

ASE® G1 - Quiz Questions with Answers

A. Engine Systems

A. Engine Systems

1.

Two technicians are discussing cooling system pressure testing. Technician A says the cooling system should be pressurized to the specification listed on the underhood label. Technician B says overpressurization of the cooling system can damage cooling system components. Who is correct?

Technician B only

Technician A only

Both A and B

Neither A nor B

Correct answer: Technician B only

Technician B is correct. Cooling system pressure corresponds with the specified relief pressure of the radiator cap. This is typically stamped or printed on the radiator cap. The radiator cap regulates maximum cooling system pressure and should be checked periodically with a cooling system pressure tester. Never exceed the specified pressure of the cooling system when using a cooling system pressure tester. Overpressurization is likely to cause damage to cooling system components.

2.

Which of the following would NOT cause a rattling noise from the exhaust system?

A faulty oxygen sensor heater

A broken exhaust hanger

An internally damaged catalytic converter

A loose heat shield

Correct answer: A faulty oxygen sensor heater

A faulty oxygen sensor heater would not cause an exhaust rattle because the surface area of the element for an oxygen sensor heater is less than one square inch and is encapsulated in a metal chamber.

A broken exhaust hanger often causes exhaust components to rattle against parts of the undercarriage. Loose heat shields can rattle when rubbing against exhaust components or the body of the automobile. The catalyst substrate in the catalytic converter can crack and break when overheated or damaged from an impact. A broken catalyst substrate can also cause a rattling noise. A broken catalyst substrate can usually be isolated by tapping on the catalytic converter with a rubber mallet.

3.

Technician A says a malfunction indicator lamp lets the technician know fault codes are stored in the powertrain control module. Technician B says a diagnostic trouble code will let the technician know which part needs to be replaced. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because a malfunction indicator lamp illuminates when an emissions-related fault occurs in the powertrain control module.

Technician B is incorrect because fault codes indicate a malfunction in a monitored emissions-related system. A technician should perform diagnostic tests as specified by the manufacturer to determine the root cause of the malfunction.

4.

Technician A says a failed cooling system thermostat can prevent an engine from reaching operating temperature. Technician B says some cooling system thermostats are located near the connection between the lower radiator hose and the engine. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. A thermostat stuck open can prevent an engine from reaching operating temperature. Thermostats are located in numerous places, depending on the manufacturer. Most thermostats are located near the connection between the upper or lower radiator hose and the engine.

5.

Which of the following is LEAST likely to leak engine coolant?

Rear main seal

Head gaskets

Freeze plugs

Heater core

Correct answer: Rear main seal

Common locations for coolant leaks include the head gaskets, engine heater core, hoses, freeze plugs, and thermostat housing. A rear main seal would leak oil, not coolant.

6.

Two technicians are discussing Diesel Exhaust Fluid (DEF) systems. Technician A says DEF usually needs to be refilled every 5000 to 8000 miles. Technician B states DEF is added to the diesel fuel tank to help reduce emissions. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Depending on driving conditions, DEF needs to be filled at approximately 5000- to 8000-mile intervals. The DEF tank filler may be near the fuel filler cap, but never put DEF in the fuel tank and only fill the DEF tank with the approved fluid.

7.

Technician A says you should check Technical Service Bulletins (TSBs) prior to performing a procedure that requires the removal of one or more spark plugs. Technician B states that .550" (13.97 mm) is a typical spark plug gap. Who is correct?

Technician A only

Technician B only

Both A and B

Neither A nor B

Correct answer: Technician A only

It is a good practice to check for TSBs before beginning any service procedure. In this case, many modern engines have extended service intervals that can make spark plugs difficult to remove from the cylinder head. Typical spark plug gaps range from .024" (.6 mm) to .071" (1.8 mm). The spark plug gap should be checked and adjusted as necessary prior to installation. A very light coat of anti-seize lubricant should be added to the spark plug threads prior to installation.

8.

Technician A says if the fan shrouding is missing from a vehicle, engine overheating may result. Technician B says belt-driven fans have an electric clutch that allows for decoupling at higher speeds. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct. The fan relies on shrouding to direct air through the radiator and fan blades. Shrouding that has been damaged or removed can cause overheating. Older vehicles use a belt-driven mechanical fan to draw air through the radiator at lower vehicle speeds. Belt-driven cooling fans typically have a thermostatic clutch which decouples as airflow and ambient temperatures cool the thermostatic fan clutch.

9.

Two technicians are discussing throttle body/induction service. Technician A says this service can be used to remove carbon deposits. Technician B says the Mass Air Flow (MAF) sensor can be damaged during this service. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. A throttle body/induction service is used to remove carbon deposits from the throttle body and other induction system components. The MAF sensor can be damaged during this process if the wrong chemical is used for cleaning. Original Equipment Manufacturer (OEM) procedures should be followed for this process. Some OEMs do not have a provision for cleaning a MAF sensor.

10.

Two technicians are discussing the process of changing the engine oil and filter. Technician A states that prior to installing a spin on the type of oil filter you should check to see if the old filter gasket is stuck to the engine. Technician B states the vehicle's oil life monitor will reset automatically when the engine oil and filter are changed. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Gaskets of spin on oil filters tend to stick to the engine sealing surface. This usually occurs when a technician fails to apply a light coat of oil to the oil filter gasket prior to installation. After an oil change, the oil life monitor reset procedure will need to be followed - it will not reset automatically.

11.

An engine has more than one oil leak. Technician A says placing dye in the oil can help locate the sources of the leak. Technician B says a faulty PCV system could be the cause of the leaks. Who is correct?

Both technicians

Technician B only

Technician A only

Neither A nor B

Correct answer: Both Technicians

Approved dye that is visible when illuminated with an ultra violet light is commonly added to fluids of the automobile to make it easier for technicians to locate the source of a leak. PCV systems that are restricted or altered can allow the engine crankcase to pressurize and cause one or more oil leaks. The PCV system is considered the root cause of this oil leak.

12.

Technician A says modern engine coolant is environmentally friendly and can be poured on the ground after use. Technician B says it's best to remove hoses when the engine is hot and the coolant level is full so they slide off easily. Who is correct?

Neither A nor B

Technician B

Both A and B

Technician A

Correct answer: Neither A nor B

Care should be taken to contain all coolant for recycling. Hoses should never be removed when the engine is hot. Hot coolant can cause burns. Coolant should be drained prior to the removal of hoses.

13.

A noise is heard coming from the bottom end of the engine. The noise does not go away when fuel is removed from that cylinder. Which of the following is the MOST LIKELY cause?

Main bearing knock

Wrist pin noise

Worn lifters

Connecting rod knock

Correct answer: Main bearing knock

A bottom end engine knock that does not go away when spark or fuel is removed from the cylinder is most likely caused by excessive clearance in the crankshaft main bearings.

A bottom end engine noise that does go away when fuel is cut is likely to be related to the connecting rod or wrist pin. Valvetrain noises including lifters and pushrods typically cause a tapping or ticking sound heard in the upper end of the engine.

14.

A technician performs a cooling system pressure test and sees coolant leaking from the weep hole of a belt-driven water pump. The water pump is mounted to an aluminum surface on the engine. Which of the following would NOT be part of the procedure for replacing the water pump?

Use a metal gasket scraper to clean the water pump mounting surface.

Perform another pressure test after installing the new water pump.

Inspect the water pump bolts for excessive corrosion prior to reassembly.

Drain the coolant from the system.

Correct answer: Use a metal gasket scraper to clean the water pump mounting surface.

Metal gasket scrapers are not suitable for use on aluminum surfaces. In addition, most motorized gasket removers can damage aluminum surfaces. Chemical gasket removers and plastic scrapers are the best option for gasket and sealer removal from aluminum surfaces.

Many technicians perform a cooling system pressure test after installing a new water pump as a quality control measure. Many water pump bolts are exposed to coolant and are prone to corrosion. The water pump bolts should be replaced if damaged. Water pump bolts can be coated with special sealants prior to assembly to prevent corrosion. Draining the coolant from the system prior to service avoids coolant spillage as cooling system components are removed.

15.

Technician A says antifreeze concentration should be checked with a thermometer. Technician B says some cooling systems need to be bled after being filled. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Only Technician B is correct. The coolant should be checked with a hydrometer or refractometer to determine the freezing point. Some cooling systems will develop air pockets when a cooling system service or repair requires refilling the cooling system. Some cooling systems have air bleeds that can be opened to allow pockets of air to escape. Techniques used to remove air pockets include special cooling system fill kits or the use of an air lift tool and adapter.

16.

Two technicians are discussing the process of checking drive belts. Technician A says V-belts should be checked with a belt wear gauge. Technician B says modern serpentine belts may have excessive wear without showing the usual signs of dryness and cracking. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct - modern serpentine belts do not show the usual signs of dryness, chunking, and cracking as the belt ages. Technician A is incorrect because the best way to check belt tension is with a belt tension gauge, and a belt wear gauge cannot be used on a traditional V-belt.

17.

Technician A says the oily residue around the throttle body and in the intake system often comes from the Positive Crankcase Ventilation (PCV) system. Technician B says the oily residue around the throttle body and in the intake system comes from the evaporative emissions system. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because the PCV system draws crankcase vapors into the air intake system. The crankcase vapors contain compression blow-by that enter the crankcase past the piston rings. These vapors contain carbon and the carbon contributes to intake deposits. Engines with excessive blow-by have more throttle body and intake system carbon deposits. It is important to use intake and throttle body cleaning chemicals that are approved by the manufacturer of the automobile.

Technician B is incorrect because the evaporative emissions system captures fuel vapors and draws them into the air intake system. The fuel vapors from the evaporative emissions system will not cause deposits in the intake system.

18.

Technician A states that all thermostats should have a rubber gasket to seal the thermostat housing. Technician B says a thermostat that is stuck closed will cause engine overheating. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because the thermostat that is stuck closed will prevent the circulation of coolant to the radiator and will cause overheating.

Technician A is incorrect because many engines have a flat thermostat housing gasket made of paper or textile fibers. Many modern thermostats have a rubber seal that fits on the thermostat prior to installation.

19.

A Positive Crankcase Ventilation (PCV) valve is attached to the valve cover. When the engine is at idle, the hose leading to the PCV valve should:

Have vacuum applied to it

Have pressure applied to it

Have one or more cracks in it for ventilation

Be collapsed

Correct answer: Have vacuum applied to it

Vacuum should be present in the PCV hose. Lack of vacuum indicates a restricted hose, which can cause oil leaks. When the PCV hose is connected, vacuum should also be present in the PCV valve. The PCV hose should be inspected for cracks and signs of collapse.

20.

What is the first step in the diagnostic process?

Verify the customer complaint by driving the vehicle or operating the system.

Verify the customer complaint by making necessary repairs.

Verify the customer complaint by checking technical service bulletins.

Verify the customer complaint by consulting the online repair help desk.

Correct answer: Verify the customer complaint by driving the vehicle or operating the system.

The first thing you should do before anything else is verify the customer complaint. After reading the work order and talking with the customer if necessary, drive the vehicle or operate the system to fully understand the complaint. After verifying the complaint, you can proceed with other diagnostic steps such as identifying related symptoms, reviewing TSBs, and consulting online repair information.

21.

Technician A says a cracked plastic valve cover should be repaired with an epoxy sealer or a plastic welder. Technician B says tightening cover bolts will usually permanently fix a leak. Who is correct?

Neither A nor B

Technician A

Technician B

Both A and B

Correct answer: Neither A nor B

Both technicians are incorrect. Cracked pans and covers should be replaced, not repaired. Tightening cover bolts may temporarily fix a leak, but in most cases, the gasket will ultimately need to be replaced.

22.

A technician is inspecting a water pump for signs of damage. Which of the following should the technician check?

Check for leaks near the front of the engine

Check for combustion gasses in the coolant

Check the engine oil for signs of coolant contamination

Check for coolant leaking in the passenger compartment

Correct answer: Check for leaks near the front of the engine

The most common sign of a damaged water pump is leaking coolant near the front of the engine. Combustion gasses in the coolant and coolant contamination of the engine oil are signs of a leaking head gasket. Coolant leaking in the passenger compartment is a sign of a leaking heater core.

23.

Two technicians are discussing cooling fan operation on a vehicle that is equipped with one electric radiator cooling fan. Technician A says the cooling fan should turn on when the engine coolant temperature rises to a predetermined point when the air conditioning is off. Technician B says the cooling fan should remain off until a predetermined coolant temperature when the air conditioning is on. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because most radiator cooling fans turn on when the engine coolant reaches a predetermined temperature around 220 degrees Fahrenheit.

Technician B is incorrect because most electric cooling fans are commanded on when the air conditioning is turned on. This usually coincides with air conditioning compressor operation.

24.

A technician retrieves a Diagnostic Trouble Code (DTC) for an evaporative emissions (EVAP) system leak. Which of the following is the LEAST likely cause for the code to be set?

The fuel tank is empty

The gas cap is not sealing

A solenoid is malfunctioning

An evaporative system hose is damaged

Correct answer: The fuel tank is empty

The evaporative emissions (EVAP) system is an emissions system used to prevent fuel vapors from entering the atmosphere. Any leak will store a corresponding DTC and turn on the check engine light. An empty fuel tank will not cause fuel vapors to leak into the atmosphere. A malfunctioning solenoid, a faulty gas cap, and a damaged evaporative system hose can cause fuel vapors to enter the atmosphere and set up a DTC.

25.

What typically happens when diesel exhaust fluid (DEF) becomes extremely low?

The engine goes into reduced power mode

The check engine light illuminates

Nothing other than a warning message turns on

The driver is temporarily unable to see any warning messages

Correct answer: The engine goes into reduced power mode

When the diesel exhaust fluid becomes low, a warning light turns on. If the level becomes extremely low, the engine will go into reduced power mode, forcing the driver to get the vehicle serviced.

B. Automatic Transmission/Transaxle

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26.

Two technicians are discussing the process of checking the automatic transmission fluid level on a late model vehicle. Technician A states the transmission fluid level will get lower as it warms up. Technician B says an automotive diagnostic scan tool is used to determine transmission fluid temperature. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because the transmission fluid should be at a specific temperature when the level is checked. A scan tool is the most accurate tool a technician can use to measure transmission fluid temperature. Scan tools can be used to monitor the data from the transmission fluid temperature sensor and give the technician a very accurate measurement.

Technician A is incorrect because the transmission fluid level will rise as its temperature rises.

27.

Which of the following would a technician do to verify a customer concern about automatic transmission operation?

Drive the vehicle and observe transmission operation.

Use a scan tool to command upshifts and downshifts.

Use a scan tool to observe which gear the transmission control module has commanded.

Use a scan tool to check transmission fluid temperature.

Correct answer: Drive the vehicle and observe transmission operation.

A test drive is required to verify a customer concern with an automatic transmission. While on the test drive, a technician will observe upshifts and downshifts and note any irregularities. The point of the initial test drive is to attempt to reproduce the customer concern as stated in the repair order. The technician should be able to match the stated customer concern with observations during the test drive and have a systematic plan to complete the diagnosis.

Using a scan tool to command upshifts and downshifts is likely to be part of the diagnostic process, but is not part of verifying the customer concern. Using a scan tool to observe the commanded gear from the transmission control module and the transmission fluid temperature are also recommended parts of the diagnostic process, but not necessary for verifying the customer concern. An exception to the required initial test drive would occur when a vehicle is towed in and will not move forward or in reverse.

28.

Technician A says in most cases, the transmission pan must be removed to access a serviceable transmission filter. Technician B says many modern transmissions and transaxles have a bolt or plug that is removed to check the fluid level. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. On vehicles that have a serviceable transmission filter, the pan must typically be removed for filter access. A few manufacturers have spin on type transmission filters and/or drain plugs on the transmission pan. Technician B is also correct. Many modern vehicles have transmissions with a bolt or plug that is removed to check the fluid level.

29.

A vehicle with an automatic transmission has harsh upshifts. A technician is retrieving fault codes related to transmission faults. Which of the following fault codes would MOST LIKELY be related to harsh upshifts?

P0716

C0716

T0716

U0716

Correct answer: P0716

The fault code P0716 is related to powertrain malfunctions. The "P" at the beginning of the alpha-numeric code indicates a powertrain malfunction and transmission malfunctions are in this category. This alpha-numeric designation for trouble codes has applied to On Board Diagnostics Second Generation (OBD II) vehicles since 1996.

A "C" in an alpha-numeric fault code stored in a module indicates a fault is stored in a chassis-related module such as an anti-lock brake system. A "B" code stored in a module indicates a fault stored in a body-related module such as a lighting module. "U" codes are reserved for network communication faults, and "T" codes are not used for OBD II-equipped vehicles.

30.

A technician is using the transmission dipstick to check the level and appearance of the fluid. Silver- or brass-colored glittery flakes suspended in the fluid indicate:

Further inspection is required; it is likely internal transmission components are damaged.

The transmission is likely within the break-in period.

The transmission is equipped with the latest friction modifiers.

The transmission is non-serviceable and it should be repaired only when it fails.

Correct answer: Further inspection is required; it is likely internal transmission components are damaged.

Metal flakes should not be visible when inspecting the fluid. The presence of metal particles indicates aluminum, steel, or brass components are damaged in the transmission.

31.

When inspecting powertrain mounts, you should look for all of the following EXCEPT:

Fluid leaking from the transmission pan

Fluid or oil leaking onto the powertrain mounts

Fluid leaking from the powertrain mounts

Cracked or missing rubber from the powertrain mount

Correct answer: Fluid leaking from the transmission pan

Transmission fluid leaking from the transmission pan usually does not reach the powertrain mount.

Oil and fluid leaking onto the transmission mounts will often deteriorate the rubber. Missing and cracked rubber in the powertrain mount is a sure sign of damage. Many modern powertrain mounts are fluid-filled and can develop leaks.

32.

Two technicians are discussing the removal, inspection, and installation of a driveshaft. Technician A says a universal joint that is being inspected after the driveshaft has been removed should be difficult to move because binding is acceptable. Technician B says you should make index marks on universal joints and flanges prior to removal. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. Index marks should be placed on flanges, the driveshaft tube, and the universal joints as necessary to make sure the driveshaft is installed with the same orientation when compared to other driveline components. This assures a driveline vibration is not created when the driveshaft is installed. These marks can be made with paint.

Technician A is incorrect because universal joints should move freely and without looseness. Binding and looseness are signs of a universal joint that needs service.

33.

Which of the following is NOT a step in checking automatic transmission fluid?

Place the transmission in neutral with the key off and the parking brake released.

Check the fluid level on the dipstick.

Inspect the fluid on the dipstick for solid particles.

Check the temperature of the transmission fluid.

Correct answer: Place the transmission in neutral with the engine off and the parking brake released.

Automobile manufacturers have a variety of procedures for checking transmission fluid. None of these procedures call for placing the transmission in neutral, with the parking brake released and the engine off. Many manufacturers require the transmission to be within a narrow range of temperature when checking the fluid level.

34.

Which of the following is the MOST LIKELY cause of a Constant Velocity (CV) joint failure?

Dirt and water contamination

Steering the vehicle left and right excessively

Uphill or downhill driving

Excessively operating the vehicle in reverse gear

Correct answer: Dirt and water contamination

Dirt and water can enter the CV joint if a CV boot is torn or if a CV boot clamp is not securely holding the boot against the CV joint. The CV boot serves two purposes: one is to contain the CV joint lubricating grease, and the other is to prevent contaminants from entering the CV joint.

Steering the vehicle excessively is not likely to cause CV joint failure because CV joints are designed to operate while turning as well as while traveling forward. Uphill and downhill driving do not change the operating angle of the CV joint and will not reduce its service life. Reverse gear operation has no effect on the life of CV joints.

35.

Which of the following is the LEAST LIKELY place to find the specification for the correct type of transmission fluid?

On the new vehicle window sticker

Stamped on the dipstick

In the owner's manual

In professional service publications

Correct answer: On the new vehicle window sticker

The new vehicle window sticker informs the buyer of the transmission type, but will not have information about transmission fluid.

The appropriate transmission fluid for the vehicle being serviced can be found in the owner's manual and in service publications. Many transmission dipsticks have the correct transmission fluid stamped on them.

36.

Two technicians are discussing halfshaft inspection and service. Technician A says cracked, torn, or punctured Constant Velocity (CV) boots typically sling grease to nearby components. Technician B says most CV joints have a grease fitting for lubrication. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because cracked, torn, or punctured CV boots allow centrifugal force to sling the grease to nearby components. Technician B is incorrect because CV joints do not have grease fittings. Grease fittings are found on some universal joints.

37.

Two technicians are discussing the inspection of transmission cooler lines designed with a section of rubber hose. Technician A says the rubber can develop cracks, become soft, and develop a leak. Technician B says transmission cooler line fittings rarely leak because they are usually soldered to the transmission case. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct. Transmission cooler lines may leak if the rubber portion becomes cracked and soft. They may also fail if they are allowed to flex too much. For example, the case of a failed powertrain mount. Transmission fittings should be serviceable and should not be soldered.

38.

A technician who consulted the owner's manual is checking the transmission fluid level with the engine running. Which of the following would be the MOST LIKELY specified transmission fluid temperature when checking the fluid level?

185 degrees Fahrenheit

110 degrees Fahrenheit

295 degrees Fahrenheit

375 degrees Fahrenheit

Correct answer: 185 degrees Fahrenheit

The fluid level rises as the fluid temperature increases and should be at a specified temperature when checking the fluid level. 185 degrees Fahrenheit falls within the range or is the closest to most manufacturers' specifications for transmission fluid temperature when checking the fluid level.

110 degrees Fahrenheit is too low for transmission fluid at operating temperature. 295 and 375 degrees Fahrenheit indicate a transmission temperature above the normal operating range.

39.

Which of the following is NOT a step in the procedure when performing a fluid and filter service on an automatic transmission?

Apply generous amounts of sealant to both sides of the new pan gasket

Remove the transmission filter

Clean the collecting magnet

Properly torque the transmission pan bolts

Correct answer: Apply generous amounts of sealant to both sides of the new pan gasket

Applying generous amounts of sealant to both sides of the new pan gasket can cause some of it to be squeezed into the transmission pan when the pan bolts are torqued. This would cause the sealer to contaminate the transmission fluid and would likely cause a restriction in the filter or other components.

Removing the filter and properly torquing the pan bolts are steps in the process of servicing a transmission. Many transmission pans have magnets in them to catch iron or steel particles, preventing their circulation throughout the hydraulic circuits of the transmission.

40.

A technician notices a rhythmic clicking noise coming from the front end of a vehicle. The noise is noticeable when accelerating while turning. The MOST LIKELY cause is:

A damaged outer CV joint

A damaged inner CV joint

Damaged wheel bearings

A damaged drivetrain mount

Correct answer: A damaged outer CV joint

A damaged outer Constant Velocity (CV) joint will cause a rhythmic clicking noise when the vehicle is turning and accelerating at the same time. The outer CV joint is responsible for transmitting torque to the wheel hub at any steering angle.

The angle of the inner CV joint varies slightly as the suspension allows the vehicle to move up and down, and will not cause a clicking noise upon acceleration while turning. Damaged wheel bearings may make a clicking or popping noise at slow speeds, but are more sensitive to road speed than acceleration. A drivetrain mount is likely to make a noise on initial acceleration, but it will not be more noticeable while turning.

41.

Technician A says modern additives cause transmission fluid to have a pink and milky appearance. Technician B says if the transmission fluid level is low and was filled to the proper level, there is a leak somewhere. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. If the fluid level of an automatic transmission is low, there is a leak somewhere. Transmission fluid doesn't get consumed or used up.

Technician A is incorrect because pink transmission fluid with a milky appearance is caused by water or coolant contamination. Transmission fluid should be red. Common causes of water contamination include a damaged transmission cooler in the radiator, which allows coolant and transmission fluid to intermix, or a vehicle that has had flood water enter through a vent or dipstick tube.

42.

Which of the following is the LEAST LIKELY place for a transaxle to leak?

Between the dipstick and the dipstick tube

From the pan gasket

From the front seal

From the drive axle seals

Correct answer: Between the dipstick and the dipstick tube

Transmission fluid flowing from the area between the dipstick and dipstick tube indicates severe overheating of the fluid. This is a rare occurrence.

The most likely place for a transaxle to leak is from the pan gasket, front seal, or axle seals.

43.

Two technicians are discussing the causes of Constant Velocity (CV) joint failure. Technician A says excessive speed while turning is a common cause of CV joint failure. Technician B says dirt and water contamination is a common cause of CV joint failure. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because torn or cracked CV boots allow the lubricating grease to escape and contaminants in. These contaminants combined with lack of lubrication cause the CV joints to fail. Damaged inner CV joints may vibrate at higher speeds and damaged outer CV joints often make a rhythmic clicking or popping noise on sharp turns. Technician A is incorrect because the known root cause of CV joint failure is a damaged boot.

44.

Technician A says continuously variable transaxles (CVTs) have an internal drive belt to transmit power between two pulleys. Technician B says manufacturers of CVTs require additional viscosity improvers to be added to the fluid at regular intervals. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because CVTs use a metal belt to transmit power between two variable diameter pulleys. The size of the pulleys varies to change the transmission input-to-output ratio. Many drivers with early CVTs had concerns about the lack of the customary upshifts felt on vehicles equipped with automatic transmissions. This prompted manufacturers to program shift feel into the transmission control modules to give drivers the feel of upshifts.

Technician B is incorrect because manufacturers have strict requirements for CVT fluids and prohibit aftermarket additives.

45.

Two technicians are discussing methods and procedures for checking the fluid level on an automatic transmission. Technician A says automatic transmissions that are not equipped with dipsticks often have a transmission fluid check bolt located at the bottom of the transmission. Technician B says the vehicle should have the driver's side elevated slightly to check transmission fluid level. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because many modern automatic transmissions have a transmission fluid check bolt or plug that can be removed from the transmission pan or the lower part of the transmission case to check the fluid level. In many cases, the removal of the check bolt will allow a small stream of fluid to pour out if the transmission fluid level is correct. Transmission fluid will not pour out of the check bolt hole if the transmission fluid level is too low and will spill out at an excessive rate if the fluid level is too high. The fluid of all modern automatic transmissions must be at a specified temperature before checking the level. The specified temperature varies with the vehicle manufacturer.

Technician B is incorrect because automobiles should be on a level surface before checking the automatic transmission fluid level.

46.

A technician is checking the transmission fluid level on a current model automobile. The transmission fluid should be at a specified temperature when checking the fluid level. What is the MOST LIKELY manufacturer-approved method of checking the transmission fluid temperature?

Use a scan tool

Operate the vehicle for 15 minutes and look down the dipstick tube

Press the accelerator pedal till the engine is at maximum speed for one minute

Use the engine temperature gauge as an initial reference and check the transmission fluid within one minute of cold start

Correct answer: Use a scan tool

If the transmission fluid on a new vehicle should be at a specified temperature when checking the fluid level, using a scan tool is the most accurate method. Pyrometers may also be used to measure the temperature of fluids and numerous other components.

Looking down the dipstick tube, operating the engine at maximum speed, and checking one minute from cold start is not a practice used by original equipment manufacturers.

47.

A customer states the transmission will allow the vehicle to move forward and in reverse, but will not upshift into a higher forward gear. Which of the following is the MOST LIKELY cause of a lack of transmission upshifts?

The transmission control module commanded a fail-safe mode

The driver did not press the brake pedal before shifting from the park position

It is a reminder for the customer to have the periodic maintenance completed for the transmission

A fault code is stored in the powertrain control module for a faulty oxygen sensor

Correct answer: The transmission control module commanded a fail-safe mode

Many of the possible faults detected by the transmission control module or the powertrain control module will place the transmission in a fail-safe mode. The purpose of a fail-safe mode is to prevent further damage to the transmission. A fail-safe mode often allows the operation of one forward gear and reverse. The operational forward gear is often second gear. Fail-safe mode, often called limp mode, will compel the driver to get the transmission fault serviced, but will allow the vehicle to be moved to a safe place.

Modern transmissions require the brake pedal to be depressed (pressed down) before shifting to drive or reverse. A lack of upshifts is not an indicator of required preventative maintenance. Many modern transmissions do not require preventative maintenance. An oxygen sensor fault will have very little effect on transmission operation and will not cause a transmission control module to command a fail-safe mode.

48.

Technician A says transmission-related Diagnostic Trouble Codes (DTCs) can be retrieved by connecting a test light to pin 16 of the Data Link Connector (DLC). Technician B says a test drive is usually the best way to verify a customer's complaint about harsh upshifts. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. The first step of the diagnostic process is to verify the customer concern, and a test drive is usually the best way to do that. Technician A is incorrect because scan tools are connected to the DLC for retrieval of diagnostic codes.

49.

Which of the following steps should NOT be performed as part of the inspection and service of a leaking rear transmission seal on a light duty truck?

Remove the transmission

Check the rear bushing to determine if the driveshaft is moving excessively during operation

Use a seal installation tool to install the new seal

Remove the driveshaft

Correct answer: Remove the transmission

The transmission does not need to be removed to install a rear seal on a light duty truck.

The driveshaft must be removed to gain access to the rear seal of the transmission. A technician should grasp the front driveshaft yoke and check for up-and-down movement prior to removing the driveshaft. This check allows the technician to determine if excessive wear and movement in the rear (tailshaft) bushing caused the rear transmission seal failure. A seal installation tool is used to prevent damage to the seal during installation.

50.

Two technicians are discussing the diagnosis of damaged powertrain mounts. Technician A says many powertrain mounts are controlled by a module. Technician B says the root cause of a powertrain mount failure could be an oil leak. Who is correct?

Both A and B

Neither A nor B

Technician A

Technician B

Correct answer: Both A and B

Both technicians are correct. Technician A is correct because several manufacturers use active powertrain mounts which are controlled by an onboard module. Technician B is correct because oil leaks often damage the rubber on powertrain mounts.

51.

Technician A says modern transmissions use a universal fluid with improved friction modifiers and can be used in all light duty vehicles except those made by European manufacturers. Technician B says service procedures should always be consulted before performing an automatic transmission service. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. The OEM service procedures should be consulted to ensure a proper automatic transmission service is performed.

Technician A is incorrect. Transmission fluid specifications vary greatly between manufacturers. Always use the transmission fluid specified by the manufacturer.

52.

The owner of a new vehicle has a concern about the upshift feel. Technician A says Continuously Variable Transmissions (CVTs) do not shift gears. Technician B says new transmissions need to be driven about three thousand miles for a break-in period. After that, the transmission should have the correct shift feel. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct. CVTs have two variable pulleys and a band to transmit power at an infinite number of ratios without the need for traditional upshifts or downshifts. Some CVTs have the feel of upshifting and downshifting due to software programming. This alleviates some customer concerns.

Technician B is incorrect. Modern automobiles should perform very similar in the first few miles of operation as they do with tens of thousands of miles on the odometer.

53.

Two technicians are discussing transmission shift linkage. Technician A says misadjusted shift linkage could be the cause of a no crank condition. Technician B says misadjusted linkage can prevent a vehicle from entering or staying in the selected gear. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. Technician A is correct because misadjusted or worn transmission shift linkage can prevent the vehicle from starting while the selector is in the park position. The transmission range sensor must detect a park or neutral gearshift position to complete the start circuit. A misadjusted transmission range sensor can cause the same concern. Technician B is also correct. Misadjusted or worn linkage can prevent the transmission from being placed fully in the correct gear. This condition can cause the transmission to move out of a selected gear and possibly to another.

54.

A technician notices a loud clunk when shifting from reverse to drive. Which of the following steps would be LEAST likely to be one of the next steps in the diagnostic process?

Adjust the forward clutch to reduce the clearance.

Hold the brake firmly, set the parking brake, open the hood, and have an assistant observe engine movement when shifting from reverse to drive.

Check the fluid level and condition.

Turn the engine off and visually inspect the powertrain mounts for cracks or other damage that could cause excessive powertrain movement.

Correct answer: Adjust the forward clutch to reduce the clearance.

Any work done on an internal clutch of an automatic transmission is considered to be a service procedure and not part of the diagnostic process. Changing clearances requires the exchange of parts within the clutch.

Holding the service and parking brakes firmly and checking for powertrain movement is a common practice for diagnosing powertrain mount issues. Observe all safety procedures set by the automobile manufacturer. Visual inspection and checking fluid level and condition are also systematic steps in diagnosing the cause of a clunk noise during a test drive.

55.

A driver has a concern about excessive vibration that can be felt in the steering wheel and seat. The vibration is noticed any time the engine is running. What is the MOST LIKELY cause of the vibration?

A worn or damaged powertrain mount

A damaged transmission output shaft

A transmission that is overfilled with fluid

A restricted automatic transmission filter

Correct answer: A worn or damaged powertrain mount

The purpose of powertrain mounts is to isolate vibration from the passenger compartment. Powertrain mounts are also called engine mounts, transmission mounts, or motor mounts. Powertrain mounts can break and allow excessive movement in the engine and transmission when the vehicle is accelerating from a stop. Powertrain mounts that are not broken and allow excessive movement can compress and lose their cushioning effect. This loss of cushioning effect will cause abnormal vibration throughout the passenger's compartment. This can occur any time the engine is running.

Transmission output shaft vibrations will only occur when the vehicle is moving. A restricted filter and an overfilled transmission is not likely to cause a vibration any time the engine is running.

C. Manual Drive Train and Axles

C. Manual Drive Train and Axles

56.

Two technicians are discussing the procedures for service and adjustment of crossover and selector cables. Technician A says crossover cables are used on automatic transaxles. Technician B says crossover and selector cables are used on manual transaxles. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because a shifter will not fit directly into a transaxle and needs extended linkage to reach the transaxle. The type of linkage often used is a crossover cable and a selector cable. The crossover cable and the selector cable connect the shifter to the transaxle.

Technician A is incorrect because automatic transaxles do not require a crossover cable.

57.

Which of the following should be used to check wheel bearing end play?

Dial indicator

Micrometer

Feeler gauge

Straight edge

Correct answer: Dial indicator

Wheel bearing end play can be checked using a dial indicator. To check end play, place the dial indicator stem against the hub and move the hub in and out. If play exceeds the manufacturer's specifications, the bearings should be serviced or replaced. Many older vehicles were equipped with serviceable tapered wheel bearings which needed adjustment to limit end play. Most modern wheel bearings are sealed and should be replaced if the wheel bearing end play measurement exceeds manufacturer specifications.

58.

A rotational howling noise that increases when the vehicle is turning a corner MOST LIKELY indicates which of the following?

A worn wheel bearing

A failed CV axle

A worn pilot bearing

A faulty u-joint

Correct answer: A worn wheel bearing

A worn wheel bearing usually makes a howling noise as it rotates at higher speeds. The amount of noise depends on how much load is put on it. Since turns put an additional lateral thrust load on the bearing, the noise often changes when the vehicle is turning. Weight must transfer to identify which side is affected. Gradual sweeping turns typically do a better job of placing lateral loads on wheel bearings.

59.

Two technicians are discussing a truck with a two-piece driveshaft and a center support bearing. Technician A states the center support bearing is pressed onto the rear portion of the driveshaft. Technician B says the noise made by a faulty carrier bearing will vary with road speed. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct: Technician B

Technician B is correct because the center support bearing rotates at the same speed as the driveshaft and the driveshaft speed increases with road speed. Noise caused by a faulty center support bearing will vary with road speed.

Technician A is incorrect because the rear section of the two-piece driveshaft must be able to move up and down as the rear suspension moves. The center support bearing is pressed into the front portion of the driveshaft and has a bracket attaching it to the vehicle's frame.

60.

Which of the following is NOT used as manual transmission fluid?

Hydraulic oil

Automatic transmission fluid

80w-90 gear oil

30 weight motor oil

Correct answer: Hydraulic oil

Hydraulic oil is not used in manual transmissions.

Original Equipment Manufacturer (OEM) specifications for manual transmission fluid vary greatly. Engine oil, gear oil, and automatic transmission fluid are three of many options used by OEMs. It is very important to adhere to manufacturers' specifications when selecting manual transmission fluid.

61.

A technician is checking the fluid level in a differential. Most differentials should be filled:

To the bottom of the fill hole

One half inch below the fill hole

One inch above the threaded hole

To the full level on the dipstick

Correct answer: To the bottom of the fill hole

Differential fluid should be level with the bottom of the fill hole.

A fluid level one half inch below the fill hole indicates the possibility of a leak and the differential should be inspected for leaks. Although most fill plugs are threaded to fit the fill plug hole, any level above the bottom of the fill hole indicates overfilling. Differentials do not have dipsticks to check the fluid level.

62.

A four-wheel-drive truck with independent front suspension is leaking differential fluid. Which of the following would be LEAST LIKELY to cause fluid to leak from the front differential on this vehicle?

A damaged wheel bearing

A restricted vent

An overfilled differential

A damaged pinion seal

Correct answer: A damaged wheel bearing

A damaged wheel bearing will not cause a front differential to leak on a truck equipped with independent front suspension. Halfshafts connect the axle housing to wheel hubs and the differential fluid does not reach the wheel bearings.

A restricted vent on any axle housing can cause a leak because the differential fluid and air in the axle housing expands when heated. The vent is located at the top of the axle housing and allows air to escape the housing as the fluid and air expands. With increased temperature, the expanding fluid will force its way past one or more seals if the vent is restricted. An overfilled differential will cause a leak because the seals on the differential housing are not designed to be submerged in fluid. A damaged pinion seal will cause a differential fluid leak near the pinion flange. Always check for up and down movement in the pinion flange caused by worn or damaged bearings. Worn or damaged pinion bearings frequently cause excessive pinion shaft movement which causes damage to the pinion seal.

63.

What kind of fluid is used in a hydraulic clutch system?

Brake fluid

Automatic transmission fluid

Synthetic manual transmission fluid

Gear oil

Correct answer: Brake fluid

Most modern vehicles use hydraulically controlled clutches. Brake fluid is used as hydraulic fluid in these systems. The clutch master cylinder generates the pressure used to release the clutch.

Automatic transmission fluid, manual transmission lubricants, and gear oils are not used in clutch hydraulic systems.

64.

Two technicians are discussing the diagnosis of a truck with a four-wheel-drive indicator lamp flashing in the instrument cluster. Technician A says a scan tool should be used to retrieve any Diagnostic Trouble Codes (DTCs) stored in the electronic control module. Technician B says the DTCs should be written down or recorded on the repair order. Who is correct?

Both A and B

Neither A nor B

Technician A

Technician B

Correct answer: Both A and B

Technician A is correct because a flashing four-wheel-drive indicator lamp lets the driver know a fault is detected by the electronic control module. As a fault is detected, the electronic control module stores a DTC to aid the technician in diagnosis. A scan tool is used to retrieve the DTCs stored in the electronic control module.

Technician B is also correct because many service operations will set new DTCs or erase stored DTCs. It is a good idea to record all DTCs on the repair order before moving on to other diagnostic procedures.

65.

Technician A says center support bearings are used on one-piece driveshafts. Technician B says driveshafts must be removed to replace the center support bearing. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. Two-piece driveshafts are supported in the front by the transmission, in the middle by a center support bearing, and in the back by the differential. The driveshafts must be removed to service the center support bearing.

Technician A is incorrect because one-piece driveshafts do not need to be supported in the center.

66.

Two technicians are discussing service procedures for tapered roller bearings. Technician A says the grease seal can be reused after performing a wheel bearing service. Technician B says the bearings should be washed in solvent. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because tapered roller bearings should be cleaned with solvent once removed.

Technician A is incorrect because the grease seal should always be replaced when performing a wheel bearing service.

67.

A manual transmission is difficult to shift into gear. Gear clash is sometimes heard when shifting into gear. A technician verifies the symptoms and suspects the clutch is not releasing properly. What is the MOST LIKELY cause of a clutch failing to release properly?

A leaking hydraulic clutch system

Weak springs in the clutch pressure plate

A worn clutch disc

A damaged countershaft

Correct answer: A leaking hydraulic clutch system

The hydraulic clutch system provides pressure to release the clutch and will not work properly when a leak occurs. A clutch that does not release properly usually requires increased shifting effort and causes gear clash when the driver tries to shift into gear.

The pressure plate springs and the clutch disc are responsible for applying the clutch and are not likely to cause this concern. Pressure plate and clutch disc issues usually result in clutch slippage. The countershaft is located in the transmission and does not cause issues related to the release of the clutch.

68.

A technician is inspecting damage on a tapered roller bearing and finds small indentations on the rollers and outer race. This is most likely caused by:

Bearing contamination by hard particles

Over lubrication

Water damage

Overheating

Correct answer: Bearing contamination by hard particles

Surface indentations on the bearing race and rollers are usually the result of contamination by particles as hard or harder than the bearing material. Bearings and races with this type of damage should be replaced. Always replace the bearing and race as a unit.

Over lubrication is not a common occurrence in serviceable wheel bearings. Water can cause dilution of grease, but is usually evidenced by the discoloration and inconsistency of grease texture. The overheating of bearings causes uniform discoloration of the tapered rollers and outer race.

69.

Two technicians are discussing proper procedure for the removal and installation of the U-joint (universal joint) caps as part of the process of replacing a faulty U-joint. Technician A says the U-joint caps should be pressed on and off. Technician B says a hammer and a correctly-sized punch should be used to remove and install U-joint caps. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because a press is much less likely to damage the U-joint cap, driveshaft yoke, or the driveshaft tube during the removal and installation of the U-joint caps.

Technician B is incorrect because a punch driven by a hammer can crack the U-joint cap or bend the driveshaft tube or yoke.

70.

Which of the following tools would the technician be LEAST LIKELY to use when servicing tapered roller-type wheel bearings?

A grease gun

A seal remover

A seal installer

A bearing packer

Correct answer: A grease gun

A grease gun is not used when servicing tapered roller wheel bearings. Grease guns pressurize grease to force it through a grease fitting. Grease fittings are often found on suspension components.

Hubs with serviceable tapered wheel bearings will have a seal that must be removed and installed during the course of wheel bearing service. Seal removers and installers are often used to make seal removal easier and seal installers prevent seal damage during installation. A bearing packer will assure the technician that the tapered roller bearings have fresh grease throughout the bearing rollers, cage, and races.

71.

Fluid leaking from the transmission clutch housing MOST LIKELY indicates a failed:

Rear main seal

Transmission output shaft seal

Manual control lever shaft seal

Axle seal

Correct answer: Rear main seal

Fluid leaking from the clutch housing of a vehicle is usually engine oil from a leaking rear main seal. It could also be oil from a failed input shaft bearing seal. Check the engine oil and manual transmission fluid to make sure they are at the proper level.

A faulty transmission output shaft seal will cause a leak at the rear of the transmission. Manual control lever shafts are only found on vehicles equipped with automatic transmissions. Axle seals will only leak near the axle.

72.

Wheel studs are typically:

Pressed into the flange

Bolted into the flange

Welded to the flange

Threaded into the flange

Correct answer: Pressed into the flange

Wheel studs are typically pressed into the axle flange from the back. Wheel studs have splines at the non-threaded end to resist turning. Special tools are available to assist the technicians with the removal and installation of wheel studs.

73.

Two technicians are discussing the proper fluid level in a manual transmission. Technician A says the manual transmission fluid level is checked by using a pressure gauge. Technician B says the fluid level is usually checked by removing a threaded metal plug. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because the fluid level is checked in most manual transmissions by removing a metal plug from the side of the unit.

Technician A is incorrect. Pressure gauges are not used to check fluid levels on manual transmissions. Pressure gauges are used for diagnosis of automatic transmissions.

74.

Which of the following is the MOST LIKELY to cause the U-joints (universal joints) on a one-piece driveshaft to be out of phase?

A twisted driveshaft

Incorrectly installed U- joints

A damaged pinion gear flange

A misaligned center support bearing

Correct answer: A twisted driveshaft

A driveshaft can twist during extraordinary driving conditions and can cause the U-joints to be out of phase or misaligned. Misaligned U-joints will cause vibration that varies with road speed.

Incorrectly installed U-joints can also cause vibration, but will not cause an out of phase condition. A damaged pinion gear flange can also cause a vibration, but will not affect the alignment of the U-joints. Center support bearings are not used with one-piece driveshafts and will not cause the misalignment described.

75.

Technician A says hydraulic clutches require adjustment as part of periodic maintenance. Technician B says a clutch that will not release is an indication of a leaking clutch hydraulic system. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. Hydraulic clutches depend on pressure generated from the clutch master cylinder to release the clutch.

Technician A is incorrect. Hydraulic clutches do not require periodic adjustment. Older style mechanical clutch linkages can be adjusted..

76.

Which of the following is NOT a method of draining the differential fluid from an axle housing on a rear-wheel drive vehicle?

Remove the vent hose from the axle housing

Remove the differential cover

Remove the drain plug

Use a suction pump

Correct answer: Remove the vent hose from the axle housing

The vent hose is located on the top of the axle housing and is not a suitable location for draining the differential fluid. The vent hose should not be restricted in any way and should always be open to the atmosphere.

Some axle housings have a cover that is secured by bolts that can be removed to drain the fluid, while others have a drain plug on the bottom. Some technicians elect to use a suction pump to remove the axle housing fluid through the fill hole.

77.

Technician A says many transfer cases are controlled by a module. Technician B says diagnostic trouble codes specific to the transfer case can be retrieved with a scan tool. Who is correct?

Both A and B

Technician B

Neither A nor B

Technician A

Correct answer: Both A and B

Technician A is correct because most modern transfer cases are controlled electronically. Technician B is also correct because modules that control modern electronically controlled transfer cases will store fault codes when malfunctioning. These codes can be retrieved by using a scan tool. Some modules can display codes on an in-dash message center without the use of a scan tool.

78.

A technician is performing a test drive on a vehicle equipped with a manual transmission and notices chatter upon clutch engagement. Which of the following would be the LEAST LIKELY cause of clutch chatter?

A damaged clutch pilot bearing

A leaking rear main seal on the engine

A leaking input shaft seal on the transmission

Driver misuse

Correct answer: A damaged clutch pilot bearing

The least likely cause for clutch chatter is a damaged pilot bearing. Damaged pilot bearings can cause the transmission input shaft and clutch disc to continue to turn after the clutch pedal is depressed and can cause difficulty shifting into first or reverse when the vehicle is stopped, but will not cause clutch chatter.

Any type of lubricant leaking on the clutch disc can change the coefficient of friction within the clutch system and cause chatter upon clutch engagement. This includes oil leaking from the engine rear main seal or lubricant leaking from a transmission input shaft seal. Driver misuse can cause rapid wear and overheating of clutch components, causing clutch chatter.

79.

Two technicians are discussing vents on differentials. Technician A says a plugged differential vent can cause an axle seal leak. Technician B says if the vent is plugged, the brake components may be damaged. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. If the vent is plugged, internal pressure may increase, forcing lubricant past the axle oil seals. Leaking axle seals often allow differential lubricant to contaminate brake shoes.

80.

Two technicians are discussing two-piece driveshafts with three universal (U) joints. Technician A states if one of the U-joints is not aligned with the others, a vibration could occur. Technician B says one of the U-joints should be about three to seven degrees out of alignment to prevent harmonic vibrations. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct. All universal joints should be aligned when inspecting one-piece or two-piece driveshafts. If the U-joints are aligned properly, they are in phase. If they are not aligned, they are out of phase. Incorrect assembly of two-piece driveshafts or twisted driveshafts are the most common causes of out of phase universal joints.

81.

A technician is verifying a customer complaint about clutch operation on a vehicle equipped with a manual transmission. The technician notices the hydraulic clutch will not release completely. Which of the following would be the LEAST LIKELY cause of concern?

The clutch linkage needs to be adjusted

The clutch master cylinder is leaking

The clutch slave cylinder is leaking

A damaged clutch pressure plate

Correct answer: The clutch linkage needs to be adjusted

The least likely cause for the failure of a clutch to release when the pedal is depressed (pressed down) is linkage that needs to be adjusted. Hydraulic clutches do not have clutch linkage, therefore they cannot be adjusted.

Either a leaking clutch master cylinder or leaking clutch slave cylinder can allow air into the clutch hydraulic system and prevent the complete release of the hydraulic clutch. A damaged clutch pressure plate can also prevent the clutch from releasing completely if the pressure plate diaphragm springs are damaged.

82.

Which of the following vehicles would be LEAST LIKELY to have misadjusted cable-type gear shift linkage?

A light duty truck with a manual transmission

A front-wheel-drive sport utility vehicle with a manual transaxle

A full mid-sized car with a manual transaxle

A compact car with a manual transaxle

Correct answer: A light duty truck with a manual transmission

Light duty trucks equipped with manual transmissions do not have cable-type shift linkage, thus the linkage cannot be misadjusted. Transmissions in rear-wheel drive vehicles are mounted in the vehicle longitudinally. Longitudinally-mounted transmissions are designed to be close to the driver and the gear shifter connects or is mounted directly to the transmission, making gear shift cables unnecessary.

Transaxles are mounted transversely and do not pass under the passenger's compartment as transmissions do. Linkage must be used to connect the gear shifter to the transaxle because transaxles are mounted further from the driver. The cables are typically three to four feet long and may need to be adjusted. Some manual transaxles are equipped with shift rods instead of shift cables.

83.

A tire has been replaced on an all-wheel drive vehicle and warning lamps illuminate for anti-lock brakes, traction control, and stability control just after leaving the tire shop. Technician A says the replacement tire is likely to be the wrong diameter. Technician B says a tire that is significantly larger or smaller should be placed on the left rear of the vehicle to compensate for rolling resistance. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct because all-wheel drive vehicles typically have a very narrow tolerance for tire size variance. The specified tire for most vehicles is usually the same for all four tires.

Technician B is incorrect because tires should match. Some vehicles have different front and rear tire sizes specified, but both front tires should be the same and both rear tires should be the same. All vehicles should have the recommended tire size installed per the tire placard, which is typically accessed by opening the driver's door.

84.

Technician A says the hydraulic system should be adjusted if the clutch is slipping. Technician B says air may be bled from the clutch hydraulic system. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct. Manufacturers have detailed procedures for bleeding the hydraulic clutch system. This procedure is typically performed when one or more hydraulic clutch components have been replaced. Many slave cylinders have a bleeder valve that allows the technician to bleed the system, similar to procedures used for bleeding hydraulic brakes.

Technician A is incorrect because hydraulic clutch systems typically do not have procedures for periodic adjustment of hydraulic clutches.

85.

A customer has a concern about a squeaking noise that is heard during acceleration. The frequency of the squeaking noise increases as the vehicle speed increases. This noise is not heard upon deceleration. Technician A says a likely cause is a worn or damaged universal joint. Technician B says a likely cause is a worn or damaged center support bearing. Who is correct?

Technician A

Technician B

Both A and B

Neither A nor B

Correct answer: Technician A

Technician A is correct. A universal joint that is dry (lacking grease) will wear and become damaged. This will typically cause a squeaking noise upon acceleration that increases with road speed.

Technician B is incorrect. Center support bearing noises typically vary with driveline speed, but are typically the same on acceleration and deceleration. Damaged center support bearings can also cause rubbing, grinding, squeaking, and roaring noises.

D. Suspension and Steering

D. Suspension and Steering

86.

Two technicians are discussing a vehicle with a handling concern. Technician A says poor handling can be caused by incorrect loading of the vehicle. Technician B says poor handling can be caused by damaged or broken stabilizer bar links or bushings. Who is correct?

Both A and B

Technician A

Technician B

Neither A nor B

Correct answer: Both A and B

Both technicians are correct. Handling concerns can be caused by excessive or unbalanced loading of the vehicle. A handling concern may also be caused by damaged or broken stabilizer bar links or bushings because the primary purpose of the stabilizer bar is to prevent excessive body roll when cornering.

87.

Which of the following would be MOST LIKELY to cause rebound bumpers to be damaged?

Weak springs

A worn stabilizer bar

Worn control arm bushings

Excessive wear on an outer tie rod end

Correct answer: Weak springs

The rebound bumpers are made of rubber and are designed to limit suspension travel as the suspension jounces and rebounds. Damage occurs to rebound bumpers when the suspension jounces to its limits and is stopped repeatedly by the rebound bumpers. Weak springs often allow the vehicle frame or suspension component to hit the rebound bumpers during suspension travel. Ride height should be measured any time a technician sees evidence of rebound bumper damage.

Stabilizer bars are not considered to be wear items or a cause of rebound bumper damage. Control arm bushings must be in good condition for wheel alignment and proper vehicle handling, but do not contribute to rebound bumper damage. Worn tie rod ends affect steering, but do not affect suspension travel and will not cause rebound bumper damage.

88.

Which of the following is NOT a consideration when mounting tires on wheels or performing a tire rotation?

An automobile equipped with metric-sized tires

An automobile equipped with asymmetric tires

An automobile equipped with directional tires

An automobile equipped with staggered tire sizes

Correct answer: An automobile equipped with metric-sized tires

Many new tires are designated as metric-sized tires and are considered standard equipment on many models of automobile.

Asymmetric tires should be mounted with a specific portion of the tread mounted toward the outside. Directional tires must turn in one direction only. They must not be crossed when performing a tire rotation. Moving a directional tire to the opposite side of the vehicle requires dismounting and remounting the tire to maintain the same direction of rotation. Vehicles with staggered tires have different sized tires on the front than on the rear. The rim sizes are usually different also. Front-to-rear tire rotation is not possible on these vehicles.

89.

A technician is performing a visual inspection to determine if an automobile is equipped with hydraulic or electric power steering. Which of the following would NOT help identify the type of power steering system used on an automobile?

The use of a serpentine accessory drive belt

Power steering hoses attached to a belt-driven pump and the rack and pinion unit

A belt-driven power steering pump

Bright orange wires attached to steering column components

Correct answer: The use of a serpentine accessory drive belt

The use of a serpentine accessory drive belt is not an indication of the type of power steering a vehicle is equipped with. Accessory drive belts are used on several accessories as well as power steering pumps.

Power steering hoses and a belt-driven power steering pump are used in hydraulic power steering systems. Some hybrid vehicles use high voltage wires to provide power to the electric power steering. The high voltage wires are identified by their bright orange cover. Most electric power steering systems are powered by a 12-volt battery.

90.

A vehicle with a MacPherson strut front suspension has too much positive camber on the right side. The top of the strut tower has a bracket that provides adjustment for camber and caster. The bracket on the strut tower allows the MacPherson strut to move inward, outward, forward, and rearward. Which way does the top of the strut need to move to correct the condition of having too much positive camber?

Inward

Outward

Forward

Rearward

Correct answer: Inward

If the technician uses the bracket on the strut tower to move the top of the MacPherson strut inward, the camber angle will decrease and make a correction for too much positive camber.

Moving the top of the MacPherson strut outward will increase camber even more and worsen the condition. Forward movement of the top of the MacPherson strut will decrease caster and rearward movement of the top of the MacPherson strut will increase caster.

91.

The tire of a vehicle shows feathering of the tread. Which of the following alignment angles requires adjustment?

Toe

Camber

Caster

Thrust

Correct answer: Toe

Incorrect toe adjustment can cause feathering of the tire tread and poor vehicle handling. A vehicle with excessive toe-in will have feathering and wear on the outside edges of the tires. Excessive toe-out will cause feathering and inside tire wear on both tires.

Incorrect camber is associated with inside or outside tire wear. Tire wear caused by incorrect camber can occur on one tire only. Caster is a directional stability angle and is not considered a tire wear angle. Thrust angle is related to vehicle tracking and is not a tire wear angle.

92.

Which alignment angle would be MOST LIKELY to need adjustment after a tie rod replacement?

Front toe

Rear camber

Caster

Front caster

Correct answer: Front toe

Toe angle is directly dependent on tie rod adjustment. If the tie rods are replaced, the toe angle will have to be measured and adjusted.

93.

Which of the following indicates the direction the rear wheels travel compared to the center line of the vehicle?

Thrust angle

Camber

Caster

Included angle

Correct answer: Thrust angle

The measurement of the thrust angle compares the centerline of the vehicle to the direction the rear wheels are traveling. If the rear wheels travel in a direction parallel to the vehicle centerline, the thrust angle is zero.

94.

All of the following should be completed when performing a pre-alignment inspection EXCEPT:

Make sure the ball joints are lubricated

Check the tire pressure

Test drive the vehicle

Make sure all the tires are the same size

Correct answer: Make sure the ball joints are lubricated

Before performing an alignment, the vehicle should be test driven. After the test drive, the tire pressure and condition should be checked. Ensure that all of the tires are the same size.

Lubricating steering and suspension components as specified by the manufacturer is a recommended periodic service, but does not need to be completed as part of a pre-alignment inspection.

95.

Two technicians are discussing the application and testing of steering dampers. Technician A says steering dampers are usually used on front-wheel drive vehicles. Technician B says steering dampers should have the same resistance when being compressed as when being extended. Who is correct?

Technician B

Technician A

Both A and B

Neither A nor B

Correct answer: Technician B

Technician B is correct because the steering damper is attached to the steering linkage and should have the same resistance to compression and extension.

Technician A is incorrect because steering dampers are most likely to be used on trucks and larger SUVs.

96.

Where can the vehicle manufacturer's recommended tire inflation pressure be found?

In the door jamb

In the glove box

In the trunk

On the sidewall of the tire

Correct answer: In the door jamb

When inflating the tires on a vehicle, use the vehicle manufacturer's recommended tire pressure, which can usually be found on a placard on the door near the latch or the door jamb. The tire placard also lists recommended tire sizes.

The maximum tire pressure is listed on the sidewall for general purposes only.

97.

Where are you most likely to find a routing diagram for belts?

Under the hood

In the door jamb

Affixed to the inner side of the glove box door

On the belt packaging

Correct answer: Under the hood

The belt routing diagram can usually be found under the hood. It may be near the radiator support or on the bottom side of the hood.

98.

Which of the following is NOT used to recalibrate a steering angle sensor?

Targets set up in front of the vehicle

The software for the wheel alignment machine

A scan tool

An onboard module

Correct answer: Targets set up in front of the vehicle

Special targets are set up in front of a vehicle to calibrate cameras for advanced driver assist systems such as collision avoidance, lane keep assist, and adaptive cruise control, but are not used to calibrate steering angle sensors.

Many modern wheel alignment machines have software that will calibrate steering angle sensors. Many higher-end scan tools also have features that will calibrate steering angle sensors. Some vehicles have software built into the onboard module to calibrate the steering angle sensors automatically.

99.

Which of the following must be done before installing an inner tie rod end bellows on a rack and pinion unit?

Remove the outer tie rod end

Remove the halfshaft

Check the level of the power steering fluid

Install the outer tie rod end

Correct answer: Remove the outer tie rod end

The inner tie rod end bellows will not fit onto the inner tie rod end without removing the outer tie rod end first. The inner tie rod end bellows is flexible and allows for the extension and retraction of the inner tie rod ends and rack gear during turns while sealing the rack and pinion unit from water and dirt.

The halfshaft is also known as a Constant Velocity (CV) axle and connects the transaxle to the wheel hub. The halfshaft does not need to be removed to install the inner tie rod end bellows. A power steering leak could cause the bellows to deteriorate, but the level of the fluid does not affect the installation of the inner tie rod end bellows. The outer tie rod end needs to be installed after installing the inner tie rod end bellows.

100.

A technician is removing an inner tie rod end on a rack and pinion unit. Which of the following does NOT need to be removed as part of the process?

The Pittman arm

The outer tie rod

The jam nut

The bellows

Correct answer: The Pittman arm

Pittman arms are used on steering systems with recirculating ball steering gears. Rack and pinion steering eliminates the need for Pittman arms.

All other components listed must be removed before removing an inner toe rod end on a rack and pinion unit.
