

PRACTICE EXAM 8: POSTAL AUTOMOTIVE TECHNICIAN EXAM (944) SIMULATION (100 QUESTIONS)

This independently written expanded practice exam contains 100 four-option questions covering automotive maintenance, troubleshooting, diagnosis, and repair topics emphasized by USPS Automotive Knowledge testing. USPS currently lists Exams 943/944/945 as Automotive Knowledge assessments and requires Automotive Technician applicants to pass Tests 943 and 944. The USPS assessment information package states a minimum passing score of 70 and describes 60 minutes for the Automotive Mechanic section and 30 minutes for the Automotive Technician section. This 100-question simulation is expanded study material, not an official USPS exam. Choose the single best answer for each item before consulting the answer key and explanations.

1. A gasoline engine idles roughly and sometimes stalls, but runs smoothly above 1,500 rpm. Blocking the EGR passage immediately smooths the idle. Which fault is most likely?
 - A. The catalytic converter is storing too much oxygen.
 - B. The fuel tank vent valve is remaining fully closed.
 - C. The EGR valve is not fully closing at idle.
 - D. The thermostat is opening slightly earlier than specified.

2. Short-term and long-term fuel trims are strongly positive on both banks at idle, but move close to zero when engine speed is held near 2,500 rpm. What should the technician suspect first?
 - A. An intake vacuum leak downstream of the airflow measurement.
 - B. A restricted exhaust system ahead of the muffler.
 - C. Excessive fuel pressure at the injector rail.
 - D. A thermostat that keeps the engine slightly too cool.

3. A contaminated mass-airflow sensor underreports the amount of air entering an engine. What fuel-control response is most likely after the system reaches closed loop?

- A. Negative fuel trim as the PCM removes fuel from a rich condition.
- B. Positive fuel trim as the PCM adds fuel to correct a lean condition.
- C. No fuel-trim change because airflow is not used for fuel delivery.
- D. Maximum EGR flow because airflow input controls only emissions hardware.

4. An engine has good power at low speed but loses power as rpm rises. A vacuum gauge shows normal vacuum at idle, then the reading steadily falls while the engine is held at 2,500 rpm. What is the best interpretation?

- A. The fuel injectors are all leaking after shutdown.
- B. The battery has excessive internal resistance.
- C. The engine oil viscosity is slightly too low.
- D. The exhaust system is likely restricted.

5. A gasoline engine misfires only during heavy acceleration. Idle quality is smooth, fuel pressure is correct, and compression is even. Which fault is most likely?

- A. A thermostat that opens too early during warm-up.
- B. A slightly restricted cabin air filter at high blower speed.
- C. A weak secondary-ignition path that breaks down under high cylinder pressure.
- D. A loose fuel-filler cap that does not maintain evaporative sealing.

6. During an injector balance test, three injectors produce nearly equal fuel-pressure drops, while one injector causes a much smaller pressure drop. What does the smaller drop indicate?

- A. The suspect injector is mechanically stuck wide open.
- B. The fuel pump is producing excessive pressure only on that cylinder.
- C. The oxygen sensor is commanding the injector to remain closed.
- D. The suspect injector is flowing less fuel than the others.

7. A scan tool shows an implausibly extreme-cold engine coolant temperature after the engine has been running and is fully warm. What circuit condition is commonly indicated?

- A. An open circuit or very high resistance in the ECT signal path.
- B. A direct short of the ECT signal circuit to ground.
- C. A fuel injector winding shorted internally to battery voltage.
- D. A catalytic converter that has reached normal operating temperature.

8. When a conventional zirconia upstream oxygen sensor is exposed to a deliberately richer mixture, how should its signal normally respond once the sensor is hot?

- A. The sensor voltage should fall toward the lean end of its range.
- B. The sensor voltage should rise toward the rich end of its range.
- C. The sensor resistance should become exactly zero ohms.
- D. The signal should remain fixed because mixture does not affect it.

9. At warm idle, a MAP sensor reports unusually high pressure in kPa while the engine has no known sensor reference-voltage problem. What does that reading correspond to?

- A. High intake-manifold vacuum and a very low calculated engine load.
- B. Zero atmospheric pressure entering the intake manifold.
- C. Low intake-manifold vacuum and a relatively high calculated engine load.
- D. A direct measurement of fuel pressure at the injector rail.

10. An engine cranks at normal speed but will not start. While cranking, scan data shows 0 rpm and there is no ignition trigger. Which input should be checked first?

- A. The downstream oxygen sensor heater circuit.
- B. The evaporative canister vent filter.
- C. The air-conditioning pressure transducer.
- D. The crankshaft position sensor and its circuit.

11. After shutdown, fuel pressure drops rapidly. One spark plug is wet with fuel, and that cylinder's injector shows leakage during a rail-pressure hold test. What is the most likely cause?

- A. The thermostat is stuck in the fully open position.
- B. That injector is leaking when it should be closed.
- C. The EGR valve is completely blocked with carbon.
- D. The charging system is producing excessive ripple voltage.

12. A four-gas analysis shows very high hydrocarbons while the engine has an obvious ignition misfire. What does the elevated HC primarily represent?

- A. Unburned or partially burned fuel leaving the cylinders.
- B. Excess nitrogen created by a fully complete combustion event.
- C. Only water vapor condensed inside the exhaust analyzer hose.
- D. A direct measurement of oxygen stored inside the catalytic converter.

13. What is the main reason an EGR system introduces a controlled amount of exhaust gas into the intake during appropriate operating conditions?

- A. To raise peak combustion temperature and increase spark advance demand.
- B. To reduce peak combustion temperature and thereby reduce NO_x formation.
- C. To increase fuel pressure by using exhaust pressure on the rail.
- D. To enrich the mixture during every cold start regardless of load.

14. A vehicle is hard to restart immediately after refueling and idles rough for a short time. Testing shows the EVAP purge valve flows vapor even when it is commanded closed. What is the likely effect?

- A. The engine is receiving no fuel vapor because the canister is isolated.
- B. The charging system is losing field current through the purge circuit.
- C. The transmission line pressure is being vented into the intake manifold.
- D. Excess fuel vapor is entering the intake when purge should be stopped.

15. A positive-crankcase-ventilation system is completely blocked on an otherwise sound engine. Which symptom is most likely to develop?

- A. Excess crankcase pressure that can encourage oil leaks and seal seepage.
- B. A permanent increase in alternator output voltage above regulation.
- C. A lower brake-fluid boiling point inside the hydraulic system.
- D. A direct loss of automatic-transmission line pressure at idle.

16. A thermostat is stuck open. Which operating pattern is most likely during cool-weather driving?

- A. Immediate overheating with a cold upper radiator hose.
- B. Normal warm-up followed by sudden zero oil pressure.
- C. Slow warm-up, weak heater output, and coolant temperature below normal.
- D. High charging voltage that increases as road speed rises.

17. The knock sensor detects combustion knock during a condition where the PCM can respond normally. What ignition change is commonly commanded?

- A. Ignition timing is advanced sharply to increase cylinder pressure.
- B. Injector operation is stopped permanently on every cylinder.
- C. The starter motor is energized to slow the crankshaft.
- D. Ignition timing is retarded to reduce the tendency to knock.

18. Why does an engine-management system use a camshaft position signal in addition to a crankshaft position signal on many engines?

- A. To identify engine phase so cylinder-specific injection and ignition events can be synchronized.
- B. To measure the hydraulic pressure inside every brake caliper.
- C. To determine the electrolyte level inside the battery cells.
- D. To control wheel alignment angles while the vehicle is moving.

19. Fuel pressure is substantially higher than specified, and both banks show large negative fuel trims in closed loop. Which relationship best explains the trims?

- A. Excess pressure reduces injector delivery, so the PCM adds commanded fuel.
- B. Excess pressure increases injector fuel delivery, so the PCM removes commanded fuel.
- C. High pressure prevents the oxygen sensors from detecting mixture changes.
- D. Fuel pressure affects only evaporative emissions and not injector flow.

20. What distinguishes closed-loop fuel control from open-loop fuel control on a conventional gasoline engine?

- A. Closed loop disables all oxygen sensors until the engine is shut off.
- B. Open loop always means the engine is operating at maximum fuel pressure.
- C. Closed loop uses exhaust feedback to correct commanded mixture during operation.
- D. Open loop requires wheel-speed feedback before injection can occur.

21. One cylinder has low compression. Adding a small amount of oil through the spark-plug hole produces almost no increase in compression. Which fault is more likely than worn piston rings?

- A. Piston rings that seal much better when dry than when oiled.
- B. A battery with excessive reserve capacity during cranking.
- C. A leaking valve or another top-end sealing fault.
- D. A wheel-speed sensor with an intermittent air gap.

22. After a timing-belt service, an engine has low power and all cylinders show similarly low compression. Which installation error should be checked first?

- A. Camshaft-to-crankshaft timing is incorrectly indexed.
- B. The brake booster check valve is installed backward.
- C. The alternator output stud is slightly under-torqued.
- D. The rear wheel bearings have excessive preload.

23. A 12-volt circuit has 4 ohms of total resistance. Ignoring source resistance, how much current should flow?

- A. 0.33 ampere.
- B. 3 amperes.
- C. 8 amperes.
- D. 48 amperes.

24. Three resistors of 2 ohms, 4 ohms, and 6 ohms are connected in series. What is their total resistance?

- A. 1 ohm.
- B. 4 ohms.
- C. 48 ohms.
- D. 12 ohms.

25. Two identical 6-ohm resistors are connected in parallel. What is the equivalent resistance of the pair?

- A. 6 ohms.
- B. 12 ohms.
- C. 36 ohms.
- D. 3 ohms.

26. While cranking, a technician measures a 0.8-volt drop between the battery negative post and the starter housing. What does this most strongly indicate?

- A. Normal resistance because ground circuits cannot have voltage drop.
- B. Excessive resistance in the starter ground path.
- C. An open oxygen-sensor heater inside the exhaust system.
- D. A fuel-pressure regulator stuck in the return position.

27. Which test is most effective for finding unwanted resistance in a starter cable that appears intact during a visual inspection?

- A. Measure voltage drop across the cable while the starter is cranking.
- B. Measure cable length with the ignition switch turned off.
- C. Check tire pressure while watching starter current.
- D. Read intake vacuum with the battery disconnected.

28. A fully rested 12-volt lead-acid battery shows an open-circuit voltage consistent with a high state of charge and then maintains normal voltage during a proper load test. What is the best conclusion?

- A. The alternator diodes must be shorted because battery voltage is above zero.
- B. The starter is defective because a charged battery should show no open-circuit voltage.
- C. The battery is charged and is presently capable of supporting the test load.
- D. The battery has an internal open because a healthy battery cannot pass a load test.

29. An alternator charges at normal average DC voltage, but a scope or meter shows unusually high AC ripple at the battery. Which fault is most likely?

- A. A thermostat that is opening before the engine warms.
- B. A failed or open alternator rectifier diode.
- C. A brake caliper piston that retracts too far.
- D. A wheel alignment with slightly excessive caster.

30. A vehicle has an excessive key-off battery drain. The drain drops to an acceptable level when one fuse is removed. What has the fuse removal established?

- A. The battery must have a shorted cell regardless of the drain reading.
- B. The alternator belt is too loose and is causing the key-off current.
- C. The starter motor is mechanically binding only while the key is off.
- D. The unwanted current is flowing through a circuit protected by that fuse.

31. A relay coil clicks when commanded on, but there is no voltage at the relay's switched output terminal even though battery voltage is present at the feed terminal. What is most likely?

- A. The relay coil has no magnetic field because it is clicking normally.
- B. The battery is completely discharged despite voltage at the feed terminal.
- C. The relay contacts are open, burned, or otherwise not conducting.
- D. The engine thermostat has opened and removed power from the relay.

32. Several three-wire sensors share a 5-volt reference. All suddenly read incorrectly, and the reference measures near 0 volts. What is an efficient next check?

- A. Disconnect the sensors one at a time to locate a sensor or branch shorting the reference.
- B. Replace every sensor immediately because shared circuits cannot be tested individually.
- C. Increase battery charging voltage until the reference returns to 5 volts.
- D. Bleed the brake hydraulic system to remove voltage from the reference circuit.

33. Which waveform is typical of a properly operating digital Hall-effect position sensor when a toothed target is moving past it?

- A. A perfectly steady DC voltage with no switching as teeth pass.
- B. A hydraulic pressure pulse measured only in pounds per square inch.
- C. A continuously rising resistance that never returns to its starting value.
- D. A switching square-wave signal between low and high voltage states.

34. A replacement fuse blows immediately each time a switched load is turned on. The correct fuse rating is installed. What fault should be suspected first?

- A. Normal load current because a properly sized fuse should always open once.
- B. A slightly high tire pressure on the same side of the vehicle.
- C. A short to ground on the load side of the fuse or within the load.
- D. An engine vacuum leak that is lowering manifold pressure.

35. Headlamps are noticeably dim at idle and become brighter as engine speed increases. Battery connections are clean and the battery tests good. What system should be tested next?

- A. The charging system for low alternator output at idle.
- B. The cooling system for excessive radiator pressure at idle.
- C. The transmission for excessive clutch clearance in park.
- D. The steering system for too much positive caster.

36. A 5-volt reference is applied across two equal resistors connected in series, and the signal is measured at their midpoint with no other load. What midpoint voltage should be expected?

- A. 0 volts.
- B. 2.5 volts.
- C. 5 volts.
- D. 10 volts.

37. A 60-watt electrical load operates at 12 volts. Ignoring losses, approximately how much current does it draw?

- A. 0.2 ampere.
- B. 12 amperes.
- C. 720 amperes.
- D. 5 amperes.

38. A starter solenoid produces a strong click, battery voltage remains near normal, and a voltage-drop test shows nearly full battery voltage across the solenoid's main contacts during the click. What is most likely?

- A. The solenoid contacts have excessive resistance and are not passing starter current.
- B. The battery has no electrical energy despite maintaining normal voltage.
- C. The ignition switch is not energizing the solenoid even though it clicks.
- D. The alternator is overcharging only while the starter is engaged.

39. A vehicle network has proper power and ground at one module, but that module will not communicate while other modules do. What should be checked before replacing the module?

- A. The engine oil filter for excessive restriction in the lubrication system.
- B. The rear brake shoes for incorrect leading-trailing orientation.
- C. The module's communication circuits and connector terminals for opens, shorts, or poor contact.
- D. The tire tread depth because network voltage depends on tire wear.

40. A technician measures 12 volts on both sides of a closed switch, using chassis ground as the meter reference. Can this test alone prove the switch contacts have low resistance?

- A. Yes; equal voltage to ground always proves zero resistance through the contacts.
- B. No; a voltage-drop test across the switch under load is needed to judge contact resistance.
- C. Yes; any closed switch automatically has no measurable resistance under load.
- D. No; switch resistance can only be measured by checking engine compression.

41. Which sequence correctly lists the four strokes of a conventional four-stroke gasoline engine?

- A. Intake, compression, power, exhaust.
- B. Compression, exhaust, intake, power.
- C. Power, intake, exhaust, compression.
- D. Exhaust, power, compression, intake.

42. Two adjacent cylinders have very low compression, and the cooling system loses coolant with no external leak. Which fault best fits both symptoms?

- A. A weak battery that slows every accessory motor equally.
- B. A restricted cabin air filter that lowers heater airflow.
- C. A worn outer CV joint that clicks during tight turns.
- D. A head-gasket failure between the cylinders and a coolant passage.

43. A cylinder's dry compression is low, but compression rises sharply after a small amount of oil is added through the spark-plug hole. What is most likely worn?

- A. The valve face because oil cannot influence ring sealing.
- B. The radiator cap because it controls cylinder compression directly.
- C. The piston rings or cylinder wall sealing surfaces.
- D. The alternator brushes because they change compression when lubricated.

44. An engine produces a brief blue puff of exhaust after idling for several minutes and then accelerating. Compression is good. Which condition is most likely?

- A. A stuck-open thermostat causing coolant to enter the exhaust.
- B. Worn valve-stem seals or guides allowing oil into the cylinders.
- C. An overcharged battery forcing electrolyte into the intake.
- D. Excessive toe-in causing engine oil to pass the piston rings.

45. A mechanical gauge confirms low engine oil pressure at hot idle. Oil level and viscosity are correct, and pressure increases somewhat with rpm. Which internal condition is a likely cause?

- A. A radiator cap holding slightly more pressure than specified.
- B. Excessive bearing clearance that allows too much oil leakage.
- C. A brake hose with an internal restriction at one wheel.
- D. A tire with reduced tread depth on the drive axle.

46. Why does a pressurized cooling-system cap allow coolant to operate at a higher temperature before boiling?

- A. Increasing pressure lowers the coolant's boiling point below room temperature.
- B. The cap cools the coolant by electrically powering the water pump.
- C. Increasing system pressure raises the coolant's boiling point.
- D. The cap removes all dissolved minerals from the coolant while driving.

47. A water pump's impeller is badly eroded even though the shaft does not leak or wobble. What problem can the damaged impeller cause?

- A. Increased alternator field current with no change in coolant flow.
- B. Higher brake hydraulic pressure at every wheel cylinder.
- C. Permanent reduction of transmission gear ratio during acceleration.
- D. Reduced coolant circulation and overheating under higher heat load.

48. An engine overheats rapidly from a cold start. The radiator remains relatively cool and the upper hose does not become hot even though the engine is very hot. What should be suspected?

- A. A thermostat stuck closed or a major blockage preventing radiator flow.
- B. A thermostat stuck open and circulating too much coolant through the radiator.
- C. An alternator diode that produces excessive AC ripple at idle.
- D. A rear wheel bearing with excessive radial clearance.

49. Which finding most strongly supports combustion leakage into the cooling system rather than a simple external coolant leak?

- A. A small amount of road dirt is found on the outside of the radiator.
- B. Combustion gases are detected in the coolant above the radiator or reservoir.
- C. The battery voltage drops slightly when the headlights are switched on.
- D. The steering wheel is not centered after an alignment adjustment.

50. An infrared temperature check shows several distinct cold sections across a radiator after the thermostat has opened and the engine is hot. What does this pattern suggest?

- A. Uniformly excellent coolant flow through every radiator tube.
- B. A starter motor drawing slightly less current than expected.
- C. Restricted or plugged radiator tubes reducing flow through those sections.
- D. A brake booster holding normal vacuum after shutdown.

51. Excessive crankcase blow-by is measured on an engine with high oil consumption. Which mechanical condition is most consistent with both findings?

- A. A new radiator cap that maintains the specified cooling pressure.
- B. A properly adjusted parking brake cable at the rear wheels.
- C. A clean cabin air filter producing normal blower airflow.
- D. Worn piston rings or cylinders allowing combustion gases past the pistons.

52. A camshaft is installed one tooth retarded from its specified timing position. Which general result is most plausible?

- A. A guaranteed increase in compression and power at every engine speed.
- B. A direct increase in brake-fluid pressure with no pedal input.
- C. Reduced cylinder filling and poor engine performance because valve timing is shifted.
- D. A fixed alternator output of exactly twice battery voltage.

53. An engine has normal oil pressure, but one hydraulic lifter continues to tick after warm-up. Which fault is most likely at that location?

- A. A sticking, restricted, or internally worn hydraulic lifter.
- B. A radiator cap that is holding proper cooling-system pressure.
- C. A wheel-speed sensor producing a correct square-wave signal.
- D. A fully charged battery passing its load test.

54. A cooling system repeatedly pushes coolant into the overflow reservoir soon after a cold start, and bubbles continue before normal operating temperature is reached. What should be investigated?

- A. Normal thermal expansion as the only possible explanation.
- B. Combustion pressure entering the cooling system.
- C. A brake master cylinder bypassing internally.
- D. A front wheel with excessive positive camber.

55. An engine's oil-pressure warning lamp flickers only at hot idle, but a mechanical gauge shows pressure within the manufacturer's acceptable range. What should be checked next?

- A. The piston rings because normal mechanical pressure proves they are broken.
- B. The brake rotors because lamp circuits are controlled by rotor runout.
- C. The differential because gear backlash controls the warning switch.
- D. The oil-pressure switch, sender, and its electrical circuit.

56. A brake pedal feels spongy and improves after being pumped several times. No external leak is visible. What condition should be checked first?

- A. Air trapped in the hydraulic brake system.
- B. Excessive positive caster at the front wheels.
- C. A fully charged battery with low internal resistance.
- D. A thermostat that opens at the specified temperature.

57. The brake pedal is very hard with the engine running, but hydraulic braking still works if the driver pushes unusually hard. What system is most likely at fault?

- A. The power-brake booster or its vacuum/hydraulic assist supply.
- B. The ABS tone ring because it always makes the pedal hard continuously.
- C. The parking-brake cable because it supplies normal pedal assist.
- D. The wheel alignment because caster directly multiplies pedal force.

58. With steady foot pressure applied, the brake pedal slowly sinks toward the floor. No external fluid leak is found. What is a likely cause?

- A. Excessive caster causing the steering knuckle to rotate.
- B. A charged battery holding more than 12 volts open circuit.
- C. Internal bypass leakage inside the brake master cylinder.
- D. An air filter restriction increasing blower motor current.

59. A vehicle pulls left during braking. The right front rotor is much cooler than the left after repeated stops, and tire pressures are equal. What is the best initial interpretation?

- A. The left brake cannot be applying because its rotor is warmer.
- B. Both front brakes are applying equally because temperature is irrelevant.
- C. The rear differential is increasing front-brake pressure on the left side.
- D. The right front brake is contributing less braking force than the left.

60. A rear drum brake locks too easily, and inspection finds brake fluid on the shoe linings from a leaking wheel cylinder. Why can the leak cause abnormal braking?

- A. Brake fluid always lowers friction to exactly zero and cannot cause grabbing.
- B. Fluid-contaminated linings can change friction unpredictably and require replacement after the leak is repaired.
- C. The leak increases tire pressure and therefore locks the wheel mechanically.
- D. Wheel-cylinder leakage automatically increases ABS pump speed at all times.

61. During a low-speed stop, one ABS wheel-speed signal suddenly drops to zero while the other three remain smooth and nearly equal. What should be inspected at that wheel?

- A. The engine thermostat because it directly creates wheel-speed pulses.
- B. The fuel injector balance because it controls ABS speed data.
- C. The alternator belt because it determines only one wheel's speed signal.
- D. The wheel-speed sensor, wiring, air gap, and tone ring or encoder.

62. A driver feels a repeating brake-pedal pulsation during moderate stops, and the frequency changes with vehicle speed. Which condition is commonly responsible?

- A. A thermostat stuck open causing coolant to circulate early.
- B. Brake-rotor thickness variation or lateral runout affecting pad contact.
- C. A battery with high reserve capacity during a load test.
- D. A steering wheel centered correctly after alignment.

63. A front disc brake remains applied after the pedal is released. Opening the caliper bleeder immediately releases the brake. What fault is strongly indicated upstream of the caliper?

- A. A restricted flexible brake hose or another hydraulic restriction trapping pressure.
- B. A worn wheel bearing that can only release pressure through the bleeder.
- C. A discharged battery that holds hydraulic pressure in the caliper.
- D. A loose exhaust shield that blocks the caliper piston mechanically.

64. After rear drum-brake service, the parking brake has excessive lever travel even though the cables move freely. What should be checked first?

- A. Engine oil pressure because it sets parking-brake cable travel.
- B. Alternator ripple because it changes drum diameter electrically.
- C. Rear shoe adjustment and parking-brake mechanism adjustment.
- D. Front caster because it directly shortens rear parking cables.

65. What provides the assist pressure for a hydro-boost brake system?

- A. Compressed air stored only in the tires.
- B. Exhaust pressure taken directly from the catalytic converter.
- C. Battery electrolyte pressure inside the starting battery.
- D. Hydraulic pressure supplied by the power-steering pump or hydraulic assist circuit.

66. Petroleum-based fluid is accidentally added to a brake system designed for glycol-based brake fluid. What damage is most likely?

- A. Rubber seals and hoses can swell or deteriorate, requiring thorough corrective service.
- B. The brake fluid becomes electrically conductive and charges the battery.
- C. The wheel alignment automatically changes to excessive toe-in.
- D. The brake rotors become magnetized and increase ABS frequency.

67. One pad on a floating-caliper disc brake is worn much thinner than its mate, and a caliper slide pin is seized. What is the most likely relationship?

- A. The slide pin controls engine valve timing and therefore pad thickness.
- B. A seized slide guarantees both pads wear at exactly the same rate.
- C. The seized slide prevents the caliper from centering and causes uneven pad loading.
- D. The pin changes tire inflation pressure rather than brake movement.

68. A brake master-cylinder piston is pushed with 100 pounds of force and has an effective area of 0.5 square inch. Ignoring losses, what hydraulic pressure is produced?

- A. 50 psi.
- B. 200 psi.
- C. 100 psi.
- D. 500 psi.

69. A caliper piston has an effective area of 2 square inches and receives 600 psi hydraulic pressure. Ignoring losses, what force acts on the piston?

- A. 300 pounds.
- B. 598 pounds.
- C. 2,400 pounds.
- D. 1,200 pounds.

70. During ABS operation on a slippery surface, why can the driver feel rapid pedal pulsation?

- A. The engine cylinders are changing compression through the brake pedal.
- B. The hydraulic modulator is rapidly changing wheel brake pressure to control slip.
- C. The alternator is reversing battery polarity several times per second.
- D. The steering rack is changing toe angle to stop wheel rotation.

71. Automatic-transmission fluid is very dark and has a strong burned odor. What does this most strongly suggest?

- A. The fluid is unquestionably new because fresh ATF is always dark and burned smelling.
- B. The differential has too much positive caster during cornering.
- C. The transmission has experienced excessive heat and possible friction-material distress.
- D. The battery electrolyte is mixing normally with the transmission fluid.

72. An automatic transmission engages both Drive and Reverse only after a long delay. The fluid level is well below the specified range, and there is no major leak visible during the test. What should be corrected first?

- A. Restore the fluid to the proper level with the specified fluid and recheck operation.
- B. Increase tire pressure because transmission engagement depends on tire volume.
- C. Adjust front camber before checking any transmission hydraulic condition.
- D. Replace the catalytic converter because it controls transmission fluid level.

73. During an upshift, engine speed rises sharply for a moment before the next gear takes hold. What does this flare indicate?

- A. The parking pawl is engaging normally during every upshift.
- B. A clutch, band, or hydraulic apply element is slipping or applying too slowly.
- C. The differential is locking both axle shafts solid on a straight road.
- D. The torque converter is mechanically coupling more strongly than commanded.

74. An automatic-transmission vehicle stalls as it comes to a stop, but restarts normally and drives again until the next stop. Which condition should be considered?

- A. The torque-converter clutch may be remaining applied instead of releasing.
- B. The differential side gears are allowing the wheels to turn at different speeds.
- C. The transmission vent is correctly equalizing case pressure.
- D. The parking pawl is fully disengaged while the selector is in Drive.

75. What is the primary purpose of an open differential during a turn?

- A. Force both drive wheels to rotate at exactly the same speed in every turn.
- B. Disconnect the driveshaft from the transmission whenever steering input begins.
- C. Increase engine compression so the inside wheel can slow down.
- D. Allow the two drive wheels to rotate at different speeds while still transmitting torque.

76. A front-wheel-drive vehicle makes a rhythmic clicking noise from one front corner during tight turns under power. Which component is most likely worn?

- A. The radiator cap because it clicks when cornering pressure increases.
- B. The brake master cylinder because it rotates with the wheel hub.
- C. The outer constant-velocity joint at that wheel.
- D. The engine oil pump because its speed changes only with steering angle.

77. A rear-wheel-drive vehicle has a clunk when changing between Drive and Reverse and a vibration that increases with road speed. Which component should be inspected closely?

- A. The thermostat housing because it changes driveline angle under load.
- B. The driveshaft universal joints and related yokes.
- C. The oxygen sensor heater because it supports driveshaft rotation.
- D. The cabin blower resistor because it controls universal-joint preload.

78. A differential whine is most pronounced during acceleration and changes noticeably when the throttle is released. What does the load sensitivity suggest?

- A. The cabin air filter is changing airflow direction through the differential.
- B. The brake fluid is boiling only when engine torque increases.
- C. The battery is reversing polarity as axle load changes.
- D. The ring-and-pinion mesh, bearing preload, or pinion position should be inspected.

79. Transmission line pressure is low in every forward range and Reverse, and the fluid level is correct. Which common hydraulic source should be investigated?

- A. The transmission pump or main pressure-regulator circuit.
- B. One individual shift solenoid that controls only a single gear change.
- C. The front wheel toe setting because it directly creates hydraulic pressure.
- D. The engine air filter because it meters transmission pump volume.

80. A 20-tooth driving gear turns a 40-tooth driven gear. What is the speed-reduction ratio of the gearset, expressed as driven teeth divided by driving teeth?

- A. 0.5:1.
- B. 1:1.
- C. 2:1.
- D. 20:1.

81. A transmission gear provides a 3:1 reduction and the final drive provides a 4:1 reduction. Ignoring converter slip, what is the overall reduction in that gear?

- A. 0.75:1.
- B. 7:1.
- C. 1.33:1.
- D. 12:1.

82. A vehicle has a vibration only during acceleration that largely disappears when the throttle is released at the same road speed. Which driveline condition is plausible?

- A. A tire imbalance that must disappear whenever engine torque is reduced.
- B. An inner CV joint or driveline angle problem that becomes pronounced under torque.
- C. A radiator restriction that changes only with axle torque.

D. A headlamp ground fault that alters driveshaft balance under load.

83. A tire tread shows feathering across the ribs, with each rib smooth on one edge and sharp on the other. Which alignment setting is most often associated with this pattern?

- A. Incorrect toe.
- B. Correct caster within specification.
- C. Correct steering-axis inclination.
- D. Normal ride height with equal springs.

84. A front tire is worn mainly on its inner shoulder, tire pressure is correct, and toe is within specification. Which alignment condition is a likely cause?

- A. Excessive positive camber at that wheel.
- B. Correct caster with no side-to-side difference.
- C. Excessive negative camber at that wheel.
- D. A normal steering-axis inclination angle.

85. A vehicle pulls on a level road after tire problems are ruled out. All other alignment angles are acceptable, but left caster is substantially less positive than right caster. Which direction will the vehicle tend to pull?

- A. Toward the right side with the more positive caster in every case.
- B. Straight ahead because caster differences cannot influence pull.
- C. Alternately left and right once per wheel revolution.
- D. Toward the left side with the less positive caster.

86. Which alignment angle most directly contributes to steering return-to-center and straight-line directional stability?

- A. Toe-out on turns only.

- B. Wheel offset only.
- C. Positive caster.
- D. Tire tread depth only.

87. Before checking ball-joint looseness, why must a technician know whether the joint is load-carrying or follower type?

- A. The suspension must be supported at the correct point so joint load is relieved for an accurate play check.
- B. Every ball joint is checked identically with the vehicle weight fully on the joint.
- C. Ball-joint play can only be measured with the engine running at high rpm.
- D. The joint type matters only for brake-fluid bleeding sequence.

88. After a vehicle is pushed down firmly at one corner and released, that corner continues to oscillate several times. What component is most suspect?

- A. The battery has excessive cold-cranking capacity.
- B. The shock absorber or strut has insufficient damping.
- C. The engine thermostat is opening at the correct temperature.
- D. The brake fluid has the specified boiling point.

89. A vehicle sits noticeably lower on the left rear than on the right rear before alignment. What should be done before final alignment adjustments?

- A. Correct the ride-height or spring problem first.
- B. Set toe immediately and ignore ride height because angles cannot change with suspension position.
- C. Increase alternator voltage until the body height becomes equal.
- D. Bleed the brake system because brake fluid establishes static ride height.

90. A front wheel bearing produces a growling noise that becomes louder when the vehicle is steered left and quieter when steered right. What does the change with steering help indicate?

- A. The alternator is changing frequency because steering always drives the charging system.
- B. The thermostat is opening and closing with each steering input.
- C. Cornering load is changing bearing load, helping identify the noisy side.
- D. The brake fluid is changing viscosity instantly with steering direction.

91. A tire is consistently underinflated and develops excessive wear on both outer shoulders. Why does low pressure create this pattern?

- A. Low pressure always wears only the exact center of the tread first.
- B. Low pressure increases positive caster equally on both front wheels.
- C. Low pressure causes the wheel bearing to reverse its rolling direction.
- D. The tread center is supported less effectively, increasing loading toward both shoulders.

92. The distance between the front edges of a pair of tires is 60.00 inches, and the distance between the rear edges at the same height is 60.125 inches. What toe condition do these measurements describe?

- A. 0.125 inch of toe-out.
- B. 0.125 inch of toe-in.
- C. 0.250 inch of toe-out.
- D. Exactly zero toe.

93. Before measuring resistance of a component with a digital ohmmeter, what should normally be done?

- A. Apply maximum battery voltage through the meter's resistance terminals.
- B. De-energize the circuit and isolate the component as needed from parallel paths.
- C. Keep the circuit powered so the ohmmeter can add its own test current safely.
- D. Connect the meter in series with the starter while it is cranking.

94. How are a voltmeter and an ammeter normally connected when testing an operating circuit?

- A. A voltmeter is connected in parallel; an ammeter is connected in series with the current path.
- B. Both meters are always connected in parallel with the battery regardless of the test.
- C. Both meters are always connected in series with the load regardless of rating.
- D. A voltmeter is connected in series and an ammeter is connected across the load.

95. An intermittent crank-sensor dropout occurs for only a few milliseconds and cannot be captured reliably by a standard numerical meter display. Which tool is most useful?

- A. A tire tread-depth gauge because it records electrical events over time.
- B. A cooling-system pressure cap tester connected to the sensor wire.
- C. A brake shoe gauge used while the engine is cranking.
- D. A digital storage oscilloscope capable of recording the signal waveform.

96. A vacuum gauge needle flutters rapidly at idle on an engine with one cylinder suspected of a valve problem. What makes the vacuum gauge useful here?

- A. The gauge directly measures battery state of charge through the intake manifold.
- B. The gauge converts hydraulic brake pressure into ignition timing.
- C. Valve sealing or motion faults can create repeated manifold-vacuum disturbances synchronized with engine operation.
- D. The gauge measures wheel alignment while the vehicle is stationary.

97. Why should a click-type torque wrench generally not be used as a breaker bar for loosening stubborn fasteners?

- A. A torque wrench cannot apply any rotational force in either direction.
- B. Excessive reverse or shock loading can damage or alter the wrench's calibration mechanism.
- C. Using it to loosen fasteners always increases engine compression.
- D. The wrench automatically changes a bolt into a left-hand thread.

98. A vehicle must be raised so a technician can work underneath it. Which practice is essential before entering the work area below the vehicle?

- A. Rely only on a hydraulic floor jack because its pressure cannot decrease unexpectedly.
- B. Place support stands under any thin sheet-metal panel that is easiest to reach.
- C. Support the vehicle at approved lift or jack points with equipment rated for the load and verify stability.
- D. Leave the vehicle partially supported by an unsecured rolling jack while working underneath.

99. When disconnecting a conventional 12-volt vehicle battery for service, which terminal is normally disconnected first to reduce accidental short-circuit risk?

- A. The positive terminal while a metal wrench touches body ground.
- B. Either terminal only after bridging the posts with a jumper wire.
- C. The starter output terminal while the battery remains connected.
- D. The negative terminal.

100. During routine maintenance, a technician discovers a fresh oil spill on the shop floor beside the vehicle. What is the best immediate response?

- A. Stop the spread, use the appropriate absorbent or spill procedure, and clean the walking surface promptly.
- B. Leave the spill until the repair is finished so its source can be ignored.
- C. Wash the oil into the nearest floor drain with a large amount of water.
- D. Cover the spill with loose paper and continue walking through the area.

Practice Exam 8: Answer Key and Explanations

1. C — EGR flow is normally minimized or eliminated at idle because exhaust dilution can destabilize combustion at very low airflow. If blocking the EGR passage immediately restores a smooth idle, unwanted EGR flow is strongly indicated. A closed tank vent or early thermostat would not react instantly to blocking the EGR passage, and catalyst oxygen storage would not create this pattern.

2. A — An intake leak adds unmetered air, and its effect is proportionally greatest when normal airflow is low at idle. The control module responds by adding fuel, producing positive trim. At higher rpm the

leak becomes a smaller percentage of total airflow, so trims improve. Comparing commanded values with actual sensor response helps separate a control problem from a mechanical one.

3. B — When a MAF sensor underreports airflow, the PCM initially calculates less fuel than the engine actually needs. The oxygen sensor then detects excess oxygen from the resulting lean mixture, and closed-loop control adds fuel. That appears as positive fuel trim. Negative trim would indicate excess fuel, and modern fuel strategy directly depends on airflow or an equivalent load calculation.

4. D — A restricted exhaust can allow acceptable flow at idle but create increasing backpressure as exhaust volume rises. Manifold vacuum may begin normally and then fall during a sustained higher-speed test as the engine struggles to expel gases. Leaking injectors would affect mixture and restart behavior, while battery resistance and oil viscosity do not produce this classic vacuum pattern.

5. C — Ignition voltage demand rises as cylinder pressure increases, so a marginal plug, excessive gap, damaged boot, or weak coil may fire normally at idle yet fail under load. Even compression and correct fuel pressure make a mechanical or supply problem less likely. Thermostat, cabin-filter, and fuel-cap faults do not create a load-dependent single combustion misfire.

6. D — Injector balance compares how much each energized injector lowers rail pressure during an equal pulse. A smaller drop means less fuel passed through that injector, which points to restriction or reduced opening. Comparing commanded values with actual sensor response helps separate a control problem from a mechanical one. Verify the result with the appropriate service procedure before completing the repair.

7. A — Many thermistor temperature circuits interpret very high sensor resistance as an extremely cold temperature. An open ECT circuit can therefore drive the displayed value toward the cold end of the scale even when the engine is warm. A signal short to ground often drives the reading the opposite way. Injector and catalyst faults do not directly create this ECT pattern.

8. B — A conventional narrowband zirconia oxygen sensor produces a higher signal voltage when exhaust oxygen is low, which corresponds to a rich mixture. Lean exhaust with more oxygen produces a lower signal. Therefore a controlled richening test should make the voltage rise. A fixed signal suggests a sensor, wiring, or control problem rather than normal mixture response.

9. C — MAP measures absolute pressure, not vacuum directly. When manifold vacuum is high, absolute pressure is low; when vacuum falls, absolute pressure rises toward atmospheric pressure. Therefore a high kPa reading at idle represents low vacuum and an unexpectedly high load indication. The sensor does not measure fuel pressure, and it cannot indicate zero atmospheric pressure under ordinary operation.

10. D — The PCM needs crankshaft position information to recognize engine speed and schedule ignition and injection. If the engine is physically cranking but the scan tool remains at 0 rpm, the crank signal or its circuit is a primary suspect. Oxygen heater, EVAP vent, and A/C pressure faults do not normally erase cranking rpm information or the basic ignition trigger.

11. B — A leaking injector can allow rail pressure to bleed down after shutdown while wetting the affected cylinder. The rail hold test localizes the loss to that injector, making it a stronger explanation than a pump check valve or regulator. Thermostat, EGR blockage, and charging ripple do not directly release stored fuel pressure into one cylinder after the engine stops.

12. A — Hydrocarbons are fuel molecules that pass through combustion without being fully oxidized. An ignition misfire leaves much of the air-fuel charge unburned, so HC rises sharply. Nitrogen is not measured as HC, condensed water is a separate exhaust constituent, and catalyst oxygen storage is not what a hydrocarbon channel directly reports.

13. B — Recirculated exhaust is largely inert relative to the fresh charge and absorbs heat during combustion. This lowers peak combustion temperature, which suppresses formation of nitrogen oxides. EGR is not a fuel-pressure device and is not intended to enrich every cold start. Too much EGR at the wrong time can instead cause roughness or stalling.

14. D — A purge valve stuck open can pull a large amount of stored fuel vapor from the canister into the intake, especially after refueling. That can make the mixture temporarily too rich and cause difficult restarting or rough idle. The condition concerns vapor flow, not alternator field current or transmission pressure, and it is the opposite of a fully isolated canister.

15. A — The PCV system draws blow-by gases and vapor from the crankcase. If flow is blocked, pressure can build as blow-by continues, promoting oil leaks through gaskets and seals and allowing sludge-forming vapors to remain. Alternator regulation, brake-fluid boiling point, and transmission line pressure are controlled by unrelated systems and are not direct results of blocked crankcase ventilation.

16. C — A thermostat stuck open allows coolant to circulate through the radiator before the engine reaches normal operating temperature. In cold weather, the engine may warm slowly, run cooler than intended, and provide poor cabin heat. A stuck-closed thermostat is associated with rapid overheating, while oil pressure and charging voltage are not controlled by the thermostat.

17. D — Detonation is promoted by excessive pressure and temperature before the flame front completes normal combustion. Retarding spark reduces peak pressure at the critical point and is a common knock-control response. Advancing timing usually increases knock tendency. Permanently disabling all injectors or engaging the starter is not a normal closed-loop knock response during a running engine.

18. A — The crank signal provides rotational speed and position, but it may not identify which stroke a particular cylinder is on. Camshaft position supplies phase information, allowing sequential fuel injection, coil control, and variable-valve-timing strategies to be synchronized correctly. Brake pressure, battery electrolyte, and wheel alignment are unrelated to camshaft phase sensing.

19. B — For a given injector pulse width, a larger pressure difference across the injector generally increases fuel flow. The mixture becomes richer than commanded, the oxygen sensors report the rich result, and the PCM shortens fuel delivery, producing negative trim. Positive trim would indicate fuel being added. Fuel pressure directly influences injector delivery rather than only the EVAP system.

20. C — In closed loop, the control module uses oxygen-sensor or air-fuel-ratio feedback to adjust fueling around the commanded target. Open loop relies on programmed maps and other inputs without using that feedback for correction. Open loop does not mean maximum fuel pressure, and wheel-speed information is not a prerequisite for basic engine fuel injection.

21. C — Oil added during a wet compression test temporarily helps seal the piston rings. If compression rises substantially, ring or cylinder wear becomes more likely. Little or no improvement points instead toward leakage past a valve, head gasket, or another area not sealed by the added oil. Battery capacity and wheel-speed sensing do not determine one cylinder's compression.

22. A — Uniformly low compression after timing work points to valve events occurring at the wrong crankshaft positions. A belt installed one or more teeth out of time can reduce cylinder filling and effective compression across the engine. The timing relationship should be verified before deeper teardown. Brake-booster, alternator, and wheel-bearing faults cannot lower compression evenly on every cylinder.

23. B — Ohm's law states that current equals voltage divided by resistance. Dividing 12 volts by 4 ohms gives 3 amperes. The 48-ampere choice comes from multiplying instead of dividing, while 0.33 and 8 amperes do not satisfy the stated relationship. This calculation assumes the resistance value represents the complete energized circuit.

24. D — Series resistances add directly because the same current must pass through each resistor in sequence. Adding 2, 4, and 6 ohms gives 12 ohms. A one-ohm result would require a different parallel network, 4 ohms simply repeats one component, and 48 ohms incorrectly multiplies the values rather than adding them.

25. D — Two equal resistors in parallel have an equivalent resistance equal to half the resistance of either branch. Half of 6 ohms is 3 ohms. The total must also be lower than the resistance of either individual branch, which rules out 6, 12, and 36 ohms. Parallel current paths reduce overall resistance.

26. B — A ground cable and its connections should lose very little voltage while carrying starter current. A relatively large drop between the battery negative post and starter housing means resistance exists somewhere in that return path, such as corrosion or a poor connection. Ground circuits can have voltage drop under load, and oxygen-sensor or fuel-regulator faults do not create this measurement.

27. A — A cable may pass an unloaded continuity test yet develop excessive resistance when hundreds of amperes flow. Measuring voltage drop across the cable during cranking tests it under the condition where the fault occurs. Cable length, tire pressure, and intake vacuum do not reveal resistance at corroded terminals or damaged conductors carrying starter current.

28. C — An open-circuit voltage consistent with a high state of charge shows the battery is charged, while a successful load test shows it can maintain usable voltage under demand. That does not prove every charging or starting component is good, but it makes a weak battery less likely. The other choices contradict the stated successful battery tests rather than explaining them.

29. B — The alternator generates alternating current internally and uses rectifier diodes to produce DC output. A failed diode can leave a pronounced AC component or ripple even when average charging voltage appears plausible. Thermostat, caliper, and caster faults do not create an electrical ripple waveform at the battery. Ripple testing is therefore useful for identifying rectifier problems.

30. D — Removing a fuse opens the branch circuits it supplies. If the parasitic current immediately falls, the excessive draw lies somewhere in that fused branch or in a device supplied by it. The next step is to identify loads on that circuit and determine which remains active. The result does not by itself prove a battery, belt, or starter fault.

31. C — An audible click indicates the relay armature is moving, so the control side is at least functioning enough to energize the coil. With battery voltage at the contact feed but none at the switched output, the contact path is not passing current. Burned contacts or an internal open are likely.

32. A — A shorted sensor or rubbed-through branch can pull a shared 5-volt reference low and affect every device on that supply. Disconnecting branches one at a time can reveal when the reference recovers, identifying the loaded branch. Replacing all sensors is unnecessary without isolation, and charging voltage or brake bleeding does not repair a reference-circuit short.

33. D — A Hall-effect digital sensor typically switches an electronic output on and off as the target changes the magnetic field, producing a square-wave style signal. A steady signal would not encode tooth passage. Hydraulic pressure is a different quantity, and a continuously rising resistance is not the expected digital output of a functioning position sensor.

34. C — A properly sized fuse opens when current exceeds its safe value. If it blows immediately whenever the load is commanded, a low-resistance path to ground or an internally shorted component is a primary suspect. Installing a larger fuse would remove protection rather than repair the fault. Tire pressure and intake vacuum do not cause a branch fuse to open.

35. A — Headlamp brightness changing directly with engine speed suggests system voltage is changing with alternator output. With a known-good battery and clean connections, charging voltage and current at idle should be checked. A weak alternator, slipping belt, or control problem may undercharge at low speed. Cooling pressure, transmission clutch clearance, and caster do not determine lamp brightness.

36. B — Equal series resistors divide the applied voltage equally when the midpoint is unloaded. Half of the 5-volt reference appears across each resistor, so the midpoint measures 2.5 volts relative to ground. Zero or 5 volts would indicate a short or open arrangement rather than equal division, and the passive divider cannot create 10 volts.

37. D — Electrical power equals voltage multiplied by current. Rearranging gives current equals power divided by voltage, so 60 watts divided by 12 volts equals 5 amperes. Multiplying 60 by 12 produces the unrealistic 720 value, while 0.2 and 12 amperes do not satisfy the power relationship for the stated load. This confirms the diagnostic relationship.

38. A — Nearly full battery voltage measured across closed high-current contacts means most of the source voltage is being lost at those contacts rather than delivered to the starter motor. That indicates an

open or very high-resistance contact path. The click confirms coil actuation, and maintained battery voltage argues against a completely dead battery. Alternator overcharge is not the cause during cranking.

39. C — Once module power and ground are verified, loss of communication can still result from an open, shorted, or corroded network connection at that module. Checking terminals and bus integrity avoids condemning a module that cannot hear or transmit. Oil restriction, brake-shoe orientation, and tire tread do not create an isolated communication fault at an otherwise powered module.

40. B — Seeing source voltage on both sides proves that voltage is present, but it does not show how much is lost across the contacts while current flows. Measuring directly from one side of the closed switch to the other under load reveals contact voltage drop. A high-resistance switch can still show nearly the same unloaded voltage to ground on both terminals.

41. A — During the intake stroke the piston draws in the charge, then the compression stroke prepares it for ignition. Combustion drives the power stroke, and the exhaust stroke pushes spent gases out. The sequence repeats every two crankshaft revolutions. The alternative orders place valve events and combustion in physically incorrect positions within the operating cycle.

42. D — A failed head gasket can leak between neighboring cylinders and also open a path into a coolant passage. That produces low compression on adjacent cylinders together with unexplained coolant loss, sometimes accompanied by bubbles or combustion gases in the cooling system. Battery, cabin-filter, and CV-joint faults cannot connect cylinder sealing loss with internal coolant loss.

43. C — Oil added for a wet compression test temporarily improves the seal between the piston rings and cylinder wall. A substantial increase therefore points toward ring or cylinder wear. A leaking valve or head gasket usually changes little because the oil does not seal those paths. Radiator caps and alternator brushes have no direct effect on cylinder compression.

44. B — During prolonged idle, high intake vacuum can draw oil past worn valve guides or stem seals. That oil burns when throttle is opened, producing a brief blue puff even when ring sealing and compression remain good. Thermostat operation, battery state, and wheel alignment do not provide a path for engine oil to enter the combustion chambers in this pattern.

45. B — Oil pressure depends on pump flow meeting resistance within the lubrication clearances. Excessively worn bearings allow more oil to escape, reducing pressure most noticeably when the oil is hot and thin at idle. Correct level and viscosity remove common external causes. Radiator caps, brake hoses, and tire tread cannot lower a verified mechanical oil-pressure reading.

46. C — Boiling point increases as pressure above a liquid increases. A properly rated cooling-system cap therefore raises system pressure and allows the coolant to absorb more heat before boiling. The cap does not electrically drive the water pump or purify coolant. Using an incorrect cap can create cooling-system problems, so the specified pressure rating matters.

47. D — The impeller is the part that actually moves coolant through the engine and radiator. Severe erosion can reduce pumping efficiency even if the bearing and seal appear normal. Under greater engine

load, inadequate circulation may allow temperature to climb. Alternator field current, brake pressure, and transmission ratio are unrelated to the water pump's hydraulic function.

48. A — If the engine becomes hot while the radiator and upper hose remain comparatively cool, hot coolant is not reaching the radiator. A thermostat stuck closed is a common cause, although a major blockage can create a similar result. A stuck-open thermostat usually causes slow warm-up, while alternator and wheel-bearing faults do not interrupt coolant flow.

49. B — A chemical block test or gas analyzer can detect combustion gases that have crossed from a cylinder into the cooling system through a failed gasket, cracked head, or similar defect. External leaks do not introduce exhaust gases into the coolant. Road dirt, headlamp voltage change, and steering-wheel position provide no evidence of a cylinder-to-coolant leakage path.

50. C — Once hot coolant is circulating, a healthy radiator should show a reasonably progressive temperature change across its active core. Localized cold sections can indicate tubes with little or no coolant flow because of internal restriction. Uniform flow would not normally create isolated cold bands. Starter-current and brake-booster tests are unrelated to radiator heat distribution.

51. D — Blow-by occurs when combustion gases leak past the piston rings into the crankcase. Worn rings or cylinder walls increase that leakage and can also allow oil to reach the combustion chamber, raising oil consumption. Cooling pressure, parking-brake adjustment, and cabin airflow do not create a combustion-to-crankcase leakage path or directly increase engine oil consumption.

52. C — Valve timing determines when the intake and exhaust valves open and close relative to piston motion. A one-tooth timing error can reduce volumetric efficiency, alter manifold vacuum, lower power, and sometimes affect compression readings. The exact symptoms depend on engine design, but brake pressure and alternator regulation are unrelated to camshaft indexing.

53. A — Hydraulic lifters use pressurized engine oil internally to maintain valve-train clearance. If system oil pressure is normal but one lifter continues to tick, a localized restriction, sticking plunger, wear, or oil-supply problem at that lifter is likely. A cooling cap, wheel-speed signal, and healthy battery do not create a single persistent valvetrain tick.

54. B — Continuous bubbling and early coolant displacement before normal warm-up can indicate cylinder pressure entering the cooling system through a head-gasket or casting defect. Normal thermal expansion occurs as coolant heats, but persistent bubbles from a cold start deserve further testing. Master-cylinder bypass and wheel camber cannot pressurize the engine cooling system.

55. D — A mechanical gauge directly confirms actual oil pressure. If that pressure is acceptable while the warning lamp flickers, the indication circuit becomes the logical next target: sender calibration, switch contacts, wiring, or connection quality. Internal engine teardown is not justified by a normal mechanical reading, and brake or differential conditions do not operate the oil-pressure lamp.

56. A — Air compresses much more than brake fluid, so trapped air can produce a soft or spongy pedal and additional pedal travel. Pumping may temporarily improve the feel by compressing the air and moving components. Caster, battery condition, and thermostat operation do not change hydraulic fluid

compressibility. Brake diagnosis should compare wheel-to-wheel behavior and confirm hydraulic operation before parts are replaced.

57. A — A brake booster reduces the pedal force needed to generate hydraulic pressure. If assist is lost, the base hydraulic brakes can still operate, but the pedal feels hard and requires much greater effort. ABS wheel-speed hardware does not provide routine pedal assist, and parking-brake cables or alignment angles cannot multiply service-brake pedal force.

58. C — If the pedal continues to sink under constant pressure without an external leak, brake fluid may be bypassing the master-cylinder seals internally from the high-pressure side. That prevents the cylinder from holding pressure even though fluid does not leave the system. Caster, battery state, and cabin airflow do not create a slowly sinking hydraulic brake pedal.

59. D — Braking converts kinetic energy to heat, so a significantly cooler rotor after repeated comparable stops suggests that corner is doing less work. Reduced right-front braking lets the stronger left-front brake pull the vehicle left. Temperature alone is not final proof, but it directs inspection toward the right caliper, hose, pads, and hydraulic supply rather than assuming equal operation.

60. B — Brake fluid on friction material can alter the coefficient of friction and lead to grabbing, reduced braking, or inconsistent operation. The leaking wheel cylinder must be repaired, and contaminated shoes are normally replaced rather than trusted after cleaning. The effect is not a fixed zero-friction condition, and tire pressure or ABS pump speed does not explain the contaminated drum behavior.

61. D — ABS compares wheel-speed signals to detect impending lockup. If one signal drops out while the wheel is still rotating and the others remain normal, the fault is localized to that sensor path or its target. Wiring damage, excessive gap, rust, a cracked tone ring, or encoder damage can produce the dropout.

62. B — Rotor thickness variation or runout can move the caliper piston or change braking force once per wheel rotation, creating a pedal pulsation whose frequency follows vehicle speed. The rotor and hub should be measured and inspected for mounting errors or corrosion. Thermostat, battery capacity, and steering-wheel centering do not create a speed-related hydraulic pedal pulse.

63. A — If opening the bleeder releases the brake, fluid pressure was trapped at the caliper. A deteriorated flexible hose can act like a one-way valve, allowing pressure to apply the brake but restricting return flow. Mechanical caliper binding would not normally release simply by venting pressure. Battery condition and exhaust shields do not trap hydraulic pressure in the brake line.

64. C — A parking brake on drum-equipped rear brakes depends on the shoes starting close enough to the drum and on correct cable or lever adjustment. Excessive shoe clearance can create long parking-brake travel even when the cable slides freely. Oil pressure, alternator ripple, and front caster cannot change the mechanical clearance between rear shoes and drums.

65. D — Hydro-boost systems use hydraulic pressure, commonly from the power-steering pump, to multiply driver pedal force. This differs from vacuum boosters, which use manifold vacuum or a

vacuum pump. Tire air, exhaust pressure, and battery electrolyte are not sources of service-brake assist. A hydraulic supply problem can therefore affect both steering assist and braking assist on shared systems.

66. A — Brake-system elastomers are selected for compatibility with the specified fluid. Petroleum contamination can swell and damage seals and hoses, causing binding, leaks, or component failure. Simply removing fluid from the reservoir may not eliminate contamination throughout the system. Battery charging, alignment angles, and rotor magnetism are unrelated to this chemical compatibility problem.

67. C — A floating caliper must slide so clamping force can be shared across both pads. A seized guide or slide can prevent proper centering, keep one pad in contact, or reduce application of the opposite pad, producing uneven wear. The slide does not control valve timing or tire pressure, and seizure makes equal pad wear less rather than more likely.

68. B — Hydraulic pressure equals applied force divided by piston area. Dividing 100 pounds by 0.5 square inch gives 200 pounds per square inch. The 50-psi choice multiplies force by area, while 100 psi ignores the area change and 500 psi does not follow the stated relationship. Real systems also include mechanical pedal leverage before the master cylinder.

69. D — Hydraulic force equals pressure multiplied by piston area. Multiplying 600 pounds per square inch by 2 square inches gives 1,200 pounds of force. Dividing pressure by area gives the incorrect 300-pound choice, while 598 and 2,400 pounds do not match the basic pressure-area relationship stated in the problem. Verify the result with the appropriate service procedure before completing the repair.

70. B — ABS uses solenoid valves and, when needed, a pump to hold, decrease, and reapply hydraulic pressure as wheel slip changes. Those rapid pressure changes can be transmitted back through the pedal as pulsation or vibration. The sensation is a normal result of modulation, not changing engine compression, battery polarity, or steering toe.

71. C — Dark, burned-smelling ATF indicates oxidation from excessive temperature and may accompany clutch or band friction damage. Fluid condition alone does not identify the exact failed part, but it is an important warning that overheating or slipping has occurred. Alignment caster and battery electrolyte cannot create normal ATF discoloration, and fresh fluid should not smell burned.

72. A — Low fluid can let the pump draw air and delay hydraulic pressure buildup, affecting engagement in multiple ranges. The first step is to correct the level using the specified fluid and investigate why it became low, then retest. Tire pressure, camber, and catalyst condition do not establish the transmission's hydraulic fluid supply.

73. B — A flare occurs when the releasing element lets go before the next clutch or band develops enough holding capacity. Engine speed rises because the transmission momentarily loses the intended ratio. Low pressure, worn friction material, or control timing can cause it. The operating condition that changes the noise or slip often identifies which rotating member is actually loaded.

74. A — If the torque-converter clutch remains locked as vehicle speed falls to zero, the mechanical connection can drag the engine down much like stopping a manual-transmission vehicle without depressing the clutch. Restarting and repeating the symptom supports that possibility. Normal differential action, venting, and a released parking pawl are necessary functions and do not explain stop-related stalling.

75. D — During a turn, the outside wheel travels a longer path than the inside wheel and therefore must rotate faster. An open differential allows that speed difference while transmitting torque through the final drive. Locking both wheels to identical speed would cause tire scrub on dry pavement. Engine compression and driveshaft disconnection are not the differential's normal turning function.

76. C — Outer CV joints operate through large articulation angles while transmitting drive torque. Wear in the joint tracks commonly produces a repeating click or pop during tight powered turns. Inner joints more often cause shudder under acceleration. Radiator caps, master cylinders, and oil pumps do not rotate with the steering knuckle in a way that creates this corner-specific driveline click.

77. B — Worn universal joints can develop rotational play that produces a clunk when torque direction reverses. Binding, looseness, or lost balance at the joint can also create a road-speed-related vibration. The driveshaft and yokes should be checked for play, stiffness, missing weights, and damage. Thermostat, oxygen-heater, and blower-resistor faults do not create driveline lash.

78. D — Ring-and-pinion tooth contact and bearing loads change between drive and coast conditions. A whine that changes with throttle therefore points toward gear mesh, pinion depth, backlash, or bearing preload rather than a simple tire noise. Inspection of lubricant and contact pattern can help. Cabin airflow, brake-fluid boiling, and battery polarity are unrelated to differential load direction.

79. A — A pressure problem present in all ranges points toward a source shared by the entire hydraulic system, such as pump output, inlet leakage, filter restriction, or the main regulator. A single shift solenoid usually affects particular apply circuits rather than every range. Wheel toe and engine air filtration do not generate automatic-transmission line pressure.

80. C — The stated ratio is driven teeth divided by driving teeth. Dividing 40 by 20 gives 2, so the driven gear turns once for every two revolutions of the driving gear, ignoring other effects. The 0.5 value reverses the ratio, 1:1 would require equal tooth counts, and 20:1 does not follow the provided counts.

81. D — Overall reduction is the product of the individual ratios in series. Multiplying the 3:1 transmission ratio by the 4:1 final-drive ratio gives 12:1. Adding them produces the incorrect 7:1 choice, while 0.75 and 1.33 result from dividing the ratios. The engine therefore turns twelve times for one axle rotation in this simplified case.

82. B — A vibration that depends strongly on drive torque rather than road speed alone can come from an inner CV joint, worn mount, universal joint, or driveline-angle issue that shifts under load. Tire imbalance usually remains tied to wheel speed regardless of throttle. Radiator restriction and headlamp grounding do not change rotating driveline geometry as torque is applied.

83. A — Toe error makes the tires scrub sideways as they roll, producing a sawtooth or feathered feel across the tread ribs. The direction of feathering can help indicate toe-in or toe-out, though other looseness should also be checked. Caster and steering-axis inclination primarily affect directional stability and geometry rather than creating the classic cross-tread feathering pattern.

84. C — Negative camber tilts the top of the tire inward. Too much negative camber concentrates load toward the inner shoulder and can create inside-edge wear when toe and pressure are otherwise correct. Excessive positive camber tends to wear the outer shoulder. Caster and steering-axis inclination influence steering behavior but are not the primary static cause described here.

85. D — A vehicle generally tends to pull toward the side with less positive caster, assuming road crown, tires, and other angles are controlled. The side-to-side difference affects directional stability and steering effort. That makes the lower-caster left side the likely pull direction. Caster is not a once-per-revolution effect and can contribute to pull despite otherwise acceptable geometry.

86. C — Positive caster places the steering axis so vehicle weight and tire forces tend to trail the contact patch behind the steering-axis intersection. That creates a self-centering effect and improves directional stability. Toe and wheel offset influence other aspects of handling and wear, while tread depth affects traction, but positive caster is the principal alignment angle associated with returnability.

87. A — Suspension design determines whether vehicle weight loads a particular ball joint. To check looseness correctly, the suspension may need support under the control arm or the frame so the joint is unloaded as specified. Using the wrong support point can hide or exaggerate play. Engine speed and brake bleeding have no role in the mechanical joint-clearance test.

88. B — Springs support vehicle weight and store energy, while shocks or struts damp the spring's oscillation. If a corner continues bouncing after being released, damping is insufficient and the damper should be inspected along with mounts and related suspension parts. Battery capacity, thermostat operation, and brake-fluid boiling point do not control body oscillation after a bounce test.

89. A — Ride height changes suspension-arm position and can alter camber, caster, and toe on many designs. Aligning a vehicle while one corner is abnormally low may produce settings that change after the spring or support problem is repaired. The ride-height cause should be corrected first. Charging voltage and brake bleeding do not restore static suspension height.

90. C — Steering transfers vehicle load from side to side. A worn hub bearing often becomes louder when the affected bearing is loaded and quieter when unloaded, so controlled lane changes can help isolate the side. The exact side interpretation depends on vehicle and bearing design, but the load sensitivity is diagnostically useful.

91. D — Underinflation lets the tire carcass flex more and can reduce effective support across the tread center, concentrating wear toward both shoulders. It also increases heat generation and rolling resistance. Center wear is more commonly associated with overinflation on many tires. Caster and bearing rotation are not mechanically reversed by ordinary changes in tire inflation pressure.

92. B — Toe-in means the front edges of the tires are closer together than the rear edges. The rear measurement exceeds the front measurement by 60.125 minus 60.00, or 0.125 inch. Therefore the pair has one-eighth inch of toe-in. Toe-out would require the front measurement to be larger, and equal measurements would indicate zero toe.

93. B — An ohmmeter supplies a small internal test current and is intended for de-energized circuits. External voltage can damage the meter or create false readings. Parallel circuit paths can also change the measured resistance, so isolation may be necessary. Powered-circuit diagnosis should use voltage or current methods instead of applying an ohmmeter across an energized component.

94. A — A voltmeter measures potential difference between two points, so it is placed in parallel across the section being tested. An ammeter measures the current flowing through a path, so the circuit current must pass through the meter in series. Connecting an ammeter directly across a source can create a damaging short if the meter is not protected.

95. D — An oscilloscope displays signal voltage versus time and can capture brief dropouts, noise, missing pulses, or distorted waveforms that a slowly updating numerical display may miss. Recording capability is especially useful for intermittent faults. Tread-depth, cooling-pressure, and brake gauges measure unrelated physical quantities and cannot characterize a millisecond electrical position-sensor signal.

96. C — Intake manifold vacuum reflects the pumping action of all cylinders. A valve that sticks, leaks, or moves abnormally can create recurring pressure disturbances as that cylinder cycles, producing a fluttering needle. The pattern is not a final diagnosis by itself, but it can guide compression, leak-down, or valvetrain checks. Battery, brake, and alignment quantities are unrelated.

97. B — A torque wrench is a measuring tool designed to apply controlled tightening torque within its rated range. Using it as a breaker bar can subject the internal mechanism to loads or impacts that affect calibration or cause damage. A separate breaker bar is better for loosening tight fasteners. The wrench still applies rotation, but its measurement accuracy must be protected.

98. C — Working under a raised vehicle requires stable mechanical support at manufacturer-approved points using equipment with adequate capacity. A hydraulic jack alone is not a dependable long-term support because leakage or movement can occur. Incorrect stand placement can damage the vehicle or allow slipping. Stability should be confirmed before the technician places any part of the body underneath.

99. D — The vehicle chassis is normally connected to battery negative. Removing the negative cable first breaks the chassis return path, reducing the chance that a tool touching body metal while working on the positive terminal will create a direct short. A brief safety check before starting work is faster than correcting an injury, spill, or damaged component afterward.

100. A — Fresh oil creates a slip hazard and can spread into drains or work areas. The technician should control the source if safe, contain the spill, use the shop's approved absorbent and disposal procedure,

and restore a safe walking surface. Washing oil into a drain or leaving temporary paper over it can increase environmental and injury risk.