressure to the line between master cylinder and caliper — the brake hose with an internally collapsed flap acts as a one-way valve. Pressure passes from master cylinder to caliper but cannot release back; opening the bleeder confirms the diagnosis by venting the trapped pressure.

97. D — Noise pitch increasing when turning right means the bearing is loaded during right turns. During a right turn, weight transfers to the outside of the turn (the left side), loading the left bearings more heavily. The worn left front wheel bearing produces more noise when loaded, matching the symptom pattern.

98. C — Shocks are replaced in axle pairs to maintain matched damping; one new and one worn shock produces uneven handling and accelerates wear of the newer component. Adding fluid is not possible on most modern sealed shocks. Replacing all four when only one is leaking is unnecessary and wasteful.

99. A — Wear concentrated on the tread center indicates the tire is contacting the road only through its center, with the shoulders carrying less load. Chronic over-inflation crowns the tire, lifting the shoulders and concentrating wear at the center. Setting cold pressure to the door jamb placard corrects the wear pattern.

100. B — Manufacturer service intervals typically specify time-based brake fluid replacement (2–3 years) regardless of mileage to address moisture absorption. Independently, a moisture content of 3% or more triggers replacement at any time to maintain proper boiling point. Either condition is a valid trigger for service; both technicians describe correct facts.

101. D — A calibrated torque wrench in a star pattern to the manufacturer's specified torque, after hand-threading each lug nut to verify clean engagement, is the proper procedure. Impact wrenches produce

inconsistent torque and can over-stress studs. The star pattern ensures the wheel seats evenly against the hub without cocking.

102. C — Off-center steering wheel after suspension/alignment work with correct rack adjustment indicates SAS zero-point calibration is required. The SAS retains its previous "zero" reference until the manufacturer's calibration procedure is executed with the wheels straight ahead; the calibration takes minutes and resolves the off-center display and any related ESC/EPS warnings.

103. A — Tires over 11 years old have hardened rubber compounds and microscopic sidewall cracking regardless of tread depth, reducing wet grip and increasing failure risk. Tire service life is typically 6–10 years; recommending replacement based on age is the safety-driven recommendation despite the adequate tread.

104. B — An illuminated ABS warning light with no DTCs stored requires explicit re-verification through the manufacturer's diagnostic procedure: scan tool self-test, road test verifying wheel speed data, and module power/ground checks. The warning may indicate a tripped condition that requires recreating the operating conditions or a recent reset that hasn't completed verification.

105. C — The 94 is the tire's load index, a coded value corresponding to 670 kg maximum load per tire from the published load index table. The index is a coded number that maps to kilograms; using the tire at loads exceeding the rating causes overheating and structural failure.

106. D — A moaning noise from the power steering pump that worsens with steering input, with correct fluid level, indicates pump wear, low pressure output, or contaminated fluid (caused by debris from internal wear). Pressure testing the pump output identifies whether the pump or the rack is the cause; the moaning noise itself points to the pump.

107. A — The SRS module's reserve capacitor can deploy an airbag even with the battery disconnected. Turning ignition off, disconnecting the negative cable, and waiting the manufacturer-specified discharge time (typically 1–10 minutes) bleeds the capacitor before harness work. Skipping the wait risks accidental deployment during service.

108. B — A deployed pretensioner is a single-use pyrotechnic device that cannot be reset or refurbished; the complete seat belt assembly must be replaced. Reuse risks failure to deploy in a subsequent crash or premature deployment during service — both unacceptable safety outcomes per regulation and manufacturer policy.

109. D — Structural integrity verification requires measuring at manufacturer-designated control points using a tram gauge, laser system, or similar tool, with measured dimensions compared to OEM specification. Visual inspection cannot detect the dimensional changes that affect crash-energy management performance.

110. A — Blocked sunroof drain tubes are the most common cause of water ingress in sunroof-equipped vehicles. Debris (leaves, dirt, insect debris) accumulates in the tubes routing water from sunroof corners through the A-pillars to outlets behind the front fenders. Clearing the blocked tubes restores function inexpensively, often without parts.

111. C — Integrated mirrors require scan tool configuration to program memory positions, learn blind spot detection zones, enable auto-dim activation, and verify each integrated function operates correctly. Without configuration, the customer loses the features they paid for and the system may set DTCs; configuration completes the installation.

112. B — A new clock spring is shipped centered with a locking pin or alignment mark. The steering wheel must be at straight-ahead before installation; the locking pin remains in place during clock spring and steering wheel installation, and is removed only after the assembly is complete. Preserving the centered state prevents ribbon cable damage from over-rotation in service.

113. D — Damaged seat belt webbing (cuts, burns, fraying, melted fibers) may fail under crash load. Seat belt assemblies are non-repairable single units; trimming or fabric repair does not restore the engineered strength. Replacement of the complete assembly is the only safety-compliant option.

114. A — Manufacturer-specified panel bonding adhesive requires surface preparation per technical instructions, mixing the components in the specified ratio within pot life, applying the specified bead pattern, and clamping for the full cure period. The procedure preserves the body's crash-energy management; substitutions or shortcuts compromise crashworthiness.

115. B — DTC B1008 (driver's airbag deployment loop fault) indicates the deployment circuit is open — most commonly because the new airbag has not been installed after the original deployed in the collision, or because the new airbag's connector is not fully seated. The deployment loop sees an open circuit until a resistive airbag is connected.

116. C — Normal motor current with incomplete close indicates anti-pinch detection is triggering, not a motor failure. Causes include real or false anti-pinch detection from glass misalignment, seal drag, or

learning threshold issues. Addressing the alignment, cleaning the track, replacing the worn seal, or recalibrating the anti-pinch threshold restores normal close function.

117. D — The complete HV de-energization sequence is required before any HV contact: vehicle off and key/fob removed, MSD removed, manufacturer-specified discharge wait time for inverter DC bus capacitor bleed, and voltage absence verification with a Cat III/IV-rated DMM at specified test points. Each element addresses a specific risk; skipping any creates lethal exposure.

118. A — Class 0 (1000 V) HV insulating gloves require visual inspection (cracks, tears, contamination) and air-trap inspection (rolling the gauntlet to pressurize the glove, listening for leaks) before each use. Replacement is required at the manufacturer's service interval or whenever any defect is found; gloves with even minor damage cannot be trusted at HV.

119. C — HV cables are universally colored orange on hybrid and EV vehicles, providing a visual warning recognized worldwide by technicians and first responders. The orange color requires HV-safe handling procedures whenever it appears, regardless of vehicle make or model, ensuring consistent recognition across the industry.

120. B — Three modules reading 3.2 V versus 3.7 V on healthy modules indicates cell-level failure or imbalance in those three modules. Module-level replacement (when supported by the manufacturer) addresses the failed cells and rebalances the pack at a fraction of full pack replacement cost — preserving the still-healthy modules.

121. A — During accelerator-released deceleration, the traction motor operates as a generator: vehicle kinetic energy spins the motor, producing electrical energy that flows back to the HV battery (regenerative braking). Friction brakes engage only when more deceleration is needed than regen can supply, with brake-by-wire blending the two transparently.

122. D — The CCS-1 connector combines J1772 AC charging (top of the connector for Level 1/Level 2) with two additional DC pins below for DC fast charging. A single port supports both AC and DC charging at multiple power levels, simplifying public infrastructure and home charging compatibility on one vehicle inlet.

123. B — A high-voltage insulation tester (megger) at the manufacturer-specified test voltage (typically 500 V or 1000 V DC) measures insulation resistance between each conductor and ground, and between

conductors. A healthy HV cable reads more than 100 MΩ; lower readings indicate insulation degradation requiring cable replacement before re-energization.

124. C — A Cat III/IV-rated DMM (with appropriate voltage rating, typically 600 V or 1000 V) survives the transient voltage spikes possible on HV systems. Lower-rated meters and test lights can fail catastrophically when exposed to HV transients, creating arc-flash hazards for the technician.

125. A — Cold-weather EV range reduction is normal physics: lithium-ion cell efficiency drops in cold, cabin heating draws significant energy (especially with resistive heat rather than heat pump), and regen acceptance is reduced. Mitigation includes preconditioning while plugged in, using seat and steering wheel heaters, and maintaining proper tire pressure. A 20–40% reduction in cold is expected and does not indicate component failure.