

# **Automotive Service Technician**

## **Practice Interprovincial Red Seal Exam**

**Disclaimer:** This is NOT an Interprovincial Standards (Red Seal) Examination. This is a practice examination that has been developed using similar weighting, question distribution, question taxonomies and question styles to that of a red seal examination. Success on this examination will NOT result in certification or qualification. This examination is intended to be used for self assessment in preparation for attempting a red seal examination. More information about the standard that the red seal examination is based on may be found within the National Occupational Analysis for the occupation at [www.red-seal.ca](http://www.red-seal.ca).

### **Section 1**

#### **OCCUPATIONAL SKILLS**

1. What is the correct procedure for preparing an engine hoist to lift an engine?
  - A. Draw the legs on the hoist in, then extend the lift arm to access the engine.
  - B. Extend the legs as far as possible, then pull the lifting arm in for stability.
  - C. Adjust the leg length and then adjust the lift beam length to lift the engine.
  - D. Adjust the engine hoist to carry the engine as low as possible, then lift the engine.
  
2. What steps should be taken if a technician shows symptoms of carbon monoxide poisoning after working in a closed shop all day?
  - A. Evacuate the technician to fresh air and then check the cold air return on the shop heater.
  - B. Evacuate the technician to fresh air and then check the exhaust system including the makeup air unit.
  - C. Keep the technician warm and then contact a doctor.
  - D. Test the oxygen level in the shop and then test the carbon monoxide level.

3. Where would a technician find an engine vacuum diagram?
  - A. In a schematic manual.
  - B. On a calibration sticker on the engine.
  - C. In a service manual.
  - D. In a machine shop manual.
  
4. What is the correct fluid to use in an automotive rear axle assembly?
  - A. SAE 10W30
  - B. API SF/CC
  - C. API GL3
  - D. API GL5
  
5. A customer asks for an inspection while the vehicle is being serviced. What must be done in order to check the fluid in the automatic transmission?
  - A. Start the engine and then read the level on the transmission dipstick while observing colour and smell of the fluid.
  - B. Raise the vehicle and then remove the inspection plug. Measure the fluid by feeling how far below the hole the fluid sits.
  - C. Run the engine until normal operating temperature is reached and then shut it off. Check the transmission dipstick and look for metal particles.
  - D. Ensure the vehicle is horizontal and level and then load the transmission while watching the gauge for an extreme temperature rise.
  
6. What is the procedure for road testing a vehicle for steering, suspension or braking concerns?
  - A. Test drive the vehicle by driving it normally on errands, then perform some hard turns in a parking lot.
  - B. Try to drive in the same fashion as the owner, then start and stop aggressively to make any problems more apparent.
  - C. Drive the vehicle long enough to get to full operating temperature, then observe the handling and braking characteristics.
  - D. Test the brakes and handling at low speeds, then road test on several different surfaces while trying to recreate the condition.

## Section 2

### ENGINE SYSTEMS

7. The capacity of a cooling system is 9.5 litres (2.1 gallons). Which antifreeze mixture will provide adequate freeze protection for winter, at the lowest cost?
- A. 2.5 L (0.6 gal.) of coolant and 7 L (1.5 gal.) of distilled water.
  - B. 3.5 L (0.8 gal.) of distilled water and 6.0 L (1.3 gal.) of coolant.
  - C. 5.0 L (1.1 gal.) of coolant and 4.5 L (1 gal.) of distilled water.
  - D. 6.5 L (1.4 gal.) of coolant and 3.0 L (0.7 gal.) of distilled water.
8. Testing an engine coolant temperature sensor shows 100 000 ohms resistance at  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) and 70 ohms at  $130^{\circ}\text{C}$  ( $266^{\circ}\text{F}$ ). What does this indicate?
- A. The sensor is functioning normally within its design limits.
  - B. The sensor circuit is shorted in the powertrain control module.
  - C. The sensor is shorted when hot, bypassing all controls.
  - D. The engine coolant temperature sensor has a ground fault.
9. A customer reports coolant is being lost. Coolant was recently added to a hot engine. The customer now notices white smoke from the exhaust when the engine is loaded. During a cooling system pressure test, the pressure drops slowly but no external leaks are seen. What is the problem?
- A. The intake manifold is leaking into the crankcase.
  - B. The cylinder head gasket is leaking, pressurizing the cooling system.
  - C. The transmission cooler is leaking coolant into the transmission.
  - D. The cylinder head has cracked and is leaking coolant into the combustion chamber.

10. A technician installs an oil pressure master gauge. The oil pressure test reveals low oil pressure at idle and lower than expected oil pressure at 2500 rpm. What do the results indicate?
- A. The oil pump pressure relief valve is stuck closed.
  - B. There is a leak in the oil filter.
  - C. There is significant wear in the engine bearings.
  - D. The oil return passages are plugged and the engine is starved for oil.

11. A technician is performing engine compression and cylinder leakage tests. What is indicated by the results in the chart?

	Compression	Cylinder Leakage
Cylinder #1	145 psi	49%
Cylinder #2	157 psi	51%
Cylinder #3	167 psi	68%
Cylinder #4	150 psi	60%

- A. The rings are worn in all cylinders.
  - B. Valve seals and valve guides are leaking.
  - C. The timing chain is loose and has jumped.
  - D. Valve sealing is poor in all cylinders.
12. An engine is described as being “sluggish”. The vacuum reading at idle is 17 inches Hg (57 kPa). On a snap throttle test the vacuum drops to 8 inches Hg (27 kPa) then rebounds to 18 inches Hg (61 kPa). The vacuum reading drops off slowly when the engine is held at 2500 rpm. What do these results indicate?
- A. A stretched timing chain.
  - B. A burned exhaust valve.
  - C. A restricted exhaust system.
  - D. A rich fuel/air mixture.

13. A technician has identified a cooling system leak in the radiator. The leak is isolated in the radiator core. What repairs should be done?
- A. The radiator should be flushed and then refilled with good quality coolant.
  - B. The radiator should be cleaned and then repaired by crimping the leaking tube.
  - C. The radiator core should be repaired or replaced and then refilled with good quality coolant.
  - D. The affected tubes of the core should be isolated and then abandoned.
14. While pressure testing a cooling system, a technician notices a leak from the water pump. What should be done?
- A. Drain the system, remove the pump drive belt and the timing belt if required, replace the water pump, refill and bleed the system.
  - B. Drain the system, fill the hole with silicone, refill and retest for further leakage.
  - C. Check the oil for coolant contamination. If present, replace the engine.
  - D. Flush the cooling system, replace the water pump, add coolant conditioner and leak stopping material to the system.
15. What is the procedure to check the coolant serviceability?
- A. The coolant should be drained, then the correct volume of a 50% solution installed.
  - B. Coolant should be checked for pH level using a voltmeter, for electrolytic level using an ohmmeter, and for concentration using a hydrometer.
  - C. A coolant additive package should be added to restore the coolant quality before testing.
  - D. Coolant should be checked for pH level using a test strip, for electrolytic level using a voltmeter, and for concentration using a refractometer.
16. A technician checks the clearances in an oil pump and finds they are excessive. What repairs should be done?
- A. The rotors or gears should be replaced and the bore resized.
  - B. Install a larger relief spring and an oil filter bypass valve.
  - C. The complete pump assembly should be discarded and replaced.
  - D. A larger gear set should be installed and the system pressure checked.

17. What is the correct procedure to install a 0.020 in. (0.50 mm) oversize piston?
- A. Bore the cylinder 0.020 in (0.50 mm) oversize, then hone to provide a suitable finish.
  - B. Subtract the clearance required, bore the cylinder to that size, then hone for clearance.
  - C. Measure the piston, bore the cylinder to actual piston size, then hone for clearance.
  - D. Bore the cylinder to 0.022 in (0.56 mm) to provide clearance, then hone to a suitable finish.
18. When installing new bearings, what should be done to verify bearing clearance during final assembly?
- A. Look for cast codes on the counterweights of the crankshaft and install bearing shells to match.
  - B. Look on the back of the original bearing shells for size information and install new shells of the same size.
  - C. Measure the bore diameter to determine oversize required and the journal diameter to determine the undersize required.
  - D. Install replacement bearings and use Plastigage<sup>®</sup> to measure the installed clearance.
19. A multiport V6 engine is running rough and appears to be starved for fuel on two of three cylinders on a bank-fire injection system. Adding propane seems to improve the idle and drivability. A cylinder balance test indicates low power contribution from cylinders 1 and 5. Further testing proves there are no vacuum leaks. What causes this condition?
- A. The powertrain control module has a failing injector driver.
  - B. Restricted injectors on cylinders 1 and 3.
  - C. An open in the injector winding of cylinder 3.
  - D. An injector with low resistance in cylinder 3.

20. A vehicle with port injection is hard to start after sitting for an hour or more. A fuel pressure test shows that the fuel pressure is normal, but quickly drops to zero after the engine is turned off. What causes this condition?
- A. A defective fuel pump.
  - B. A plugged injector.
  - C. A defective fuel pump check valve.
  - D. Fuel pressure regulator stuck closed.
21. A vehicle equipped with a distributor ignition system is hard starting when cold. Which of the following conditions will cause this?
- A. Spark plugs gapped too closely.
  - B. Poorly grounded ignition module.
  - C. Wires installed on distributor cap incorrectly.
  - D. Open coil wire to distributor cap.
22. Refer to the chart below. The engine idles poorly but runs fine at 2000 RPM. What is the cause?

Scan Tool	Idle	2000 RPM
TPS	0.7 volts	1.5 volts
CTS	76°C	76°C
MAP	83 kPa	31 kPa
HO2S	Varying from 725 – 900 mV	Varying from 225 – 900 mV
RPM	550	2050
IAC	50	20

- A. The engine is running rich
- B. The EGR valve is not seating.
- C. One or more injectors are clogged.
- D. The engine is overheating.

23. A technician performing an emission test finds high CO and HC. Which test would confirm a suspected defective catalytic converter?
- A. Outlet temperature would be notably higher than inlet temperature
  - B. Exhaust gas backpressure should not exist ahead of the catalytic converter
  - C. Engine vacuum should stay up during a cruise check and respond quickly during a snap throttle test
  - D. When the converter is struck with a hammer it should not rattle.
24. After road testing for lack of power a technician notices a hot smell from under the car and a catalytic converter that has an orange glow. What causes this condition?
- A. A disconnected spark plug wire.
  - B. A broken air pump drive belt.
  - C. A plugged canister purge vacuum hose.
  - D. A plugged fuel injector.
25. Refer to the chart below. A vehicle failed enhanced emissions for high oxides of nitrogen (NOx). What is causing this problem?

Scan Tool	Idle
TPS	0.55 volts
CTS	80°C
MAP	40 kPa
HO2S	Varying from 100 mV – 900 mV

- A. The engine is running too hot.
- B. The MAP sensor vacuum is below 9 inches (30 kPa).
- C. The EGR solenoid has an open ground.
- D. Fuel vapours are being drawn in to the intake.

26. During an enhanced I/M test, a vehicle passed the pressure test but failed the evaporative purge flow test. No Diagnostic Trouble Codes (DTCs) were recorded. While running the vehicle with the throttle held open, the scan tool display indicates that the evaporative emissions control (EVAP) solenoid is commanded on. What causes the failed test?

- A. EVAP solenoid shorted.
- B. EVAP solenoid open.
- C. Blocked vacuum port to solenoid.
- D. Vacuum leak at valve diaphragm.

27. Refer to the chart below. A vehicle failed an enhanced emission test for high hydrocarbons (HC). The readings were obtained during an exhaust analysis, with the Air Injection Reaction (AIR) system disabled. What is causing the problem?

Scan Tool	Idle	2000 RPM
HC	660 ppm	69 ppm
CO	0.0%	0.22%
CO <sub>2</sub>	10.9%	13.9%
O <sub>2</sub>	2.1%	0.1%

- A. Defective catalytic converter.
- B. A grounded ignition wire.
- C. A leaking power brake booster.
- D. Base timing is retarded 3 degrees

28. When installing a fuel pressure tester on a multiport fuel injection system, what procedure must be followed to obtain accurate pressure readings?

- A. Relieve the rail pressure then install and bleed the gauge.
- B. Install the gauge then relieve the pressure in the line.
- C. Disconnect the fuel line then install the gauge.
- D. Remove the power fuse then bleed out air in the line.

29. A fuel pump relay is suspected of being faulty. What is a quick check to confirm the fuel pump relay is working?
- A. Test for power at the pump and then cycle the ignition key off.
  - B. Back probe the relay terminal with a test light then cycle the key on.
  - C. Install scan tool and then check the data stream.
  - D. Remove the fuel pump relay then feel for a click.
30. What is the procedure for diagnosing a no-start condition in a multiport fuel injected vehicle?
- A. First determine there is no injector pulse or spark, then test for an open circuit at crankshaft position sensor.
  - B. First test the battery voltage level, then inspect the spark wires with a high impedance digital ohmmeter.
  - C. First confirm the complaint, then test the fuel system pressure and compare to specification.
  - D. First install the scan tool, then perform a bidirectional test to fire the spark plugs.
31. Refer to the chart below. What is indicated by the cylinder head bolt torque specifications shown?

Initial pass	30 N·m (22 ft. lbs.)
2 <sup>nd</sup> pass	65 degrees

- A. Head bolts must be torqued to 30 N·m (22 ft. lbs.), then warm the engine to 65 degrees before retorquing to 30 N·m (22 ft. lbs.).
- B. All head bolts must first be torqued to 30 N·m (22 ft. lbs.), then all turned another 65 degrees.
- C. Each head bolt must be torqued to 30 N·m (22 ft. lbs.), then immediately turned another 65 degrees.
- D. Head bolts must be torqued to 30 N·m (22 ft. lbs.), bring the engine to full operating temperature, then turn the bolts another 65 degrees.

32. Which procedure describes the process for replacing an exhaust gas recirculation valve?
- A. Ensure the valve is cool then torque the bolts to specification.
  - B. Ensure the passage is open then operate the valve.
  - C. Ensure the valve is the correct type then clear the passage in the intake.
  - D. Ensure the passage is blocked, then replace with the correct valve.
33. When testing fuel control system response by creating a vacuum leak, what two things should be observed?
- A. A voltage drop in O<sub>2</sub> sensor output and an increase in injector dwell.
  - B. A voltage rise in O<sub>2</sub> sensor output and a decrease in injector dwell.
  - C. A decrease in RPM and an advance in spark timing.
  - D. An increase in RPM and a drop in spark advance.

### Section 3

#### VEHICLE MANAGEMENT SYSTEMS

34. A vehicle has been brought in for a Malfunction Indicator Lamp (MIL) complaint. The lamp has been illuminated for the past three days, with no drivability concerns. After installing a scan tool what diagnostic steps should be performed?
- A. Check the data stream then check for trouble codes.
  - B. Perform bidirectional tests then check freeze frame data.
  - C. Check for trouble codes then clear the codes from memory.
  - D. Check the freeze frame data then check failure records.
35. A vehicle has an illuminated Malfunction Indicator Lamp (MIL). A P0133 code (O<sub>2</sub> sensor circuit slow response) is present. While monitoring the O<sub>2</sub> sensor, what test procedure would verify a slow response time?
- A. Create a lean condition then clear the codes and road test the vehicle.
  - B. Create a lean condition then a rich condition and monitor response time.
  - C. Ground the wire to the sensor then monitor the scanner for low voltage.
  - D. Install a resistance in the signal wire at the O<sub>2</sub> sensor then watch for a response.

36. Refer to the chart below. A vehicle has an intermittent Malfunction Indicator Lamp (MIL) illumination. Diagnostic Trouble Code (DTC) P0118 (Engine Coolant Temperature (ECT) Circuit High Input) is present. The information below is stored in freeze frame data. What procedure must be used to capture this fault?

Information		
<b>ECT</b> – 5.0 V	<b>IAT</b> – 2.3 V	<b>MAF</b> – 3.5 V
<b>RPM</b> – 1515	<b>HO<sub>2</sub>B1S1</b> – 0.75 V	<b>HO<sub>2</sub>B2S1</b> – 0.75 V
<b>VSS</b> – 5 MPH	<b>MAP</b> – 4.0 V	<b>MIL</b> – ON
<b>LOOP</b> – OPEN	<b>TPS</b> – 3.1 V	<b>DTCs</b> - YES

- A. Test the signal line to the sensor for high resistance, then clear the code and road test to complete the drive cycle.
  - B. Test the ignition power fuse for an intermittent open to the Powertrain Control Module (PCM) then perform the drive cycle.
  - C. Test the sensor ground terminal for an intermittent open at the Powertrain Control Module (PCM) then perform the drive cycle.
  - D. Test the connections in the coolant sensor circuit then install a meter on the signal line on glitch capture and complete the drive cycle.
37. Refer to the chart below. The Malfunction Indicator Lamp is illuminated. A scan reveals the diagnostic trouble codes noted in the chart are stored in the Powertrain Control Module (PCM) memory, indicating an open at the PCM terminal for sensor ground. What test in the ground circuits will confirm this diagnosis?

Codes	
<b>P0100</b> – MAF Sensor circuit	<b>P0123</b> – TPS high input
<b>P0108</b> – MAP high input	<b>P0405</b> – A/C charge low
<b>P0113</b> – IAT high input	<b>P0450</b> – Fuel tank pressure
<b>P0118</b> – ECT high input	<b>P0713</b> – TFT high input

- A. Locate the grounds in the manual then perform a voltage drop on the ground connections while the circuits are functioning.
- B. Check for high resistance to ground with an ohmmeter then remove and clean the grounds.
- C. Clean the PCM terminal for sensor grounds then clear the codes and road test.
- D. Determine the ground locations in the manual then test them with a test light while the circuits are functioning.

38. After obtaining trouble codes from a vehicle, in what order is the diagnosis performed?
- Record the codes and consult freeze frame data.
  - Clear the codes and then consult failure records.
  - Record the codes and consult failure records.
  - Clear codes and duplicate freeze frame on road test.

39. Refer to the chart below. The vehicle is hard starting and surges intermittently during acceleration. The information shown was captured in a snap shot with the scan tool but no code was set. The data suggests an intermittent open at the throttle position sensor (TPS). How would a technician diagnose this problem?

Information			
<b>ECT</b> – 0.6 V	<b>IAT</b> – 2.3 V	<b>MAF</b> – 2.9 V	<b>TPS</b> – 5.0 V
<b>RPM</b> – 2015	<b>LOOP</b> – OPEN	<b>HO<sub>2</sub>B1S1</b> – 0.45 V	<b>HO<sub>2</sub>B2S1</b> – 0.75 V
<b>VSS</b> – 35 mph	<b>MAP</b> – 1.9 V	<b>MIL</b> – ON	<b>DTCs</b> - YES

- Read the drive cycle section in the manual then road test to duplicate the problem.
  - Read the enable criteria section in for the code then replace the TPS sensor.
  - Consult the symptom charts then follow the diagnostic aids in the manual.
  - Consult the trouble code chart and then replace the component.
40. Refer to the chart below. The torque converter on the vehicle will not engage. The listed data was recorded while driving on the highway. Which defective component is causing the problem?

Information			
<b>ECT</b> – 0.6 V	<b>Brake Switch</b> – ON	<b>TPS</b> – 2.2 V	<b>RPM</b> – 3175
<b>TR</b> – 3	<b>SS1</b> – ON	<b>SS2</b> – ON	<b>VSS</b> – 50 MPH
<b>TCC</b> – 0%	<b>MIL</b> – OFF	<b>DTCs</b> – NO	

- Vehicle speed sensor.
- Brake switch.
- Thermostat.
- Transmission range switch.

41. A vehicle has been brought in for a Malfunction Indicator Lamp complaint. The lamp has been illuminated for the past three days, with no drivability concerns. The code that is present is PO135 (O<sub>2</sub> sensor heater circuit problem, bank 1, sensor 1). What causes the code to set?
- A. A poor voltage supply for the oxygen sensor heater at the powertrain control module.
  - B. Blown fuse for the ignition feed to the powertrain control module.
  - C. A bad connection at the ground terminal of the oxygen sensor heater circuit.
  - D. A short at the power feed terminal at the oxygen sensor heater circuit.
42. A technician is diagnosing a vehicle with a no-start complaint. An injector pulse is observed with an injector test light, but there is no spark at any ignition coil. What component has failed?
- A. Mass air flow sensor.
  - B. Crankshaft position sensor.
  - C. Throttle position sensor.
  - D. Ignition control module.
43. An O<sub>2</sub> sensor is giving a continuous reading of 0.2 volts. What is causing this reading?
- A. A leaking fuel injector.
  - B. An open winding in an injector.
  - C. A plugged catalytic converter.
  - D. A vacuum leak to the MAP sensor hose.
44. Before replacing a control module, all outputs are checked for shorts and grounds. What else should be tested?
- A. Module programming chips.
  - B. Pinpoint tests on inputs.
  - C. All module powers and grounds.
  - D. Pinpoint tests on all outputs.

45. A coolant sensor code is stored. A DVOM shows 0.0 volts on the coolant temperature sensor sense line circuit. A faulty connection or an open in the sense line could cause this. How should this be tested?
- A. Measure voltage drop on the sensor circuit, then monitor the scan tool for changing temperature.
  - B. Disconnect the sensor then test the resistance of the sensor and compare to the service chart.
  - C. Disconnect the sensor, jump the terminals then watch the scan tool for a high temperature reading.
  - D. Measure the sense line for an open circuit with a voltmeter then replace the sensor.
46. A computer network has stopped communicating. The technician has located and disconnected the splice pack. What procedures should be followed next?
- A. Test the resistance in the wire, then test for voltage present.
  - B. Test the circuit for continuity to ground, then test for short to power.
  - C. Test the circuit for shorts, then check for grounds on the power line.
  - D. Test the circuit for power with a test light, then test for grounds.
47. An A/C signal generator is being tested for an out put signal. Which characteristics would indicate a good signal?
- A. The peaks should be even all the way across the wave form and they should the same height both positive and negative.
  - B. The peaks should be irregular across the wave form and they should the same height both positive and negative.
  - C. The pattern should be a saw tooth shape and repeat itself.
  - D. The pattern should be bell shaped and go in opposite amplitude as it is being tested.

48. What engine operating condition must be met before a bidirectional scan tool can perform a cylinder balance test and what does the scanner actually do?
- A. Engine at operating temperature; turns off individual injectors.
  - B. Engine at operating temperature; turns off individual ignition coils.
  - C. Engine at cold start temperature; turns off individual injectors.
  - D. Engine at cold start temperature; turns off individual ignition coils.
49. When replacing an Electronic Control Module (ECM) what safety steps should be taken to prevent any damage to the computer?
- A. Wear a static strap and place a rubber mat on the seat.
  - B. Disconnect the battery and then remove the computer.
  - C. Remove the electrical connections and then remove the computer.
  - D. Spray anti-static compound on the seat and then wear a static strap.
50. What is the correct process for repairing broken computer wiring?
- A. Replace the wire in the harness, then install and solder new terminals at the computer.
  - B. Strip and connect the wires, then twist and tape them before soldering the connection.
  - C. Secure the wires by twisting and then use a heat sink when soldering the wire
  - D. Replace the complete harness then secure the terminals at the computer with solder.
51. If a poor connection is suspected in an electrical circuit what should be checked to determine the exact location of the problem?
- A. The resistance at the load, then check the ground.
  - B. The available voltage at the load, then proceed to check for voltage drops at other connections in the circuit.
  - C. The voltage drop across the load, then check battery voltage.
  - D. Resistance in the wires for the lowest resistance, then test amperage in the circuit.

52. How should an electrical connector be tested for integrity?
- A. For tightness, then a voltage drop should be performed across the connector
  - B. Back probed and then a resistance test with an ohmmeter should be performed on the connector.
  - C. Remove and clean with a commercial cleaner and then re-installed.
  - D. Replaced and then tested for continuity.
53. What precautions must be observed when repairing any data transfer wires between computers?
- A. The original wire length and color must be maintained.
  - B. Only the same amount of twist must be maintained.
  - C. The original wire length and twist must be maintained.
  - D. Continuity is the only consideration.
54. What procedure must be followed when repairing a Weather Pack connector?
- A. Remove the seal then locate the entry canal and release the terminal with the appropriate tool.
  - B. Remove the secondary lock then pull the terminal out of the cavity.
  - C. Remove the primary lock then locate the entry canal and release the terminal with the appropriate tool.
  - D. Remove the primary lock then remove the secondary lock.
55. A drive cycle should be performed whenever codes are cleared or the battery is disconnected. What is the procedure that must be followed to complete the drive cycle?
- A. Warm up the engine then install the scan tool and monitor the data until the drive cycle is complete.
  - B. Operate the vehicle duplicating the freeze frame information then monitor the schedule of the diagnostic activity.
  - C. Look up the drive cycle information on the scan tool and road test the vehicle for the duration outlined in the cars computer.
  - D. Look up the unique drive cycle for the vehicle then road test and complete the trip as outlined in the information.

56. What must a technician do to allow a diagnostic monitor to run?
- A. Insure that the enable criteria will be satisfied then perform the drive cycle and monitor the readiness status until complete
  - B. Meet the enable criteria for the monitor then clear the codes and road test the vehicle
  - C. Follow the enable criteria for the monitor then perform a bi-directional test to confirm the monitor will run
  - D. Road test the vehicle to complete the drive cycle then look up the enable criteria to run the monitor
57. A vehicle is being diagnosed that has the MIL illuminated. What procedure should a technician follow to determine the correct code to diagnose?
- A. Build the correct vehicle in the scan tool then request failure records.
  - B. Build the correct vehicle in the scan tool then request freeze frame data.
  - C. Request data stream with the scan tool then check current codes.
  - D. Request data stream with the scan tool then check history codes.

## Section 4

### DRIVE LINE SYSTEMS

58. The following measurements have been taken on a  $\frac{3}{4}$  ton truck with a two-piece driveshaft. What symptoms will be caused by these conditions?

Transmission angle	2° down from horizontal
Front driveshaft angle	2.5° down from horizontal
Rear driveshaft angle	5° down from horizontal
Rear axle housing angle	5° down from horizontal

- A. The front u-joint will be tight, causing clicking.
- B. The rear u-joint will cause a vibration.
- C. The steady bearing will be loaded, causing premature wear.
- D. The joints are all within specified operating angles and will perform as expected.
59. A customer complains of a squeaking noise as the vehicle starts to move. The noise increases frequency about three times faster than the speed increases. What problem is indicated by this symptom?
- A. A worn CV joint.
- B. An out of phase driveshaft.
- C. A dry Cardan u-joint.
- D. A worn steady bearing.
60. A manual transmission is noisy under load in all reduction gears. What is the problem?
- A. First speed output gear teeth chipped.
- B. Clutch shaft pilot bearing is worn.
- C. Cluster shaft bearings damaged.
- D. Speedometer drive gear chipped.

61. How is a forward gear reduction obtained from a simple planetary gear set?
- A. The sun gear must be held.
  - B. The carrier assembly must be the input member.
  - C. The ring (annulus) gear must be held.
  - D. The carrier assembly must be the output member.
62. If a multiple-disc holding clutch in an automatic transmission fails, which of the following statements is true?
- A. One member of a planetary gear set will not lock to the output shaft.
  - B. The input shaft will not lock to the torque converter.
  - C. One member of a planetary gear set will not lock to the transmission case.
  - D. The output shaft will not lock to the transmission case.
63. An automatic transmission has no reverse and no engine braking in manual first gear range. What is the cause of the problem?
- A. The overrunning clutch has failed.
  - B. The forward clutch has burned out.
  - C. The rear band has broken.
  - D. The direct clutch is slipping.
64. A shift valve in a hydraulically operated automatic transmission fails to open. What is causing this problem?
- A. Throttle pressure is greater than governor pressure and spring force combined.
  - B. Governor pressure is less than throttle pressure and spring force combined.
  - C. Mainline pressure has reached or exceeded maximum value.
  - D. The torque converter has locked up prematurely.

65. A torque converter will not cause torque multiplication? What is the problem?
- A. The stator is not locking to redirect fluid to the impeller.
  - B. The stator is locking and redirecting fluid to the impeller.
  - C. The impeller is being driven at engine speed.
  - D. The impellor and turbine are being driven at the same speed.
66. 180 foot pounds of torque are input at a transfer case input shaft. In low range (1.8:1 ratio), how much torque is delivered to the drive pinion of the front axle of a four wheel drive vehicle?
- A. 50 foot pounds.
  - B. 100 foot pounds.
  - C. 162 foot pounds.
  - D. 324 foot pounds.
67. A technician is replacing the universal joints in a two-piece driveshaft. What is the correct procedure for replacing the center joint?
- A. Remove the retaining clips, place the companion flange on the vice, then drive the cups out with a hammer by hitting the opposite cup.
  - B. Remove the retaining clips, then push the cups out using a ball joint press.
  - C. Cut the yoke to remove the existing u-joints, then press in the cups on the new joint using the vise.
  - D. Align the two halves of the shaft and index, then remove the joint and install the new one using a press.
68. A vehicle equipped with an automatic transaxle is not shifting correctly. What is the first diagnostic step?
- A. Adjust all the bands to specification.
  - B. Perform a hydraulic pressure test.
  - C. Inspect and adjust all linkages.
  - D. Check the fluid level and type.

69. An electronically controlled automatic transaxle will not upshift to drive second. What should the technician do to repair this problem?
- A. Replace the torque converter assembly.
  - B. Remove the transmission and check for burnt or damaged clutch packs.
  - C. Remove the valve body and repair the 1-2 shift valve assembly.
  - D. Follow the correct diagnostic procedure using hydraulic diagrams.
70. What test procedures should be followed before deciding an automatic transmission needs a major overhaul?
- A. Change the transmission fluid and filter, stall test and then pressure test.
  - B. Stall test, pressure test and then adjust bands and pressures.
  - C. Check fluid levels, pressure test and then inspect pan deposits.
  - D. Check fluid levels, inspect pan deposits and then pressure test.
71. Which statement is true when repairing automatic transmissions?
- A. Clutch packs may be pressure tested using high pressure air.
  - B. Metal contaminated torque converters may be flushed and re-used.
  - C. Clutch packs may be pressure tested using low pressure air.
  - D. Metal contaminated coolers may be flushed and re-used.
72. Which statement is true when repairing automatic transmissions?
- A. Cooler lines must be flushed before the transmission is removed.
  - B. Clutch pack clearances must be measured before replacement.
  - C. Clutch pack plates are lubricated with Vaseline before installing.
  - D. Cooler lines must be flushed before the transmission is installed.

73. A vehicle has a transfer case problem. Which steps should be followed to ensure successful repair of the problem?
- A. Verify, isolate, and repair the problem, then verify the repair.
  - B. Isolate, verify and then repair the problem.
  - C. Isolate and repair the problem, then verify the repair.
  - D. Verify and repair the problem, then isolate and verify the repair.
74. Which of the following adjustment procedures is the correct sequence for adjusting a removable carrier rear-axle final drive assembly?
- A. Backlash, then pinion gear clearance.
  - B. Differential pinion clearance, then side bearing preload.
  - C. Pinion bearing preload, then pinion depth.
  - D. Side bearing preload, then clutch breakaway torque.

## Section 5

### ELECTRICAL AND COMFORT CONTROL SYSTEMS

75. A technician is checking a **no-crank** condition on a vehicle. After installing an appropriate test meter, the technician notes an extremely large current draw and the cables from the battery to the starter seemed to jump. What would cause this condition?
- A. The starter has shorted hold in windings.
  - B. The starter has an open field winding.
  - C. The engine is seized or mechanically locked.
  - D. The resistance in the starting circuit is high.
76. A heater fan is **not** working correctly on a vehicle. It was replaced with a new motor but still does **not** have adequate speed. What tests should the technician perform with a digital volt / ohm meter to determine the circuit problem?
- A. Check voltage drops in the circuit then check for current draw.
  - B. Check resistance of the motor then check for current draw.
  - C. Check voltage at the motor then test grounds.
  - D. Check the grounds for the circuit then test voltage at the motor.
77. The fuel pump keeps running after the ignition key is switched off. What could cause this?
- A. Oil pressure switch grounded out.
  - B. Fuel pump relay contacts stuck closed.
  - C. PCM fuel pump control grounded.
  - D. Fuel pump relay control open.

78. The hazard warning lights do **not** flash when the switch is activated. The signal lights work normally. The same bulb is used for both circuits on this lighting system. What causes the problem?
- A. A faulty ignition switch.
  - B. A fault in the signal light flasher.
  - C. A fault in the signal light wiring.
  - D. A faulty hazard flasher.
79. While diagnosing an inoperative power window a technician notes that the passenger side power window will operate in one direction only (down). What component failure would cause this?
- A. Circuit breaker.
  - B. Regulator.
  - C. Window switch.
  - D. Window motor.
80. A trailer with electric brakes is being diagnosed for poor brake application when loaded. The technician has set the gain on the controller correctly and confirmed that power is available at the trailers wheels. How should the technician proceed to determine the fault?
- A. Measure the current flow in the brake circuit to each wheel to verify the connections are secure.
  - B. Check resistance of the magnets and compare them to each other.
  - C. Monitor the brake controller voltage and replace the magnets at each wheel.
  - D. Check the polarity of the magnets with a compass to verify operation of each wheel.

81. Which statement is true for gauge type or warning lamp systems?
- A. When a balancing coil gauge indicates a high reading, the sending unit will have low resistance.
  - B. If all warning gauges in the instrument cluster read high, the cause is a shorted ground.
  - C. When a balancing coil gauge indicates a high reading, the sending unit will have high resistance.
  - D. If all warning gauges in the instrument cluster read high, the cause is a shorted feed.
82. Which statement is correct for boost charging a dead battery?
- A. The negative cable should be connected to the charged battery last.
  - B. The positive cable should be connected to the charged battery first.
  - C. The negative cable should be connected to the dead battery first.
  - D. The positive cable should be connected to the charged battery last.
83. What is the correct sequence for starting system testing?
- A. Perform alternator tests then test battery voltage.
  - B. Perform a battery test then test starter draw.
  - C. Remove the starter from the vehicle then test the battery.
  - D. Test the hold-in and pull-in windings then test the armature.
84. When performing heat shrink tubing repairs what is the correct procedure?
- A. Repair a fusible link, then apply the shrink tubing.
  - B. Solder the wires, then position the tubing and apply heat.
  - C. Cover an insulated butt splice, then tape the wire.
  - D. Strip the wire then apply the shrink tubing to the copper.

85. When replacing an instrument cluster what precautions must be followed on installation?
- A. Replace all fasteners and torque them to specification.
  - B. Install a static strap then remove cluster from the anti-static bag.
  - C. Reset the odometer then record it on the work order.
  - D. Remove the lens on the gauge cluster then coat it with anti-static spray.
86. A technician checking a CCFOT air conditioning system notices that the low side pressure is 180 kPa (26 psi), and the high side is 1450 kPa (210 psi). Discharge air from the vent is 14°C (57°F). What is the problem in the air conditioning system?
- A. Plugged evaporator.
  - B. Temperature blend control door malfunction.
  - C. Plugged condenser.
  - D. Air distribution control door malfunction.
87. The technician installs A/C gauges and operates the air conditioning system. The following readings and symptoms are noted. What is the cause of the problem?
- |                       |                                      |
|-----------------------|--------------------------------------|
| High side             | 1450 kPa (210 psi)                   |
| Low side              | 310 kPa (45 psi)                     |
| Compressor Cycle time | 10 seconds on and then 4 seconds off |
- A. Faulty compressor.
  - B. Plugged condenser.
  - C. Plugged evaporator.
  - D. Incorrect oil in refrigerant.
88. What is indicated when the ambient air temperature is 21 degrees Celsius (70 degrees Fahrenheit), and the pressure of the refrigerant in the storage bottle is 538 kPa (78 Psi)?
- A. Normal condition.
  - B. The bottle is overcharged.
  - C. The bottle is undercharged.
  - D. The refrigerant is a contaminated "cocktail".

89. A customer complains of a lack of heat. The technician notices that engine operating temperature is correct and lines to and from the heater core are hot. What is causing the problem?
- A. Low coolant level.
  - B. Radiator cap pressure too high.
  - C. Air lock in the heater core.
  - D. Temperature blend door malfunction.
90. A vehicle at 915 m (3000 feet) above sea level has a weak radiator cap that can only maintain 10 kPa (1.5 psi) of pressure. If the coolant is mixed 50/50, what temperature will the coolant boil?
- A. 100°C (212°F).
  - B. 97°C (207°F).
  - C. 107°C (225°F).
  - D. 125°C (257°F).
91. What is the correct procedure to remove odour from an AC system?
- A. Remove the air box then spray deodorizer onto the evaporator.
  - B. Remove the air box then steam clean the evaporator.
  - C. Remove the air box and sanitize the evaporator.
  - D. Remove the heater fan motor then spray deodorizer on the evaporator.
92. Which statement is true when repairing or servicing an air conditioning system?
- A. A/C systems are evacuated to remove moisture and air from the system.
  - B. A/C systems are recharged by adding refrigerant according to discharge temperature.
  - C. Refrigerant recovery of A/C systems is used to reduce customer costs.
  - D. The labels attached to A/C systems always indicate the correct refrigerant in the system.

93. A cooling system is being checked for coolant contamination. The antifreeze is cloudy. What should be done?
- A. Test for pH levels then add a suitable additive package.
  - B. Drain and flush the system then add new coolant.
  - C. Test for electrical conductivity then add coolant until it meets specifications.
  - D. Add acid to clean the system then replace with pH balanced coolant.

**Section 6**

**STEERING, SUSPENSION, BRAKING AND CONTROL SYSTEMS**

94. A technician is performing a four-wheel alignment. After taking the readings and adjusting the rear to eliminate the thrust angle, the technician obtains the following readings. Allowing for road crown, what adjustments will provide the best handling and tire wear?

	<b>Specifications</b>	<b>Left Side</b>	<b>Right side</b>
<b>Caster</b>	2° to 3°	2°	2¼°
<b>Camber</b>	-¼° to +¼°	0	+¼°

- A. Adjust the right side caster to 0° and the left side camber to +¼°.
- B. Adjust the left side caster to 2¼° and right side camber to 0°.
- C. Leave the right side camber and adjust left side camber to +¼°.
- D. Leave the left side camber and adjust the right side camber to +¼°.
95. A customer complains of a steering wheel that is not centered. The technician notices the thrust angle is +0.7 degrees. There is wear on the outside of the right rear tire. What causes this condition?
- A. There are bent components in the right rear suspension.
- B. The front wheel alignment is not adjusted to specifications.
- C. There are bent components in the left rear suspension.
- D. The right rear wheel is adjusted with too much negative camber.
96. A technician is pressure testing a power steering system. The gear box is a reciprocating ball type. The results of the tests are seen in the chart below. What should be done to correct the problem?
- |                         |                    |
|-------------------------|--------------------|
| Free run pressure       | 75 psi (520 kPa)   |
| Maximum output pressure | 1350 psi (9.3 MPa) |
| Left turn pressure      | 850 psi (5.9 MPa)  |
| Right turn pressure     | 1300 psi (9.0 MPa) |
- A. Replace the pressure relief valve because it is sticking.
- B. Replace the pump because the pumping element is worn.
- C. Replace the steering gear because the ball nut seal is worn.
- D. Replace the steering gear because the rotary valve seals are worn.

97. A customer complains of a “bouncing” tire with vibration at 30 to 60 kilometres per hour. When a suspension bounce test is performed, the car bounces 5 or 6 times before coming to rest. What is the problem?
- A. A weak or broken spring.
  - B. Weak shock absorbers.
  - C. A cracked shock mount.
  - D. Dynamic imbalance in the tires.
98. Which of the following statements is true for frame and suspension repair?
- A. Longitudinal torsion bars are adjusted on the opposite side of the vehicle on which they are anchored.
  - B. Steering linkage adjustment can compensate for minor frame sway.
  - C. Transverse torsion bars are adjusted on the same side of the vehicle on which they are anchored.
  - D. Steering linkage adjustment can compensate for minor frame sag.
99. A technician performing a pre-alignment inspection notices a cupping wear pattern on the tire. What causes this problem?
- A. Worn shock absorbers and static imbalance.
  - B. Worn shock absorber and dynamic imbalance.
  - C. Incorrect alignment and frame damage.
  - D. Incorrect alignment and tire faults.
100. A vehicle is being test driven for a brake pedal pulsation. The pulsation is most noticeable at slow speeds and is accompanied by a shudder in the steering wheel. What is the cause?
- A. Lack of parallelism in the front rotors.
  - B. Out-of-round rear drums.
  - C. Excessive caster.
  - D. Dynamic wheel imbalance.

101. The customer complains that the brake pedal holds on the first application if force is maintained on the pedal, but goes lower with each successive gentle application, gradually going to the floor at a stop light. What is the problem?
- A. The wheel cylinders are leaking.
  - B. The booster is not working.
  - C. The master cylinder is leaking internally.
  - D. The booster valving is faulty.
102. A customer complains of intermittent shaking and pedal pulsation under hard braking on a vehicle equipped with ABS. The pedal is high and hard most of the time. The vehicle stops smoothly and predictably under light braking. What is the problem?
- A. The quick take-up valve is sticking closed.
  - B. The ABS brakes are operating normally.
  - C. The brake booster has a small tear in the diaphragm.
  - D. There is excessive parallelism in the rotors.
103. A technician has serviced a complete brake system equipped with ABS, but the pedal feels spongy. How is this problem corrected?
- A. The rear brake shoes need to be adjusted closer to the drums.
  - B. The brake system must be bled while operating the hydraulic control unit using a scan tool.
  - C. The new brake linings must be burnished with several firm brake applications.
  - D. The brake system must be bled in order - rear brakes first, then the front brakes, then top up the reservoir and bleed the master cylinder.

104. A technician is performing a thorough brake inspection. The specifications and the measurements of the drums are shown below. Each drum has severe scoring. What service is recommended?

	<b>Specification</b>	<b>Left</b>	<b>Right</b>
<b>Diameter</b>	Max dia. 11.030" (280.16 mm)	11.032" (280.21 mm)	11.026" (280.06 mm)

- A. Machine the drums and re-measure.
  - B. Machine the drums and re-install.
  - C. Replace the right drum and machine the left.
  - D. Replace both drums.
105. A customer complains of high pedal effort. A hissing sound while braking seems to be coming from around the pedal. What is the cause?
- A. The brake booster vacuum valve is leaking.
  - B. The vacuum booster diaphragm is torn.
  - C. The brake booster atmospheric valve is leaking.
  - D. The vacuum check valve on the booster is faulty.
106. A front tire shows wear on both edges and the sidewalls are scuffed. The technician dismounts the tire and finds small rubber dust like particles inside. What is the cause?
- A. The tire has been run at low pressures.
  - B. The tire was overloaded.
  - C. The tire was overinflated.
  - D. The tire was loaded during hard cornering.
107. What steps are followed when a loaded ball joint has 0.130" (3.30 mm) vertical movement?
- A. Joint movement is acceptable - check the wheel alignment.
  - B. Replace the joint, then perform a wheel alignment.
  - C. Grease the joint, then retest.
  - D. Test drive for unpredictable steering, then examine the wear indicator.

108. A power rack and pinion steering system is stiff and hard to turn. When it is first driven, the fluid is dull grey. Which of the following repairs are indicated?
- A. Flush the system, then replace the fluid.
  - B. Replace the rack, then flush the lines and cooler.
  - C. Flush the lines and cooler, then replace the rack and the pump.
  - D. Replace the pump, then flush the system.
109. When rebuilding a reciprocating ball power steering box, what is the correct order of the adjustments?
- A. Worm-bearing preload, then sector shaft end play.
  - B. Sector shaft end play, then worm-bearing preload.
  - C. Worm-bearing preload, then over-center adjustment.
  - D. Over-center adjustment, then worm-bearing preload.
110. A technician is repairing a trailing arm suspension that uses coil-over-shocks. What must be done in order to replace the shocks?
- A. Support the rear axle, then replace the shocks.
  - B. Remove and replace one shock, then remove and replace the other.
  - C. Separate the lower ball joint, then replace the shock.
  - D. Remove the springs, then the shocks.
111. The automatic levelling feature of a vehicle suspension has stopped working. Which procedure will identify the problem?
- A. Check the fuses, and then test the pump.
  - B. Replace the level sensor, then test the air bags for leaks.
  - C. Bypass the level sensor, and then check if the pump runs.
  - D. Install a scan tool and then check for communication among the control modules.

112. How does a technician test a vacuum operated brake booster?
- A. Disconnect the vacuum source to the brake booster, then test drive the unit.
  - B. A scan tool may must be used to cycle the system, then test drive while using the scan tool function.
  - C. Measure the vacuum supply, and then measure the vacuum available at the booster.
  - D. Pump the brake pedal several times to exhaust the reserve vacuum, then hold the pedal down while starting the engine.
113. When replacing a master cylinder, what must be done in order to ensure the cylinder functions correctly?
- A. Transfer the proportioning valves, then install the master cylinder.
  - B. Install the master cylinder, bleed the quick take up valve, then fill the reservoir.
  - C. Bench bleed the master cylinder, then install and fill the reservoir.
  - D. Install the master cylinder, then adjust the brakes.
114. A technician is removing brake calipers in order to replace the disc brake pads. Which of the following practices must be observed to protect the ABS hydraulic control unit?
- A. Push the piston back, remove the calliper, then remove the disc brake pads.
  - B. Open the bleeder, push the piston back, close the bleeder, then remove the caliper and the disc pads.
  - C. Remove the caliper bracket, pump the brake pedal several times to retract the piston, then remove the disc pads.
  - D. Remove the brake pad retaining pins, then slide the pads out without retracting the piston.
115. A technician is attempting to remove rear brake drums. The drums will turn and move but will not come off. What must the technician do?
- A. Spray chemical penetrant around the axle flange, then hammer on the drum to break it loose.
  - B. Heat the axle to loosen any rust on the flange, then hammer on the drum to break it loose.
  - C. Cut the brake shoe hold-down pins, then pry the drum off the backing plate.
  - D. Loosen the adjusters to retract the shoes, then slip the drums off.

116. What must a technician look for during the road test following the installation of new brake linings?
- A. A firm pedal and straight steering wheel.
  - B. A hard pedal and a slight pull to the right.
  - C. Smell and noise complaints.
  - D. A hard pedal and straight line stop.
117. What procedure must be followed when installing a tire and wheel assembly?
- A. Tighten the lug nuts in a specific pattern, then torque them to specs in the same pattern.
  - B. Install the rim to the hub while observing the directional indicators.
  - C. The valve stem must be aligned with the indicated stud, then the on-car balance re-checked.
  - D. Install the balance ring behind the wheel, then match mount it to improve balance.

## Section 7

### BODY COMPONENTS, TRIM AND RESTRAINT SYSTEMS

118. What will cause a seat belt to seem loose and let the passenger fly forward in a minor collision?
- A. The seat belt retractor has failed.
  - B. The anchor is placed in the wrong position, allowing the belt to lie across the shoulder of the driver.
  - C. The seat belt assembly is stretched.
  - D. The energy management loop is compromised.
119. What precautions must be taken to prevent accidental deployment when removing the steering column of a vehicle equipped with an air bag?
- A. Disable the air bag and lock the clock spring in place.
  - B. Remove the air bag module first, then set it aside for safety.
  - C. Disconnect the multi-function switch to prevent deployment.
  - D. Disconnect the DERM to disable air bag.
120. A vehicle is displaying both an illuminated air bag light and MIL light. What must a technician do?
- A. Diagnose the check engine light first.
  - B. Diagnose the air bag light first.
  - C. Clear all the trouble codes first.
  - D. Disconnect the battery.
121. The passenger side power door lock does not work. All voltage tests at the switch are normal. What is the problem?
- A. Damaged or jammed parts inside the door.
  - B. The door panel is restricting the lock.
  - C. The wiring inside the door.
  - D. The wiring from the A pillar to the door.

122. What is the procedure for inspecting or repairing seat belt systems after a collision?
- A. Inspect belt and buckle operation, then inspect the stitching at the energy management loops.
  - B. Inspect the length of the belts, then replace only the affected side.
  - C. Inspect the front seat belts first, then inspect the shoulder belt set.
  - D. Inspect for torn belts and broken latches, then re-stitch the belt and replace the broken latches.
123. What procedure must be followed when replacing seat anchor bolts?
- A. Re-thread the holes with a tap, then install metric bolts by hand.
  - B. Replace all of the nuts in the floor pan, then coat the threads with a thread sealer and torque to specification.
  - C. Tighten by hand to ensure the bolt is not cross threaded, then torque the correct bolts to specification.
  - D. Remove thread sealer from threads, then install new bolts with an impact wrench.
124. What precautions must be taken when replacing the coil assembly found in a SIR (Supplemental Inflatable Restraint) steering column?
- A. Lock the steering column, then remove the steering wheel.
  - B. Remove the steering wheel, then disable the airbag.
  - C. Lock the steering column, then disable the airbag.
  - D. Remove the airbag module, then the signal light switch.
125. What steps must be followed when cleaning seatbelt webbing?
- A. Use a commercial cleaner, then dry with a heat gun.
  - B. Use only a mild soap and water solution and a soft brush or cloth, then air dry.
  - C. Replace all soiled belts with new ones, then label them before installing.
  - D. Remove belts from the retractor, then have them dyed and reinstall.