

GLOSSARY

3-minute charge test- A method used to test batteries. Not valid for all types of batteries.

4 X 2 - The term used to describe a two-wheel drive truck. The "4" indicates the number of wheels of the vehicle and the "2" indicates the number of wheels that are driven by the engine.

4 X 4 - The term used to describe a four-wheel drive vehicle. The first "4" indicates the number of wheels of the vehicle and the second "4" indicates the number of wheels that are driven by the engine.

4WAL - Four wheel antilock.

720° cycle – The number of degrees of crankshaft rotation required to complete the four-stroke cycle.

A-arm – Another name for a control arm because it often looks like the letter A.

Above ground storage tank-A type of oil storage.

ABS - Antilock brake system.

AC - See alternating current.

AC coupling - A signal that passes the AC signal component to the meter, but blocks the DC component. Useful to observe an AC signal that is normally riding on a DC signal; for example, charging ripple.

AC generator - Also called an alternator.

AC motor – An electric motor that is powered by AC (alternating current).

AC synchronous motor – An electric motor that uses a three-phase stator coil with a brushless permanent magnet rotor. Another term for DC brushless motor.

AC/DC clamp-on DMM- A type of meter that has a clamp that is placed around the wire to measure current.

Accumulator – A temporary location for fluid under pressure.

Acid – A substance with a pH lower than 7.

Acidic – A chemical compound that produces a pH of less than 7 when dissolved in water. Acidic is the opposite of alkaline.

ACIM – AC Induction Motor. See *Induction motor*.

Ackerman Principle - The angle of the steering arms causes the inside wheel to turn more sharply than the outer wheel when making a turn. This produces toe-out on turns (TOOT).

ACM – Active Control Engine Mount. ACMs are computer controlled and are designed to dampen unusual vibrations during ICE start/stop.

ACP - Audio Control Protocol, a type of serial data transmission used by Ford.

Active sensor – A type of wheel speed sensor that produces a digital output signal.

Actuator – An electromechanical device that performs mechanical movement as commanded by a controller.

Additive - A substance added in small amounts to something, such as gasoline.

Adhesive-lined heat shrink tubing- A type of heat shrink tubing that shrinks to one-third of its original diameter and has glue inside.

Adjustable wrench – A wrench that has a moveable jaw to allow it to fit many sizes of fasteners.

Advisor – A role played by a mentor.

Advocate – A role played by a mentor.

AFS-Active Front headlight System. A name for the system that causes the headlights to turn when cornering.

AFV – Alternative fuel vehicle.

AGM battery – Absorbed glass mat. AGM batteries are lead-acid batteries, but use an absorbent material between the plates to hold the electrolyte. AGM batteries are classified as valve-regulated lead-acid (VRLA) batteries.

AGST – Above ground storage tank, used to store used oil.

Ah – Ampere-hour. A battery capacity rating.

AIR - Air injection reaction emission control system; also called *secondary air injection*.

Airbag- An inflatable fabric bag that deploys in the event of a collision that is severe enough to cause personal injury.

Air-blow gun – A handheld nozzle attached to a compressed air hose to apply air pressure to a component or device.

Air compressor – A piece of shop equipment that uses an electric motor to power an air compressor, which is stored in a pressure tank for use in the shop.

Air-fuel ratio – The ratio of air to fuel in an intake charge as measured by weight.

Air gap – The distance between the wheel speed sensor and the reluctor wheel.

Air management system - The system of solenoids and valves that control the flow of air from the secondary air injection system.

Air ratchet – An air-operated hand tool that rotates a socket.

Air spring – A rubber fabric air-filled bag used to replace a spring.

Air suspension - A type of suspension that uses air springs instead of steel springs.

AKI – Anti-knock index. The octane rating posted on a gas pump, which is the average of the RON and MON octane ratings.

Alamite fitting - See Zerk.

ALB – Antilock brakes.

ALC - Automatic level control.

ALCL - Assembly line communications link.

ALDL - Assembly line diagnostic link.

Align - To bring the parts of a unit into the correct position.

Alkaline - A substance with a pH of higher than 7.

Alkaline battery – A battery that uses an alkaline (pH greater than 7) electrolyte solution.

All except questions – A type of question asked on the ASE certification tests.

Alloy - A metal that contains one or more other elements usually added to increase strength or give the base metal important properties.

Alnico - A permanent-magnet alloy of *aluminum*, *nickel*, and *cobalt*.

Alternating current - (AC) An electrical signal in which current and voltage vary in a repeating sequence.

Alternator - An electric generator that produces alternating current; also called an *AC generator*.

Alternator whine- A noise made by an alternator with a defective diode(s).

Altitude - Elevation as measured in relationship to the earth's surface at sea level.

AM - Amplitude modulation.

Amber ABS warning lamp – The dash warning lamp that lights if a fault in the antilock braking system (ABS) is detected.

Ambient air temperature - The temperature of the air surrounding an object.

American wire gauge (AWG)-a method used to measure wire diameter.

Ammeter - An electrical test instrument used to measure amperes (unit of the amount of current flow).

Ampere - The unit of the amount of current flow. Named for André Ampère (1775–1836).

Ampere turns - The unit of measurement for electrical magnetic field strength.

Amplitude - The difference between the highest and lowest level of a waveform.

Analog - A type of dash instrument that indicates values by use of the movement of a needle or similar device. An analog signal is continuous and variable.

Analog signal - An electrical signal whose voltage varies.

Analog-to-digital (AD) converter-An electronic circuit that converts analog signals into digital signals that can then be used by a computer.

ANC – Active noise control. ANC is a function of the vehicle’s sound system, and is designed to generate sound pulses that “cancel” undesirable noises from the engine compartment.

Anchor – The curved end of a brake shoe where it contacts the anchor pin.

Anchor pin - A steel stud firmly attached to the backing plate. One end of the brake shoes is either attached to or rests against it.

Anchor plate – The support for the anchor pin on a drum brake backing plate.

Anhydrous ethanol – Ethanol that has no water content.

Anode - The positive electrode; the electrode toward which electrons flow.

ANSI - American National Standards Institute, an organization that publishes safety standards for safety glasses and other personal protective equipment.

Antenna trimmer - A method used to calibrate the antenna of a radio.

Anti-dive – A term used to describe the geometry of the suspension that controls the movement of the vehicle during braking. It is normal for a vehicle to nose-dive slightly during braking and is designed into most vehicles.

Antifreeze – A liquid such as ethylene glycol or propylene glycol that is used to lower the freeze point of the ICE coolant. Antifreeze also raises the coolant boiling point and contains inhibitors to prevent rust and corrosion inside the cooling system.

Antifriction bearings - Bearings that use steel balls or rollers to reduce friction.

Anti-knock index - A measure of a fuel’s ability to resist engine knock, stated as a number, that is called the octane number.

Antilock braking system – A system that is capable of pulsing the wheel brakes if lockup is detected to help the driver maintain control of the vehicle.

Antimony - A metal added to nonmaintenance-free or hybrid battery grids to add strength.

Anti-rattle clips - Metal clips used to eliminate or dampen noise in a brake system.

Anti-roll bar - See stabilizer bar.

Anti-squat – A term used to describe the geometry of the suspension that controls the movement of the vehicle body during acceleration. 100% anti-squat means that the body remains level during acceleration. Less than 100% indicates that the body "squats down," or lowers in the rear during acceleration.

Anti-sway bar - See stabilizer bar.

API - American Petroleum Institute.

API – An arbitrary scale expressing the specific gravity or density of liquid petroleum products, usually diesel fuel.

APO – Auxiliary power outlet. APOs are 120-volt AC electrical outlets located on a vehicle such as the GM parallel hybrid truck or Ford Escape Hybrid.

APP – Accelerator pedal position sensor. Also known as an accelerator pedal sensor (APS).

Apply system – The part of a brake system that starts the operation of the brakes, including the brake pedal and levers, as well as the parking brake.

APRA - Automotive Parts Rebuilders Association.

APS – Accelerator pedal sensor. Also known as an accelerator pedal position sensor (APP).

Aramid - Generic name for aromatic polyamide fibers developed in 1972. Kevlar is the Dupont brand name for aramid.

Armature - The rotating unit inside a DC generator or starter, consisting of a series of coils of insulating wire wound around a laminated iron core.

Arming sensor- A sensor used in an air bag circuit that is most sensitive and completes the circuit first of two sensors that are needed to deploy an air bag.

Armored brake line - Steel brake line that has wire wrapped around it to provide protection against stones and other debris.

Articulation test - A test specified by some vehicle manufacturers that tests the amount of force necessary to move the inner tie rod end in the ball socket assembly. The usual specification for this test is greater than 1 lb. (.5 Kg.) and less than 6 lbs. (2.7 Kg.) of force.

AS – Air suspension.

Asbestosis - A health condition where asbestos causes scar tissue to form in the lungs causing shortness of breath.

ASE - abbreviation for the National Institute for Automotive Service Excellence, a non-profit organization for the testing and certification of vehicle service technicians.

Aspect ratio - The ratio of height to width of a tire. A tire with an aspect ratio of 60 (a 60 series tire) has a height (from rim to tread) of 60% of its cross-sectional width.

ASR - Acceleration slip regulation.

ASTM - American Society for Testing Materials.

ATC - After top center.

ATDC - After top dead center.

ATe - Alfred Teves Engineering, a manufacturer of brake system components and systems.

Atkinson cycle – An internal combustion engine design that limits the effective intake stroke in order to maximize the engine's expansion ratio. Atkinson-cycle engines produce less horsepower than Otto-cycle designs, but are more efficient overall.

Atmospheric pressure - Pressure exerted by the atmosphere on all things based on the weight of the air (14.7 pounds per square inch at sea level).

Atom - An atom is the smallest unit of matter that still retains its separate unique characteristic.

Atomize - To reduce or separate into fine or minute particles.

AT-PZEV – **Advanced Technology Partial-Zero-Emission Vehicle.**

Attenuation - The decrease in amplitude of a signal.

Auto link- A type of automotive fuse.

Auto range - Activates automatic settings of the test tool to the input signal.

Automatic adjusters – Drum brake adjusters that work to keep the proper clearance between the shoe lining and the brake drum.

Automatic level control – A type of electronic suspension that uses air shocks to control the height of the vehicle at the rear.

Auxiliary battery – The 12-volt battery in a hybrid electric vehicle.

Aviation tin snips – Cutters designed to cut sheet metal.

AWG - American wire gauge system.

Axial - In line along with the axis or centerline of a part or component. Axial play in a ball-joint means looseness in the same axis as the ball-joint stud.

Axial load - A force in line (same axis) as the centerline of the bearing or shaft.

Axial play – Movement or play in the same axis as the centerline of the ball joint.

Axle windup – The movement of the rear axle on a rear-wheel-drive vehicle equipped with a leaf spring-type suspension during acceleration.

B20 – A blend of 20% biodiesel with 80% petroleum diesel.

Back pressure - The exhaust system's resistance to flow. Measured in pounds per square inch (psi).

Back spacing - The distance between the back rim edge and the center section mounting pad of a wheel.

Backing plate - A steel plate upon which the brake shoes are attached. The backing plate is attached to the steering knuckle or axle housing.

Backlight - Light that illuminates the test tool's display from the back of the LCD.

Backlight - The rear window of a vehicle.

Backside setting - See back spacing.

Backup camera- A camera mounts on the rear of the vehicle that is used to display what is behind a vehicle when the gear selector is placed in reverse.

Baffle - A plate or shield used to direct the flow of a liquid or gas.

Bakelite - A brand name of the Union Carbide Company for phenol formaldehyde resin plastic.

Balance shaft - A shaft in the engine that is designed so that, as it rotates, it reduces or cancels out any vibration.

Ball bearings - An anti-friction bearing that uses steel balls between the inner and outer race to reduce friction.

Ball joints – A ball and socket joint used in the front suspension to allow up and down and turn motion of the front wheel.

Ball socket assembly - An inner tie rod end assembly that contains a ball and socket joint at the point where the assembly is threaded on to the end of the steering rack.

Ballast resistor - A variable resistor used to control the primary ignition current through the coil.

Ball-joint - A flexible joint having a ball and socket type of construction used in suspension systems.

BARO sensor - A sensor used to measure barometric pressure.

Barometric pressure - The measure of atmospheric pressure, in inches of mercury (Hg), that reflects altitude and weather conditions.

Barrel - A part of a micrometer, which has 40 threads per inch.

Barrel shaped - A brake drum having a frictional surface that is larger in the center than at the open end or the rear of the drum.

Barrier hose – A type of refrigerant hose that has an inner liner that helps prevent the loss of refrigerant.

BAS – Belt Alternator Starter system. A hybrid electric vehicle system that uses a motor-

generator connected to the ICE through an accessory drive belt.

Base - The name for the section of a transistor that controls the current flow through the transistor.

Base brakes - See service brakes.

Battery - A chemical device that produces a voltage created by two dissimilar metals submerged in an electrolyte.

Battery cables-Cables that attach to the positive and negative terminals of the battery.

Battery electrical drain test - A test to determine if a component or circuit is draining the battery.

Battery module – A number of individual cells (usually six) connected in series. NiMH cells produce 1.2 volts, so most NiMH battery modules produce 7.2 volts.

Battery vent – The external air intake vent for the battery cooling system in a Ford Escape hybrid.

Battery voltage correction factor A computer problem that increases the fuel-injector pulse width if the battery voltage drops to compensate for the resulting slower opening of the injector(s).

Baud rate - The speed at which bits of computer information are transmitted on a serial data stream. Measured in bits per second (bps).

BCI - Battery Council International.

BCM – Battery condition monitor module. On Honda HEVs, the BCM is responsible for providing information on high-voltage battery condition to other modules on the vehicle network.

Bead – The part of a tire that is made of wire that the body plies are wrapped around.

Beam-type torque wrench – A type of wrench that displays the torque being applied to a fastener by the position of a deflective pointer and a scale, indicating the amount of torque.

Bearing splitter – A two-part steel device used between a bearing and a gear or other component, which is used to remove the bearing using a hydraulic press.

Bearingized - A hard surface created inside a wheel cylinder or master cylinder by forcing a hardened steel ball through the bore.

Beehive holddown – A type of hold-down spring used on drum brakes and shaped like a beehive.

Bell housing - A bell-shape housing attached between the engine and the transmission.

Bell-mounted - A brake drum with a frictional surface larger at the open end of the drum than at any other point toward the rear of the drum.

Belt - Fabric or woven steel material over the body plies of a tire, and just under the tread area, to help keep the tread from squirming.

Belt-and-pulley CVT – A continuously variable transmission (CVT) that uses a belt with two variable-width pulleys (variators) to provide an infinite number of gear ratios.

Bench grinder – An electric motor with a grinding stone and/or wire brush attached at both ends of the armature and mounted on a bench.

Bench testing- A test of a component such as a starter before being installed in the vehicle.

Bendix drive - An inertia-type starter engagement mechanism not used on vehicles since the early 1960s.

BEV – Battery electric vehicle.

BHP – Brake horsepower. BHP is horsepower as measured on a dynamometer.

Bias - In electrical terms, the voltage applied to a device or component to establish the reference point for operation.

Bias voltage - In electrical terms, bias is the voltage applied to a device or component to establish the reference point for operation.

Bias-belted - A bias ply tire with additional belt material just under the tread area.

Bias-ply - The body plies cover the entire tire and are angled as they cross from bead to bead.

Bidirectional communication - Computer communication that uses serial data as both an input and an output.

BIN number – A United States federal rating of emissions. The lower the BIN number, the cleaner the exhaust emission is.

Binary system- A computer system that uses a series of zeros and ones to represent to information.

Biodiesel – A renewable fuel manufactured from vegetable oils, animal fats, or recycled restaurant grease.

Biomass – Nonedible farm products, such as corn stalks, cereal straws, and plant wastes from industrial processes, such as sawdust and paper pulp used in making ethanol.

Bipolar transistor-A type of transistor that has a base, emitter and collector.

Bit - The individual voltage signal of a serial data stream; also, the smallest unit of measurement recognized by a computer.

BJB – Battery junction box. The power distribution box located near the battery in the ICE compartment.

BJI – Ball joint inclination.

Bleeder screw - A valve in wheel cylinders (and other locations) for bleeding air from the hydraulic system.

Bleeder valve - A threaded valve used to bleed air from a brake hydraulic system.

Blend door – An air mix valve located in the air distribution box of a HVAC system. The blend door blends air from the A/C evaporator with warm air from the heater core to deliver air at the desired temperature at the outlet ducts.

Block – The foundation of any engine. All other parts are either directly or indirectly attached to the block of an engine.

Blow-by gases - Combustion gases that leak past the piston rings into the crankcase during the compression and combustion strokes of the engine.

Blower motor - An electric motor and squirrel cage type of fan that moves air inside the vehicle for heating, cooling and defrosting.

Bluetooth- A short range wireless communication standard named after a Danish king that had a bluetooth.

BNC connector - Coaxial-type input connector. Named for its inventor, Neil Councilman.

BOB - Break out box.

Body ply – A layer of cloth that gives a tire its strength.

Bolt circle - The diameter (in inches or millimeters) of a circle drawn through the center of the bolt holes in a wheel.

Bonded linings - Brake linings that are glued or bonded to the brake shoes.

Boost - An increase in air pressure above atmospheric. Measured in pounds per square inch (psi).

Boost converter – An electronic component that increases voltage from a DC power source. Toyota's THS II system utilizes a boost converter to increase electric drive motor efficiency.

Boost system – The component in the brake system used to increase the brake pedal force.

Boots - Rubber dust protectors on the ends of wheel cylinder or caliper.

Bore – The inside diameter of the cylinder in an engine.

Bottom dead center (BDC) - The lowest position in the cylinder that a piston can travel without reversing its direction.

Bounce test - A test used to check the condition of shock absorbers.

Bound electrons-electrons that are close to the nucleus of the atom.

Boxer – A type of engine design that is flat and has opposing cylinders. Called a boxer because

the pistons on one side resemble a boxer during engine operation. Also called a *pancake engine*.

BPMV - Brake pressure modulator valve.

BPP – Brake pedal position.

Braided ground straps- Ground wires that are not insulated and braided to help increase flexibility and reduce RFI.

Brake – Any device that is designed to slow or stop a mechanism or component.

Brake block - Brake pad material is pressed into a brake block before being heated to become a brake pad.

Brake control system – The component in a brake system that ensures that the wheel brakes are applied quickly and balanced among all four wheels for safe operation.

Brake fade - A result of heat buildup. It is the reduction in braking force due to loss of friction between the brake shoes and the drum or between the disc brake pads and the rotor.

Brake fluid - A non-petroleum-based fluid called polyglycol used in hydraulic brake systems.

Brake fluid level sensor – A sensor used in the brake fluid reservoir to detect when brake fluid is low and turns on the red brake warning light on the dash.

Brake hardware kit – Springs, clips, and other hardware items to replace the original items when the brake lining or pads are replaced.

Brake light switch – A switch located on the brake pedal linkage used to turn on the rear brake lights.

Brake lines – Steel tubes used to transmit brake fluid pressure.

Brake lining - A friction material fastened to the brake shoes. It is pressed against the rotating brake drum to accomplish braking.

Brake pad – The brake friction material used in disc brakes.

Brake pedal – The pedal depressed by the driver to operate the wheel brakes.

Brake pipes – Lines that carry brake fluid from the master cylinder to the wheel brakes.

Brake return springs – The springs used on a drum brake to retract the linings away from the drum when the brakes are released.

Brake shoe - The part of the brake system upon which the brake lining is attached.

Brake shoe holddown – Springs or clips used to hold brake shoes against the backing plate.

Brake shoes - The part of the brake system upon which the brake lining is attached.

Branches-electrical parts of a parallel circuit.

Breaker bar – A handle used to rotate a socket; also called a *flex handle*.

Breather tube - A tube that connects the left and right bellows of a rack and pinion steering gear.

Brake tubing – Pipes used to carry brake fluid from the master cylinder to the wheel brakes.

Brake warning lights – Include the red brake warning light and the amber ABS warning light.

Breaker bar – A long handled socket drive tool.

Breakout box – A piece of test equipment that installs between an electrical/electronic component, such as a controller, and the wiring harness.

Breather port – Another name for the master cylinder replenishing port (rearward port).

Breather tube - A tube that connects the left and right bellows of a rack and pinion steering gear.

Brinelling - A type of mechanical failure used to describe a dent in metal such as what occurs when a shock load is applied to a bearing. Named after Johann A. Brinell, a Swedish engineer.

British thermal unit (BTU) - The amount of heat required to raise 1 pound of water 1°F at sea level.

Brush-end housing- The end of a starter or generator (alternator) where the brushes are located.

Brushes - A copper or carbon conductor used to transfer electrical current from or to a revolving electrical part such as that used in an electrical motor or generator.

Brushless motor – An electric motor that does not use brushes or a commutator. Instead, brushless motors are typically constructed with permanent magnets in the rotors and are powered by three-phase alternating current.

BTDC - Before top dead center.

BTU – British thermal unit. A measure of heat energy. One BTU of heat will raise the temperature of one pound of water one Fahrenheit degree.

Buffer - A component or circuit used to reduce the interaction between two electronic circuits.

Bulb test-A test to check the operation of certain circuits controlled by the ignition switch.

Bulkhead – The panel between the engine compartment and the passenger compartment.

Bump cap – A hat that is plastic and hard to protect the head from bumps.

Bump steer - A term used to describe what occurs when the steering linkage is not level causing the front tires to turn inward or outward as the wheels and suspension move up and down. Automotive chassis engineers call it "roll steer".

Bump stop - A rubber or urethane stop to limit upward suspension travel. Also called a strikeout bumper, suspension bumper, or compression bumper.

Burn in - A process of operating an electronic device for a period from several hours to several days.

BUS – A term used to describe a communication network.

Bypass port – Another name for the master cylinder vent port (forward port).

Bypass tube – A tube located in the engine water jacket that allows coolant to bypass the radiator and be sent directly to the water pump inlet when the thermostat is closed.

Bypassing – A type of fault when brake fluid flows past cup seals and enters another chamber.

Byte - Eight bits of computer information that are processed as a unit and are transmitted in sequence on the serial data stream. Also known as a “word.”

CA-Cranking amperes. A battery rating.

CAA – Clean Air Act. Federal legislation passed in 1970 that established national air quality standards.

CAB – Controller antilock brake.

Cabin filter – A filter located in the air intake of the HVAC system.

CAFE - Corporate average fuel economy.

Cage – The support for rollers or ball bearings.

Calcium - A metallic chemical element added to the grids of a maintenance-free battery to add strength.

Calendar year (CY) – A calendar year is from January 1 through December 31 each year.

Calibration codes – Codes used on many powertrain control modules.

California Air Resources Board (CARB) – A state of California agency which regulates the air quality standards for the state.

Caliper - The U-shaped housing that contains the hydraulic pistons and holds the pads on discbrake applications.

Camber - The inward or outward tilt of the wheels from true vertical as viewed from the front or rear of the vehicle. Positive camber means the top of the wheel is out from center of the vehicle more than the bottom of the wheel.

Camber roll – The camber angle of the front wheels due to caster.

Cam-in-block design – An engine where the crankshaft is located in the block rather than in the cylinder head.

Campaign – A recall where vehicle owners are contacted to return a vehicle to a dealer for corrective action.

Camshaft – A shaft with lobes which open valves when being rotated through a chain, belt, or gear from the crankshaft.

CAN – Controller Area Network, a type of serial data transmission.

Candlepower - Measures the amount of light produced by a bulb.

Cap screw – A bolt that is threaded into a casting.

Capacitance - Electrical capacitance is a term used to measure or describe how much charge can be stored in a capacitor (condenser) for a given voltage potential difference. Capacitance is measured in farads or smaller increments of farads such as microfarads.

Capacitor - A condenser: an electrical unit that can pass alternating current, yet block direct current. Used in electrical circuits to control fluctuations in voltage.

Capillary action - The movement of a liquid through tiny openings or small tubes.

CARB – See *California Air Resources Board*.

Carbohydrates – **Chemical compounds that store energy and contain carbon, hydrogen, and oxygen atoms.**

Carbon – **An element found in all organic materials. Carbon combines with oxygen to form carbon monoxide (CO) and carbon dioxide (CO₂).**

Carbon dioxide (CO₂) - A colorless, odorless, nonflammable gas produced during the combustion process. The amount (%) in the exhaust can be used to evaluate the efficiency of an engine's combustion process.

Carbon footprint – **The net amount of carbon emitted into the atmosphere through processes such as combustion. Burning of fossil fuels is considered to have a large carbon footprint.**

Carbon monoxide (CO) - A colorless, odorless, and highly poisonous gas. It is formed by the incomplete combustion of gasoline.

Carbon pile - An electrical test instrument used to provide an electrical load for testing batteries and the charging circuit.

Carbonated water – **Water containing dissolved carbon dioxide. The carbon dioxide remains in solution when under pressure and is released when its container is opened to the atmosphere.**

Carcass ply – Plies of fabric in a tire that covers the entire tire from bead to bead.

Cardan joint - A type of universal joint named for a 16th century Italian mathematician.

Caster – The forward or backward tilt of an imaginary line drawn through the steering axis as viewed from the side of the vehicle. Positive caster is where an imaginary line would contact the road surface in front of the contact path of the tire.

Caster sweep – A process used to measure caster during a wheel alignment procedure where the front wheels are rotated first inward, then outward, a specified amount.

Casting number – An identification code cast into an engine block or other large cast part of a vehicle.

Castle nut – A nut with notches cut out around the top to allow the installation of a cotter key to keep the nut from loosening.

CAT III – **An electrical measurement equipment rating created by the International Electrotechnical Commission (IEC). CAT III indicates the lowest level of instrument protection that should be in place when performing electrical measurements on hybrid electric vehicles.**

Catalytic converter - An emission control device located in the exhaust system that changes HC and CO into harmless H₂O and CO₂. If a three-way catalyst NO_x is also divided into harmless separate nitrogen (N₂) and Oxygen (O₂).

Catalytic cracking – **Breaking hydrocarbon chains using heat in the presence of a catalyst.**

Cathode - The negative electrode.

Cavitation – A process of creating a cavity or void area. Cavitation is usually used in the automotive field to describe what happens in the cooling system when water boils, creating a bubble in the system, and then cools below 212°F, which causes the bubble to collapse. When this event occurs, water rushes back into the void left by the bubble. The force of this moving water can cause noise as well as damage to cooling system parts such as water pumps.

CCA-Cold Cranking Amps. A rating of a battery tested at zero degrees F.

CCC - Computer command control is the name of General Motors' Computer Control System that uses a carburetor.

CCD – Chrysler Collision Detection, a type of serial data transmission.

CCR – Computer Command Ride.

CCVRTMR – Chassis continuously variable real time dampening magneto-rheological. A type of electronic controlled suspension.

Cd – Coefficient of drag. A measure of the aerodynamic efficiency of a vehicle.

Cell - A group of negative and positive plates to form a cell capable of producing 2.1 V.

Cellulose ethanol – Ethanol produced from biomass feedstock such as agricultural and industrial plant wastes.

Celsius – A temperature scale where zero degrees is the freezing point of water (32 degrees F) and 100 degrees is the boiling point of water (212 degrees F).

CEMF - Counter electromotive force.

Center bolt - A bolt used to hold the leaves of a leaf spring together in the center. Also called *acentering pin*.

Center link – The center part of a parallelogram-type steering linkage.

Center section – The section of a wheel that attaches to the hub. Also called the spider.

Center support bearing – A bearing used to support the center of a long drive shaft on a rear-wheel-drive vehicle. Also called a *steady bearing*.

Center take off rack – A type of rack and pinion steering gear where the tie rods are attached to the center of the rack rather than at the ends of the rack.

Center valve – A valve used in some master cylinders that allows brake fluid to flow into and out of the reservoir without causing harm to lip seals.

Centering pin - See center bolt.

Centerline steering - A term used to describe the position of the steering wheel while driving on a straight level road. The steering wheel should be centered or within plus or minus 3 degrees as specified by many vehicle manufacturers.

Centrifugal advance - A spark advance mechanism that uses centrifugal force (outward force increases with rotational speed) to increase timing advance in proportion to engine speed.

Cetane rating – A diesel fuel rating that indicates how easily the fuel can be ignited.

CFL- cathode fluorescent lighting.

CFR – Code of Federal Regulations.

CFRC - Carbon fiber reinforced carbon.

Chapman strut – A MacPherson strut-type of suspension used at the rear of the vehicle.

Change of state – The process where a material absorbs or releases heat energy to change between solid, liquid, and gaseous states.

Channel – A term used to describe a wheel brake being controlled by the antilock brake system controller.

Charge indicator – A hydrometer built into one battery cell that gives a visual indication of the state of charge.

Charging circuit - Electrical components and connections necessary to keep a battery fully charged.

Charging voltage test- an electrical test using a voltmeter and an ammeter to test the condition of the charging circuit.

Chassis - The frame, suspension, steering and machinery of a motor vehicle.

Chassis ground - In electrical terms, a ground is the desirable return circuit path.

Chatter - Sudden grabbing and releasing of the drum when brakes are applied.

Cheater bar – A pipe or other object used to lengthen the handle of a ratchet or breaker bar. Not

recommended to be used as the extra force can cause the socket or ratchet to break.

Check ball – A steel ball used to stop the flow of fluid in one direction only.

Check engine light - A dashboard warning light that is controlled by the vehicle computer. Also called the *malfunction indicator light (MIL)*.

Chill spots – Hard stops on a brake rotor or brake drum.

Chisel – A sharpened tool used with a hammer to separate two pieces of an assembly.

CHMSL-Centrally High Mounted Stop Light; the third brake light.

Christmas tree clips - Plastic clips used to hold interior panels in place. The end that goes into a hole in the steel door panel is tapered and looks like a Christmas tree.

Circuit - A circuit is the path that electrons travel from a power source, through a resistance, and back to the power source.

Circuit breaker - A mechanical unit that opens an electrical circuit in the event of excessive flow.

City tax – A typical payroll deduction.

CKP - Crankshaft position sensor.

Clamping diode- A diode installed in a circuit with the cathode toward the positive. The diode becomes forward biased when the circuit is turned off thereby reducing the high voltage surge created by the current flowing through a coil.

Class 2- A type of BUS communication used in General Motors vehicles.

Claw poles- The magnetic points of a generator (alternator) rotor.

C-lock axle - A type of rear differential that uses a C-lock to retain the axles.

Clock generator- A crystal that determines the speed of computer circuits.

Clock in – The act of recording the time when a technician reports for work or when work is started on a vehicle.

Clockspring- A flat ribbon of wire used under the steering wire to transfer airbag electrical signals. May also carry horn and steering wheel control circuits depending on make and model of vehicle.

Clock time – The time charged to complete a service procedure, which is determined by the actual time spent.

Close end – An end of a wrench that grips all sides of the fastener.

Closed loop operation – A phase of computer-controlled engine operation in which oxygen sensor feedback is used to calculate air/fuel mixture.

Clutch – Any device that is made to couple one mechanism with another to cause each to rotate at the same speed.

CMOS - Complementary metal oxide semiconductor.

CMP - Camshaft position sensor.

CNG – Compressed natural gas.

CO - Carbon monoxide.

Coach – A role played by a mentor.

Coal-to-liquid (CTL) – A refining process in which coal is converted to liquid fuel.

Coefficient of drag (Cd) – A calculation of the amount of aerodynamic drag created by a vehicle's body. A higher coefficient of drag indicates more wind resistance created by the vehicle.

Coefficient of friction - A measure of the amount of friction usually measured from 0 to 1. A low number (0.3) indicates low friction and a high number (0.9) indicates high friction.

Coil spring - A spring steel rod wound in a spiral (helix) shape. Used in both front and rear suspension systems.

Coil-on-plug ignition system - An ignition system without a distributor, where each spark plug is integrated with an ignition coil.

Cold chisel – A type of chisel used to remove rivets or to break off fasteners.

Cold-cranking amperes (CCA) - The rating of a battery's ability to provide battery voltage during cold-weather operation. CCA is the number of amperes that a battery can supply at 0°F (-18°C) for 30 seconds and still maintain a voltage of 1.2 V per cell (7.2 V for a 12-V battery).

Cold climate fluid – A typical power steering fluid recommended for use in cold climates.

Cold solder joint- A type of solder joint that was not heated to high enough temperature to create a good electrical connection. Often a dull gray appearance rather than shiny for a good solder connection.

Collapsible column – A steering column which collapses in the event of a front impact to the vehicle to help prevent injury to the driver.

Collector - The name of one section of a transistor.

Color shift-A term used to describe the change in the color of an HID arc tube assembly over time.

Combination circuit- Another name for a series-parallel electrical circuit.

Combination wrench – A wrench that is open ended at one end and has a box end at the other end.

Combination valve – A valve used in the brake system that performs more than one function, such as a pressure differential switch, metering valve, and/or proportioning valve.

Combination wrench – A type of wrench that has an open end at one end and a closed end at the other end of the wrench.

Combustion - The rapid burning of the air-fuel mixture in the engine cylinders, creating heat and pressure.

Combustion chamber - The space left within the cylinder when the piston is at the top of its combustion chamber.

Commission pay - Income to a service technician determined by the number of hours that a flat-rate manual states in the time it should take multiplied by the hourly rate of the technician.

Commutator - The name for the copper segments of the armature of a starter or DC generator.

Commutator-end housing- The end of a starter motor that contains the commutator and brushes. Also called the brush end housing.

Companion flange – The part that attaches to the driveshaft at the differential assembly.

Compensating port - The port located in the master cylinder that allows excess fluid to return to the reservoir. See also vent port.

Compensation - A process used during a wheel alignment procedure where the sensors are calibrated to eliminate errors in the alignment readings that may be the result of a bent wheel or unequal installation of the sensor on the wheel of the vehicle.

Complete circuit- A type of electrical circuit that has continuity and current would flow if connected to power and ground.

Composite - A term used to describe the combining of individual parts into a larger component. For example, a composite leaf spring is constructed of fiberglass and epoxy and a composite master brake cylinder contains both plastic parts (reservoir) and metal parts (cylinder housing).

Composite headlights - A type of headlights that uses a separate, replaceable bulb.

Composite leaf spring – A leaf spring made from a composite material, which usually includes fiberglass and epoxy resin.

Compound circuit- Another name for a series-parallel electrical circuit.

Compound wound - A type of electric motor where some field coils are wired in series and some field coils are wired in parallel with the armature.

Compression bumper - See jounce bumper.

Compression ratio (CR) - The ratio of the volume in the engine cylinder with the piston at bottom dead center (BDC) to the volume at top dead center (TDC).

Compression rod - See strut rod.

Compression spring- A spring which is part of a starter drive that acts on the starter pinion gear.

Compressor – An A/C system component that compresses refrigerant vapor and circulates refrigerant throughout the system.

Computer - Any device that can perform high-speed mathematical or logical calculations and otherwise process data.

Computer command control (CCC or C³) - The name of General Motors' computer engine computer engine control system that uses a carburetor.

Concentric - Perfectly round - the relationship of two round parts on the same center.

Condenser – An A/C system component located in front of the radiator in most vehicles that removes heat from the refrigerant and causes it to change from a gas to a liquid.

Condenser (electrical) - Also called a capacitor; stores an electrical charge.

Conductance – The plate surface area in a battery that is available for chemical reaction. Battery condition can be assessed using a measurement of its conductance.

Conductor - A material that conducts electricity and heat. A metal that contains fewer than four electrons in its atom's outer shell.

Cone – A tapered metal cone with a hole in the center. Used to center a hubless brake drum or rotor on a brake lathe.

Conicity – A fault in a tire that causes it to be shaped like a cone and causes a pull.

Constant velocity joint - Commonly called CV joints. CV joints are drive line joints that can transmit engine power through relatively large angles without a change in the velocity as is usually the case with conventional Cardan-type U-joints.

Continuity - Instrument setup to check wiring, circuits, connectors, or switches for breaks (open circuit) or short circuits (closed circuit).

Continuity light- A test light that has a battery and lights if there is continuity (electrical connection) between the two points that are connected to the tester.

Control arms – A suspension link that connects a knuckle or wheel flange to the body or frame of the vehicle.

Control module – An electronic device used to control the operation of activities.

Control wires- The wires used in a power window circuit that are used to control the operation of the windows.

Controller - A term that is usually used to refer to a computer or an electronic control unit (ECU).

Convection – The movement of heat from the friction surface of a brake drum or rotor to the cooler part of the drum or rotor.

Conventional ignition system - Ignition system that uses a distributor; also called *distributor ignition (DI)*.

Conventional theory - The theory that electricity flows from positive (+) to negative (-).

Coolant - The liquid mixture in the engine cooling system.

Coolant heat storage system – A system used on the second generation Toyota Prius that stores hot coolant in order to warm the engine prior to a cold start.

Coolant recovery reservoir – An external storage tank for the engine cooling system.

COP – Coil-on-plug. This term describes ignition systems in which each spark plug has its own coil assembly mounted directly over top of it. Also known as *coil-over-plug*, *coil-by-plug*, or *coil-near-plug* ignition.

Core charge – An amount of money paid when a rebuildable part is purchased and refunded when the worn or defective part is returned to the parts store.

Cotter Key - A metal loop used to retain castle nuts by being installed through a hole. Size is measured by diameter and length (for example, 1/8" x 1 1/2"). Also called a cotter pin. Named for the old English verb meaning "to close or fasten".

Coulomb - A measurement of electrons. A coulomb is 6.28×10^1 (6.28 billion billion) electrons.

Counter electromotive force (cemf)-A voltage produced by a rotating coil such as a starter motor where the armature is being moved through a magnetic field.

Country of origin – The first number of the vehicle identification number (VIN), which identifies where the vehicle was assembled.

Coupling disc - See flexible coupling.

Courtesy light - General term used to describe all interior lights.

Cow Catcher - A large spring seat used on many General Motors MacPherson strut units. If the coil spring breaks, the cow catcher is designed to prevent one end of the spring from moving outward and cutting a tire.

CPA- Connector Position Assurance. A clip used to help hold the two parts of electrical connector together.

CPU- Central Processor Unit.

CR - see compression ratio.

Cracking – A refinery process in which hydrocarbons with high boiling points are broken into hydrocarbons with low boiling points.

Cradle – A structural support for the engine and transaxle on a front-wheel-drive vehicle.

Cranking amperes - A battery rating tested at 32°F (0°C).

Cranking circuit - Electrical components and connections required to crank the engine to start. Includes starter motor, starter solenoid/relay, battery, neutral safety switch, ignition control switch, and connecting wires and cables.

Creeper – A small platform mounted on short casters designed for a service technician to lie down and maneuver under a vehicle.

Crest – The outside diameter of a bolt measured across the threads.

Crimp and seal connectors- A type of electrical connector that has glue inside which provides a weather-proof seal after it is heated.

Cross camber/caster - The difference of angle from one side of the vehicle to the other. Most manufacturers recommend a maximum difference side-to-side of ½ degree for camber and

caster.

Crossflow – A radiator that is designed so the coolant flows through it horizontally.

Crossover- An electronic circuit that separates frequencies in a sound (audio) system.

Cross steer - A type of steering linkage commonly used on light and medium trucks.

Cross-steer linkage - A type of steering linkage commonly used on light and medium trucks.

Crowfoot socket - A type of socket that slips onto the side of the bolt or nut. Used where direct access from the top is restricted.

CRT - Cathode ray tube.

Cruise control- A system that maintains the desired vehicle speed. Also called speed control.

CTL – Coal-to-liquid. See *Coal-to-liquid*.

Cunife - A magnetic alloy made from copper (Cu), nickel (Ni), and iron (Fe).

Cup – Rubber seals that have a lip which forces toward where pressure is increased.

Cup - The outer race or ring of a bearing.

Cuppy tire wear – Scalloped tire wear usually on the inside or outside edges caused by defective or worn shock absorbers or other faults in the suspension system.

Current - Electron flow through an electrical circuit; measured in amperes.

CV joint boot – The covering over a constant velocity joint made from rubber, thermoplastic, or urethane.

CVT – Continuously variable transmission. A transmission that is designed to utilize an infinite number of gear ratios during normal operation.

CY – See calendar year.

Cycle life – The number of times a battery can be charged and discharged without suffering significant degradation in its performance.

Cylinder deactivation – A phase of internal combustion engine operation in which the valves of

certain cylinders are disconnected from the valve train and remain closed. This allows the engine to operate on fewer cylinders for greater fuel economy and efficiency.

Cylinder hone - A tool that uses an abrasive to smooth out and bring to exact measurement such things as wheel cylinders.

Cylindrical cell – A battery cell that is constructed similar to a D cell.

Darlington pair - Two transistors electrically connected to form an amplifier. This permits a very small current flow to control a large current flow. Named for Sidney Darlington, a physicist at Bell Laboratories from 1929 to 1971.

Data - Information used as a basis for mechanical or electronic computation.

dB – An abbreviation for decibel, a measure of relative noise level.

DC - Direct current.

DC coupling - A signal transmission that passes both AC and DC signal components to the meter. (Also see AC coupling.)

DC brushless motor - An electric motor that uses a three-phase stator coil with a brushless permanent magnet rotor. Also called an *AC synchronous motor*.

DC motor – An electric motor powered by direct current (DC).

DC-to-DC converter – An electronic component found in a hybrid electric vehicle that converts high-voltage DC to 12-volts DC for charging the auxiliary battery.

Dead-blow hammer – A type of hammer that has lead shot (small pellets) inside a steel housing, which is then covered with a plastic covering. Used to apply a blunt force to an object.

Deceleration sensor- A sensor mounted to the body of frame of a vehicle that detects and measures the deceleration of the vehicle. Used to control the activation of the air bags and vehicle stability systems.

Decibel (dB) – A unit of the magnitude of sound.

Deep cycling - The full discharge and then the full recharge of a battery.

Default setup - The setup that exists as long as there are no changes made to the settings.

Deflection - A bending or distorting motion. Usually applied to a brake drum when it is forced out-of-round during brake application.

Degrees – A degree is 1/360th of a circle.

Delta wound - A type of stator winding where all three coils are connected in a triangle shape. Named for the triangle-shape Greek capital letter.

Desiccant – An ingredient, such as silica gel used to remove moisture from air. Used in electronic systems that uses air shocks or springs.

Despiking diode-Another name of clamping diode.

Detonation - A violent explosion in the combustion chamber created by uncontrolled burning of the air-fuel mixture; often causes a loud, audible knock. Also known as *spark knock* or *ping*.

DI – Distillation index. A rating of the volatility of a fuel and how well it evaporates in cold temperatures.

Diagnostic trouble code (DTC) - An alphanumeric or numeric sequence indicating a fault in a vehicle operating system. Each sequence corresponds to a specific malfunction.

Diagonal pliers – Pliers designed to cut wire and to remove cotter keys. Also called *side cuts* or *dike pliers*.

Diagonal split master cylinder – A master cylinder for front-wheel vehicles that contains two circuits – one for the LF and LR wheel brakes and the other for the RF and LR wheel brakes.

Diaphragm - A flexible cloth/rubber sheet that is stretched across an area, separating two different compartments.

DIC – Driver Information Center. The instrument panel readout on a vehicle that provides extra information about vehicle operation and diagnostics.

Die grinder - A handheld air-operated tool used with a grinding stone or a wire brush.

Dielectric strength - Resistance to electrical penetration.

Diesohol – Standard #2 diesel fuel combined with up to 15% ethanol.

Diff - An abbreviation or slang for differential.

Differential - A mechanical unit containing gears that provides gear reduction and a change of direction of engine power and permits the drive wheels to rotate at different speeds as is required when turning a corner.

Differential measurement (delta) - Measurement of the difference between the waveform sample values at the position of the two cursors.

Digital - A method of display that uses numbers instead of a needle or similar device.

Digital computer- A computer that uses on and off signals only. Uses an A to D converter to change analog signals to digital before processing.

Digital signal - An electrical signal that is either ON or OFF with no in between.

Dimmer switch - An electrical switch used to direct the current to either bright or dim headlight filaments.

Diode - An electrical device that allows current to flow in one direction only.

Diode trio - A group of three diodes grouped together with one output used to put out the charge indicator lamp and provide current for the field from the stator windings on many alternators.

Direct current (DC) - A constant electric current that flows in one direction only.

Direct drive – A drive train that rotates the output shaft at the same speed as the input shaft. A direct drive has a gear ratio of 1:1.

Direction wires- The wires from the control switch to the lift motor on a power window circuit. The direction of current flow through these wires determines which direction the window moves.

Directional stability - Ability of a vehicle to move forward in a straight line with a minimum of driver control. Cross winds and road irregularities will have little effect if directional stability is good.

DIS - Distributorless ignition system; also called *direct-fire ignition system*.

Disc brakes – A type of wheel brake that squeezes two brake pads on both sides of a rotor or disc.

Discs – Another name for brake rotors.

Displacement – The total volume displaced or swept by the cylinders in an internal combustion engine.

Distillation – the process of purification through evaporation and then condensation of the desired liquid.

Distillation curve – A graph that plots the temperatures at which the various fractions of a fuel evaporate.

Distributor - Electromechanical unit used to help create and distribute the high voltage disturb the function of the signal when it exceeds a certain electrical level.

Division - A specific segment of a waveform, as defined by the grid on the display.

DMM – Digital multimeter. A digital multimeter is capable of measuring electrical current, resistance, and voltage.

Dog Tracking - A term used to describe the condition where the rear wheels do not follow directly behind the front wheels. Named for way many species of dogs run with their rear paws offset toward one side so their rear paws will not hit their front paws while running.

Doping - The adding of impurities to pure silicon or germanium to form either P or N type material.

DOT - Abbreviation for the Department of Transportation.

DOT 3 – Rating of the most commonly specified brake fluid.

DOT 4 – A brake fluid rating for polyglycol.

DOT 5 – Silicone brake fluid rating.

DOT 5.1 – The highest rated polyglycol brake fluid.

DOT tire code - The Department of Transportation.

Double Cardan - A universal joint that uses two conventional Cardan joints together to allow the joint to operate at greater angles.

Double-cut file – A file that has two rows of teeth that cut at an opposite angle.

Double flare - A tubing end made such that the flare area has two wall thickness'.

Double-trailing shoe – A type of non-servo drum brake when both shoes are the same size that are applied with equal force by a pair of wheel cylinders.

Downflow radiator – A radiator design in which coolant flows vertically (top to bottom).

DPDT switch - Double-pole, double-throw switch.

DPST- Double pole, single throw switch.

Drag link – Used to describe a link in the center of the steering linkage; usually called a *center link*.

Drag rod – See strut rod.

Drift - A mild pull that does not cause a force on the steering wheel that the driver must counteract (also known as lead). Also refers to a tapered tool used to center a component in a bolt hole prior to installing the bolt.

Drive axle shaft – The shaft that connects the transaxle or differential to the drive wheels.

Drive-by-wire – Another term for electronic throttle control. See *ETC*.

Drive-end (DE) housing- The end of a starter motor that has the drive pinion gear.

Drive plate – A flywheel that is used on an engine equipped with an automatic transmission.

Drive shaft – A shaft that transfers engine torque from the output of the transmission to the rear axle (differential) assembly.

Drive size – The size in fractions of an inch of the square drive for sockets.

Driveline angles – The angles of the driveshaft at the front and rear, which are equal, plus or minus 0.5 degrees.

Driver select switch – A switch which allows the driver to select the harshness of the suspension.

Driveshaft runout - A measurement of the amount a driveshaft is from perfectly round when rotated.

Driveability - The general evaluation of an engine's operating qualities, including idle smoothness, cold and hot starting, throttle response, and power delivery.

DRL- Daytime Running Lights. Lights that are on located in the front of the vehicle and come on whenever the ignition is on. In some vehicles the vehicle has to be moving before they come on. Used as a safety device on many vehicles and required in many counties such as Canada since 1990.

Dropping point - The temperature at which a grease passes from a semi-solid to a liquid state under conditions specified by ASTM.

Drum brakes – A type of wheel brake that uses expanding brake shoes inside a brake drum.

Dry park test - A test of steering and/or suspension components. With the wheels in the straight ahead position and the vehicle on flat level ground, have an assistant turn the steering wheel while looking and touching all steering and suspension components looking for any looseness.

Dry charged – Emptying the electrolyte from a fully charged lead-acid battery in order to store or ship it. Dry-charged batteries are filled with electrolyte before being put back into service.

DSO-Digital Storage Oscilloscope.

Dual diameter bore master cylinder – A master cylinder designed to work with low-drag calipers that uses two different bore sizes.

Dual diaphragm – A type of vacuum booster that uses two parallel diaphragms.

Dual inline pins (DIP) - A type of electronic chip that has two parallel lines of pins.

Dual-mass flywheel - A flywheel that consists of two parts separated by springs used to absorb

vibration in the drive line.

Dual master cylinder - A two compartment master cylinder.

Dual overhead camshaft (DOHC) - An engine design with two camshafts above each line of cylinders - one for the exhaust valves and one for the intake valves.

Dual servo brake – A drum brake design where the primary (forward facing) brake shoe exerts force against the secondary (rearward facing) brake shoe during braking while the vehicle is traveling forward.

Dual split master cylinder – A tapered master cylinder for a rear-wheel drive vehicle which has two different portions – one for the front wheel brakes and the other for the rear wheel brakes.

Dual-stage airbags- Airbags that can deploy either with minimum force or full force or both together based on the information sent to the airbag controller regarding the forces involved in the collision.

Duo-Servo - Brand name of a Bendix dual-servo drum brake.

Duration - A rating system applied to engine camshafts that determines how long the valve will be open, relative to crankshaft movement in degrees.

Durometer - The hardness rating of rubber products named for an instrument used to measure hardness that was developed about 1890.

Dust Cap - A functional metal cap that keeps grease in and dirt out of wheel bearings. Also called a grease cap.

Duty cycle - Refers to the percentage of on-time of the signal during one complete cycle.

DVOM- Digital volt-ohm-milliammeter.

Dwell - The amount of time, recorded on a dwell meter in degrees, that voltage passes through a closed switch.

Dynamic balance - When the weight mass centerline of a tire is in the same plane as the centerline of the object.

Dynamic seals – Seals used between two surfaces where there is movement.

Dynamic voltage- Voltage measured with the circuit energized and current flowing through the circuit.

E10 – A fuel blend of 10% ethanol and 90% gasoline.

E85 – A fuel blend of 85% ethanol and 15% gasoline.

E & C- Entertainment and comfort.

Earth ground - The most grounded ground. A ground is commonly used as a return current path for an electrical circuit.

Easy out – A tool used to extract a broken bolt.

EBCM - Electronic brake control module.

EBTCM – Electronic brake traction control module.

ECA- Electronic Control Module. The name used by Ford to describe the computer used to control spark and fuel on older model vehicles.

ECB – Electronically controlled braking system used on hybrid electric vehicles. Also called *regenerative braking systems*.

Eccentric - The relationship of two round parts having different centers. A part which contains two round surfaces, not on the same center.

Eccentric distortion – A fault with brake drums where the geometric centerline of the drum is different from the centerline of the axle.

Eccentric cam – A plate that has a bolt offset from the center used to change camber and/or caster.

ECM - Electronic control module on a vehicle.

ECU - Electronic control unit on a vehicle.

eCVT – Electronic continuously variable transmission.

E-diesel - Standard #2 diesel fuel combined with up to 15% ethanol. Also known as *diesohol*.

EDR- Event data recorder. The hardware and software used to record vehicle information before, during and after an airbag deployment.

EEPROM - Electronically erasable programmable read-only memory.

EFI - Electronic fuel injection.

EGR - Exhaust gas recirculation. An emission control device to reduce NO_x (oxides of nitrogen).

EHCU - Electro-hydraulic control unit.

EHPS – Electro-Hydraulic Power Steering.

EI – Electronic ignition. An SAE term for an ignition system that does not use a distributor.

Elastic limit – The limit of movement of brake shoes due to the metal not being able to return to its original dimensions.

Elastomer - Another term for rubber.

Electrical load- Applying a load to a component such as a battery to measure its performance.

Electrical potential- Another term to describe voltage.

Electricity - The movement of free electrons from one atom to another.

Electrochemistry- The term used to describe the chemical reaction that occurs inside a battery to produce electricity.

Electrode - A solid conductor through which current enters or leaves a substance, such as a gas or liquid.

Electrolyte - Any substance which, in solution, is separated into ions and is made capable of conducting an electric current. The acid solution of a lead-acid battery.

Electromagnet – An electromagnet consists of a soft iron core surrounded by a coil of wire. Electrical current flowing through the coiled wire creates a magnetic field around the core.

Electromagnetic gauges - A type of dash instrument gauge that uses small electromagnetic coils.

Electromagnetic induction - The generation of a current in a conductor that is moved through a magnetic field. Electromagnetic induction was discovered in 1831 by Michael Faraday.

Electromagnetic interference (EMI) - An undesirable electronic signal. It is caused by a magnetic field building up and collapsing, creating unwanted electrical interference on a nearby circuit.

Electromagnetism - A magnetic field created by current flow through a conductor.

Electromotive force (EMF) - The force (pressure) that can move electrons through a conductor.

Electron - A negative-charged particle: 1/1800 the mass of a proton.

Electron theory - The theory that electricity flows from negative (-) to positive (+).

Electronic brake proportioning – The control of the rear brakes during heavy braking is controlled by the ABS controller instead of using a proportioning valve.

Electronic circuit breaker - See PTC.

Electronic ignition - General term used to describe any of various types of ignition systems that use electronic instead of mechanical components, such as contact points.

Electronic spark control (ESC) - Means that the computer system is equipped with a knock sensor that can retard spark advance if necessary to eliminate spark knock.

Electronic spark timing (EST) - The computer controls spark timing advance.

Element - Any substance that cannot be separated into different substances.

EM – Electric machine. A term used to describe any device, such as an electric motor, that converts mechanical energy into electrical energy or electrical energy to mechanical energy.

Emergency brake - See parking brake.

Emitter- The name of one section of a transistor. The arrow used on a symbol for a transistor is on the emitter and the arrow points toward the negative section of the transistor.

E-metric – A tire designation for electric vehicles, which have low rolling resistance.

EMF - Electromotive force.

EMI – Electromagnetic interference. An undesirable electronic signal. It is caused by a magnetic field building up and collapsing, creating unwanted electrical interference on a nearby circuit.

Emissions - Gases and particles left over after the combustion event of an engine. The primary emissions of concern are hydrocarbons, carbon monoxide, and oxides of nitrogen.

Emitter - The name of one section of a transistor. The arrow used on a symbol for a transistor is on the emitter and the arrow points toward the negative section of the transistor.

Endplay – The movement in line with the centerline of an assembly.

Energized shoe - A brake shoe that receives greater applied force from wheel rotation.

Energy - Capacity for performing work.

Energy carrier – Any medium that is utilized to store or transport energy. **Hydrogen is an energy carrier because energy must be used to generate hydrogen gas that is used as a fuel.**

Engine control module (ECM) - The on-board computer of the engine management system that controls fuel and emissions, as well as diagnostics, for the vehicle's engine management system.

Engine mapping- A computer program that uses engine test data to determine the best fuel-air ratio and spark advance to use at each speed of the engine for best performance.

Engine stand – A floor mounted-frame usually equipped with casters on which an engine can be attached and rotated.

Enleanment - The act of reducing fuel delivery to the air-fuel mix to create a leaner mixture.

Enrichment - The act of adding fuel to the air-fuel mix to create a richer mixture.

Entrepreneur – A person who owns a business.

Environmental Protection Agency (EPA) - A federal government agency that oversees the

enforcement of laws related to the environment. Included in these laws are regulations on the amount and content of automotive emissions.

EPA - Environmental Protection Agency.

EPAS – Electric power assist steering. Also known as EPS (electric power steering).

EPM- Electrical Power Management. A General Motors term used to describes a charging system control sensor and the control of the generator(alternator) output based on the needs of the vehicle.

EPR - Ethylene propylene rubber.

EPROM - Erasable programmable read-only memory.

EPS – Electric Power Steering.

Equalizer – A bracket used in a parking brake cable system to balance the force and transmit an equal amount to each rear brake assembly.

ERFS – Electronic returnless fuel system. A fuel delivery system that does not return fuel to the tank.

ESC - Means that the computer system is equipped with a knock sensor that can retard spark advance if necessary to eliminate spark timing advance.

ESD- Electrostatic discharge. Another term for ESD is static electricity.

EST - The computer controls spark timing advance.

ETC – Electronic throttle control. The intake system throttle plate is controlled by a servo motor instead of a mechanical linkage. Also known as *drive-by-wire*.

Ethanol (grain alcohol) - An octane enhancer added, at a rate of up to 10 percent, to gasoline; will increase the octane rating of the fuel by 2.5 to 3.0. Ethanol is a fuel oxygenate.

Ethyl alcohol – see *Ethanol*.

Ethyl tertiary butyl ether (ETBE) - An octane enhancer for gasoline. It is also a fuel oxygenate that is manufactured by reacting isobutylene with ethanol. The resulting ether

is high octane and low volatility. ETBE can be added to gasoline up to a level of approximately 13 percent.

Ethylene glycol – Used with water for use as a coolant.

ETR-Electronically tuned radio. A type of radio now used in all vehicles that use electronics to tune the frequencies instead of using a variable capacitor.

EV – Electric vehicle. A term used to describe battery-powered vehicles.

EVA – Electronic Vibration Analyzer.

Evaluator – A role played by a mentor.

Evaporative (EVAP) emissions - Control system used to prevent fuel vapors in the tank from entering the atmosphere as HC emissions.

Evaporator – An A/C system component that absorbs heat from the air in the vehicle's passenger compartment.

Evaporator drain – An outlet at the bottom of the evaporator housing that allows condensed water to flow out of the passenger compartment.

EVO – Electronic variable orifice.

Exhaust gas recirculation (EGR) - The process of passing a small, measured amount of exhaust gas back into the engine to reduce combustion temperatures and formation of NO_x (oxides of nitrogen).

Expander – A spring used inside a sealing cup in a wheel cylinder to help prevent the lip from deforming when the brakes are rapidly released.

Experienced-based questions – A type of question asked on the ASE certification tests that require the technician to determine the correct answer based on experience rather than on book knowledge.

Extension – A socket wrench tool used between a ratchet or breaker bar and a socket.

External trigger- When using an oscilloscope connecting when the scope is to be triggered or

started is connected to another circuit when the one being measured.

Eye wash station – A water fountain designed to rinse the eyes with a large volume of water.

F = MA – A formula for inertia. The force (F) of an object in motion is equal to the mass (M) times the acceleration (A).

Fade - To grow weak; brakes becoming less effective.

Fahrenheit – A temperature scale developed by Gabriel Fahrenheit (1686-1736), a German physicist.

Fan clutch – A device used to control the speed of the radiator fan, used with belt- driven fans.

Farad - A unit of capacitance named for Michael Faraday (1791–1867), an English physicist. A farad is the capacity to store 1 coulomb of electrons at 1 volt of potential difference.

Fast-fill master cylinder – Another name for a quick-take-up master cylinder used with low-drag calipers.

Federal tax – A payroll deduction.

Feed controlled circuit - A circuit that energizes by applying voltage; it already has a ground.

Feedback - The reverse flow of electrical current through a circuit or electrical unit that should not normally be operating. This feedback current (reverse-bias current flow) is most often caused by a poor ground connection for the same normally operating circuit.

Feeler gauge – A set of precision thickness steel blades used to measure a gap. Also called a *thickness gauge*.

FET - Field effect transistor.

FFV – Flex-fuel vehicle. Flex-fuel vehicles are capable of running on straight gasoline or gasoline/ethanol blends.

Fiber optics - The transmission of light through special plastic that keeps the light rays parallel even if the plastic is tied in a knot.

FICA – A payroll deduction (Federal Insurance Contribution Act, also known as Social

Security).

Field coils - Coils or wire wound around metal pole shoes to form the electromagnetic field inside an electric motor.

Field housing- The part of a starter that supports the field coils.

Field poles- The magnets used as field coils in a starter motor.

Filament - The light-producing wire inside a light bulb.

Files – A metal smoothing tool.

Filler port - A term sometimes used to identify the replenishing port (rear port) of a master cylinder.

Filler vent - A breather hole in the filler cap on the master cylinder.

Filter - Electrical device that only passes or blocks certain signal frequencies. An application can be removing noise from a signal.

Fire blanket – A fire-proof wool blanket used to cover a person who is on fire and smother the fire.

Fire extinguisher classes – The types of fires that a fire extinguisher is designed to handle is referred to as fire class.

First-class lever – A type of lever where the fulcrum is between the weight and the force.

Fischer-Tropsch – A refining process that converts coal, natural gas, or other petroleum products into synthetic motor fuels.

Fitting wrench – A wrench that is used to remove the fitting holding a brake line or other line. Also called a *line wrench* or *flare-nut wrench*.

Five-wheel alignment – An alignment that not only includes the four wheels that are on the ground, but also includes the steering wheel.

Fixed brake caliper – A type of disc brake caliper that has pistons on both sides of the rotor.

Fixed joint – A type of CV joint used at the wheel end of the drive axle shaft.

Flagging – The act of recording the time and the description of the work completed on a vehicle.

Flare nut wrench – A type of wrench used to remove brake lines.

Flash codes – Diagnostic trouble codes that are retrieved using a jumper wire and watching the flashing of a light.

Flat rate – Pay based on the amount of time published in a labor guide rather than using the actual amount of time spent on the repair.

Flat-tip screwdrivers – A screwdriver used to remove and insert screws that have a single slot. Also called a *straight blade screwdriver*.

Flex handle - See breaker bar.

Flexible brake hoses – Brake hoses between the body or frame of a vehicle and the caliper or axle.

Flexible coupling - A part of the steering mechanism between the steering column and the steering gear or rack and pinion assembly. Also called a *rag joint* or *steering coupling disc*. The purpose of the flexible coupling is to keep noise vibration and harshness from being transmitted from the road and steering to the steering wheel.

Floating caliper - A type of caliper used with disc brakes which moves slightly to assure equalpad pressure on both sides of the rotor.

Floating ground – An electrical system where neither the power nor ground circuits are connected to a chassis or body ground.

Flooded cell – A battery cell with electrodes immersed in liquid electrolyte.

Floor jack – A hydraulic jack mounted on casters or steel wheels and used to lift a vehicle.

Flow Control Valve - A valve that regulates and controls the flow of power steering pump hydraulic fluids to the steering gear or rack and pinion assembly. The flow control valve is usually part of the power steering pump assembly.

Flux – Magnetic lines of force.

Flux density- The density of the magnetic lines of force around a magnet or other object.

FM - Frequency modulation.

FMSI - Friction Materials Standards Institute

FMVSS – Federal Motor Vehicle Safety Standard.

Follower ball-joint - A ball joint used in a suspension system to provide support and control without having the weight of the vehicle or the action of the springs transferred through the joint itself. Also called a friction ball-joint.

Foot-pound - A measurement of torque. A one-pound pull, one foot from the center of an object.

Force – The amount of effort measured in pounds or Newtons.

Forward bias - Current flow in normal direction.

Forward steer - *See* Front steer.

Force – Energy applied to an object.

Forward bias - Current flow in normal direction.

Forward steer - *See* Front Steer.

Foundation brakes - *See* service brakes.

Four-stroke cycle – An internal combustion engine design where four strokes of the piston (two crankshaft revolutions) are required to complete one cycle of events. The four strokes include intake, compression, power, and exhaust.

Four-wheel alignment – A wheel alignment that checks and adjusts, if necessary, the angles of all four wheels.

Fractions – A measurement in parts of an inch, such as $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$.

Free electrons-The outer electrons in an atom that has fewer than four electrons in its outer orbit.

Free play - The amount of movement that the steering wheel moves without moving the front

wheels. The maximum allowable amount of free play is less than two inches for a parallelogram-type steering system and 3/8 inch for a rack and pinion steering system.

Frequency - The number of times a waveform repeats in one second, measured in Hertz (Hz), frequency band.

Friction - The resistance to sliding of two bodies in contact with each other.

Friction ball-joint - Outer suspension pivot that does not support the weight of the vehicle. Also called a follower ball-joint.

Front steer - A construction design of a vehicle that places the steering gear and steering linkage in front of the center line of the front wheels. Also called forward steer.

FTD – Fischer-Tropsch diesel process. See *Fischer-Tropsch*.

FTP – Federal test procedure.

Fuel cell – An electrochemical device that converts the energy stored in hydrogen gas into electricity, water, and heat.

Fuel-cell stack – A collection of individual fuel cells, which are stacked end-to-end into one compact package.

Fuel compensation sensor – A sensor used in flex-fuel vehicles that provides information to the PCM on the ethanol content and temperature of the fuel as it is flowing through the fuel delivery system.

Fuel trim - A computer function that adjusts fuel delivery during closed-loop operation to bring the air-fuel mixture to as close to 14.7:1 as possible.

Fulcrum – A pivot point of a lever.

Full fielding - The method of supplying full battery voltage to the magnetic field of a generator as part of the troubleshooting procedure for the charging system.

Full frame – A frame of a vehicle that extends the entire length and width of the vehicle.

Full-floating – A type of axle assembly where the weight of the vehicle is supported by the axle

housing and not on the axle itself.

Full hybrid – A hybrid electric vehicle that utilizes high voltages (200 volts and above) and is capable of propelling the vehicle using “all-electric” mode at low speeds. Also known as a “strong” hybrid.

Fuse - An electrical safety unit constructed of a fine tin conductor that will melt and open the electrical circuit if excessive current flows through the fuse.

Fuse link- A safety device used on a solvent washer which would melt and cause the lid to close in the event of a fire. A type of fuse used to control the maximum current in a circuit.

Fusible link - A type of fuse that will melt and open the protected circuit in the event of a short circuit, which could cause excessive current flow through the fusible link. Most fusible links are actually wires that are four gauge sizes smaller than the wire of the circuits being protected.

FWD - Front wheel drive.

G force – **The amount of force applied to an object by gravity.**

Galvanized steel - Steel with a zinc coating to help protect the steel from rust and corrosion.

Garter spring - A spring used in a seal to help keep the lip of the seal in contact with the moving part.

Gas fade – A type of brake fade where the lining materials are heated enough to emit gas. The gas between the pads and the rotor result in a loss of braking force.

Gasoline – **Refined petroleum product that is used primarily as a gasoline engine.**

Gassing - The release of hydrogen and oxygen gas from the plates of a battery during charging or discharging.

Gauge - Wire sizes as assigned by the American wire gauge system; the smaller the gauge number, the larger the wire.

Gauss - A unit of magnetic induction or magnetic intensity named for Karl Friedrich Gauss (1777 - 1855), a German mathematician.

GAWR – Gross axle weight rating. A rating of the load capacity of a vehicle and included on placards on the vehicle and in the owner’s manual.

GC-LB – A grease rating for GC is the highest rating for wheel bearing grease and LB is the highest rating for chassis grease. A GC-LB grease, therefore, can be used.

GDI – Gasoline direct injection. A fuel injection system design in which gasoline is injected directly into the combustion chamber.

Gear lash – Clearance between gears.

Gear ratio – For a transmission or drive axle, the number of turns of the input shaft required to produce one turn of the output shaft.

Gel battery – A lead-acid battery with silica added to the electrolyte to make it leakproof and spill proof.

Generation mode – A mode of operation in hybrid electric vehicles that uses engine power to generate electricity for charging the high-voltage battery.

Generator - A device that converts mechanical energy into electrical energy.

Geometric centerline – A type of wheel alignment where all four wheels are aligned parallel to the centerline of the vehicle.

Germanium A semiconductor material.

G force – The force of gravity.

GFD – Ground-Fault Detection. A diagnostic function used to monitor the auxiliary power outlets in a GM parallel hybrid truck.

GHG – An abbreviation for greenhouse gas.

Global warning – An overall increase in the temperature of the earth thought to be caused by increased greenhouse gases such as carbon dioxide and methane.

GKN – A company named after its founders, Guest, Keene, and Nettelfolds.

Gland nut - The name commonly used to describe the large nut at the top of a MacPherson strut

housing. This gland nut must be removed to replace a strut cartridge.

Glazed drum - A drum surface hardened excessively by intense heat.

Glitch - A momentary spike in a waveform. This can be caused by a momentary disruption in the tested circuit.

GMLAN – GM local area network. A type of serial data transmission by General Motors.

GMM-Graphing Multimeter.

GPS-Global Positioning System. A government program of 24 satellites which transmit signals and used by receivers to determine their location.

Grab - Seizure of the drum on linings when brakes are applied.

Grade – The strength rating of a bolt.

Grain alcohol – See *Ethanol*.

Gram - A metric unit of weight measurement equal to 1/1000 kilogram (1 oz. X 28 = 1 gram). An American dollar bill or paper clip weighs about 1 gram.

Graticule- The series of squares on the face of a scope. Usually 8 by 10 on a screen.

Gravity bleeding – Removing air from a hydraulic brake system by opening the bleeder valve and allowing the brake fluid to flow downward and out the bleeder taking any trapped air with it.

Grease – Oil with thickener.

Grease cap - A functional metal cap that keeps grease in and dirt out of wheel bearings. Also called a *dust cap*.

Grease fitting – A metal replaceable fitting shaped to hold the end of a grease gun in place and equipped with a spring-loaded valve.

Grease retainer - See grease seal.

Grease seal - A seal used to prevent grease from escaping and to prevent dirt and moisture from entering.

Green tire - An uncured assembled tire. After the green tire is placed in a mold under heat and pressure, the rubber changes chemically and comes out of the mold formed and cured.

Greenhouse gas – See *GHG*.

Grid - The lead-alloy framework (support) for the active materials of an automotive battery.

Grommet - An eyelet usually made from rubber used to protect, strengthen or insulate around a hole or passage.

Gross pay – Total amount of income earned before deductions.

Ground - The lowest possible voltage potential in a circuit. In electrical terms, a ground is the desirable return circuit path. Ground can also be undesirable and provide a shortcut path for a defective electrical circuit.

Ground brushes-The brushes in a starter motor that carry current to the housing of the starter or ground.

Ground-controlled circuit - A circuit that energizes by applying ground; voltage is already

Ground plane- A part of antenna that is metal and usually the body of the vehicle.

Ground (return) path- The electrical return path that the current flows through in a complete circuit.

Growler - Electrical tester designed to test starter and DC generator armatures.

GTL – Gas-to-liquid. A refining process in which natural gas is converted into liquid fuel.

GVW - Abbreviation for gross vehicle weight. GVW is the weight of the vehicle plus the weight of all passengers and cargo up to the limit specified by the manufacturer.

GVWR – Gross vehicle weight rating. The total weight of the vehicle including the maximum cargo.

Hacksaw – A saw that uses a replaceable blade and is used to cut a variety of materials depending on the type of blade used.

Half shaft - Drive axles on a front-wheel drive vehicle or from a stationary differential to the drive wheels.

Hall-effect sensor - A type of electromagnetic sensor used in electronic ignition and other systems. Named for Edwin H. Hall, who discovered the Hall effect in 1879.

Hall-effect switch - A semiconductor moving relative to a magnetic field, creating a variable voltage output. Used to determine position. A type of electromagnetic sensor used in electronic ignition and other systems. Named for Edwin H. Hall, who discovered the Hall effect in 1879.

Halogenated Compounds - Chemicals containing chlorine, fluorine, bromine or iodine. These chemicals are generally considered to be hazardous and any product containing these chemicals should be disposed of using approved procedures.

Haltenberger linkage - A type of steering linkage commonly used on light trucks.

Hammer-A hand tool used to deliver a force to a concentrated place.

Hanger bearing - See center support bearing.

Hand brake - See parking brake.

Handwheel position sensor – A sensor that detects the direction and speed of rotation of the steering wheel.

Hard spots – Formed in brake drums or rotors due to high heat.

Hash - An unclear or a messy section of a scope pattern.

Hazard flasher - Emergency warning flashers; lights at all four corners of the vehicle and flashes on and off.

Hazard warning- A sticker or decal warning that a hazard is close.

HC - Hydrocarbons (unburned fuel); when combined with NO_x and sunlight, they form smog.

HCCI – See *Homogeneous-charge compression ignition*.

HCU – Hydraulic control unit.

HD - Heavy duty.

Heat checked - Cracks in the braking surface of a drum caused by excessive heat.

Heat shrink tubing- A type of rubber tubing that shrinks to about half of its original diameter when heated. Used over a splice during a wire repair.

Heat sink - Usually, a metallic-finned unit used to keep electronic components cool.

Heater core – A cooling system component that is responsible for transferring heat from the engine coolant to the passenger compartment.

HEI - General Motors' name for their high energy ignition.

Height-sensing proportioning valve – A valve connected to the rear suspension that limits the brake pressure sent to the rear brakes if the rear of the vehicle is high (unloaded).

Height sensor – A height sensor determines the vertical relationship between the suspension component and the body of a vehicle.

Helical insert - A steel insert used to repair damaged threads.

Helicoil – A brand name for a helical insert.

Helper springs - Auxiliary or extra springs used in addition to the vehicle's original springs to restore proper ride height or to increase the load carrying capacity of the vehicle.

HEPA - High Efficiency Particulate Air filter.

HEPA vacuum – High efficiency particulate air filter vacuum used to clean brake dust.

Hertz - A unit of measurement of frequency. One Hertz is one cycle per second, abbreviated Hz. Named for Heinrich R. Hertz, a 19th century German physicist.

HEV – Hybrid electric vehicle. Describes any vehicle that uses more than one source of propulsion, such as internal combustion engine (ICE) and electric motor(s).

HID-High Intensity Discharge. A type of headlight that uses high voltage to create an arc inside the arc tube assembly which then produces a blue-white light.

High energy ignition (HEI)-The brand name for the electronic ignition used in General Motors vehicles.

High flotation tires – A type of tire that is large in size and holds a large volume of air.

High impedance meter-A digital meter that has at least 10 million ohms of internal resistance as measure between the test leads with the meter set to read volts.

High-pass filter-A filter in an audio system that blocks low frequencies and only allows high frequencies to pass through to the speakers.

HOAT – Hybrid Organic Acid Technology. A corrosion inhibitor additive with reduced silicate content.

Hold-in winding - One of two electromagnetic windings inside a solenoid; used to hold the movable core into the solenoid.

Hole theory - A theory which states that as an electron flows from negative (-) to positive (+), it leaves behind a hole. According to the hole theory, the hole would move from positive (+) to negative (-).

HomeLink-A brand name of a system used and included in many new vehicles to operate the automatic garage door opener.

Homogeneous-charge compression ignition – A low-temperature combustion process that involves air-fuel mixtures being burned without the use of spark ignition.

Hooke's Law - The force characteristics of a spring discovered by Robert Hooke (1635-1703). An English physicist. Hooke's Law states "the deflection (movement or deformation) of a spring is directly proportional to the applied force."

Horn-An electro-mechanical device that creates a loud sound when activated.

Horsepower - A unit of power; 33,000 foot-pounds per minute. One horsepower equals 746 W.

Hotchkiss drive – A type of power transmission for a front engine, rear-drive vehicle where the engine torque reaction is controlled by the suspension as compared to the use of torque arm or frame-mounted differential.

Housing expense – Includes rent or mortgage payment, plus heat, light, and other utility expenses.

HOV lane – High-occupancy vehicle lane. Sometimes known as the carpool or diamond lane.

hp – Horsepower.

HPA – High pressure accumulator.

HSD - High side driver.

HSMO – Hydraulic system mineral oil.

HSS - High strength steel - a low carbon alloy steel that uses various amounts of silicon, phosphorus and manganese.

Hub cap - A functional and decorative cover over the lug nut portion of the wheel. Also see wheel cover.

HUD-Head up display.

HV – High voltage. Applies to any voltage above 50 volts.

HV battery – High-voltage battery. Hybrid electric vehicles use NiMH battery packs that are rated up to 330 volts DC.

HV cables – Vehicle cables that carry high voltage.

HVTB – High voltage traction battery. The high-voltage battery in a Ford Escape Hybrid.

Hybrid - Something (such as a battery) made from more than one different element; abbreviated version of hybrid electric vehicle (HEV); a type of vehicle that uses two types of propulsion.

Hybrid flasher- A type of flasher unit that can operate two or more bulbs at a constant rate.

Hydraulic - The force exerted by pressurized liquid in a closed system.

Hydraulic control unit – A mechanical assembly that controls hydraulic pressure to wheel brakes. Used in ABS and traction control systems.

Hydraulic lifter - A valve lifter that, using simple valving and the engine's oil pressure, can

adjust its length slightly, thereby maintaining zero clearance in the valve train. Hydraulic lifters reduce valve train noise and are maintenance-free.

Hydraulic press – A piece of shop equipment usually mounted on the floor, which uses a hydraulic cylinder to remove and install pressed-on components, such as bearings.

Hydraulic system – The base brake system containing the master cylinder, wheel cylinders, calipers, and brake fluid lines.

Hydrocarbons (HC) - Any of a number of compounds of carbon and hydrogen used as fuel, such as gasoline. High levels of hydrocarbons in tailpipe emissions are a result of unburned fuel. When combined with NO_x and sunlight, they form smog.

Hydrocracking – A refinery process that converts hydrocarbons with a high boiling point into ones with low boiling points.

Hydrometer - An instrument used to measure the specific gravity of a liquid. A battery hydrometer is calibrated to read the expected specific gravity of battery electrolyte.

Hydrophilic - A term used to describe a type of rubber used in many all-season tires where the rubber has an affinity for water (rather than repels).

Hydrophobic - A term used to describe the repelling of water.

Hydroplaning - Condition that occurs when driving too fast on wet roads where the water on the road gets trapped between the tire and the road forcing the tire onto a layer of water and off the road surface. All traction between the tire and the road is lost.

Hygroscopic – Ability of brake fluid to absorb moisture from the air.

Hypoid gear set - A ring gear and pinion gear set that meshes together below the center line of the ring gear. This type of gear set allows the drive shaft to be lower in the vehicle, yet requires special hypoid gear lubricant.

Hz – An abbreviation for Hertz, cycles per second.

IAC - Idle air control.

IAT – Inorganic Additive Technology. The corrosion inhibitor used in most green-colored

coolants.

ICE – Internal combustion engine.

Icing - Formation of ice on or around the throttle plate due to atmospheric conditions and the lowering of temperatures as the air-fuel mixture passes through the throttle opening.

ICU - Integrated control unit.

Idle stop mode – A phase in hybrid electric vehicle operation in which the internal combustion engine shuts off during idle operation.

Idler arm – The pivot point and support arm of a parallelogram-type steering linkage located on the passenger side of the vehicle.

IEC – International Electrotechnical Commission.

IGBT – Insulated gate bipolar transistors. IGBTs are the primary switching devices for the inverter in a hybrid electric vehicle.

Ignition circuit - Electrical components and connections that produce and distribute high-voltage electricity to ignite the air-fuel mixture inside the engine.

Ignition coil - An electrical device consists of two separate coils of wire: a primary and a secondary winding. The purpose of an ignition is to produce a high-voltage (20,000 to 40,000 V), low-amperage (about 80 mA) current necessary for spark ignition.

Ignition timing - The exact point of ignition in relation to piston position.

ILC - Idle load control.

ILEV – Inherently low-emission vehicle. One category of emission standards set by the state of California.

ILSAC – International Lubricant Standardization and Approval Committee. Responsible for development of the ILSAC standard for motor oil performance.

IMA – **Integrated Motor Assist. Describes the motor-generator located between the internal combustion engine and the transmission on Honda hybrid electric vehicles.**

Impact wrench – An air-operated hand tool used to install and remove threaded fasteners.

Impedance-The resistance of a coil of wire, measured in ohms.

Impeller – **The mechanism in a water pump that rotates to produce coolant flow.**

Impurities - Doping elements.

Incandescent light – A type of light that uses an incandescent rather than a fluorescent or LED light source.

Incentive pay – see *commission pay*.

Included angle - SAI angle added to the camber angle of the same wheel. Includes starter motor, starter solenoid/relay, battery, neutral safety switch, ignition including co-solvents, in unleaded gasoline is limited by law to 5 percent.

Independent suspension - A suspension system that allows a wheel to move up and down without undue effect on the opposite side.

Independent switches-Switch located at each door and used to raise or lower the power window for that door only.

Inductance - The signal caused by the sudden change of a magnetic field. For example, when you turn off the current through a solenoid, a voltage spike is generated across the solenoid.

Induction motor – **An AC motor in which electromagnetic induction is used to generate a magnetic field in the rotor without the need for brushes.**

Inductive ammeter- A type of ammeter that is used a Hall Effect sensor in a clamp that is used around a conductor carrying a current.

Inductive reactance - An opposing current created in a conductor whenever there is a changing current flow in a conductor.

In. Hg – Abbreviation for inches of Mercury – a unit of measure for vacuum.

Inches of Mercury – A measurement of vacuum; pressure below atmospheric pressure.

Inclinometer – An instrument used to measure angles. Normally used to measure driveshaft

angles.

Included angle - SAI angle added to the camber angle of the same wheel.

Independent suspension - A suspension system that allows a wheel to move up and down without undue effect on the opposite side.

Indicator ball joints – A type of ball joint that shows when the joint is worn enough to require replacement.

Inertia – Energy in a moving object.

Inflator module – The part of an airbag that contains the airbag itself, plus the unit that is used to inflate the airbag.

Inlet port - See replenishing port.

Inner liner – The inner layer of rubber inside a tire.

Input – Information on data from sensors to an electronic controller is called input. Sensors and switches provide the input signals.

Input conditioning- What the computer does to the input signals to make them useful; usually includes an analog to digital converter and other electronic circuits that eliminate electrical noise.

Insulated brushes-Brushes used in a starter motor that connect to battery power through the solenoid.

Insulated path-The power side of an electrical circuit.

Insulator - A material that does not readily conduct electricity and heat. A nonmetal material that contains more than four electrons in its atom's outer shell.

Insulators – Thin strips of plastic or hard rubber used to separate the leaves of a leaf spring.

Intake air temperature (IAT) sensor - Measures the air temperature of the air entering the engine.

Integral ABS – An antilock braking system that includes the master cylinder, booster, ABS solenoids, and accumulator(s) all in one unit.

Integral reservoir – A type of power steering pump that includes the pump inside the fluid reservoir.

Integral sensor- A term used to describe a crash sensor that is built into the airbag control module.

Integrally molded – Disc brake pads where the friction material is molded and locked into holes in the steel backing plate.

Integrated circuit (IC)-An electronic circuit that contains many circuits all in one chip.

Intermediate lever – A lever used as part of the parking brake cable system.

Intermittent - Irregular; a condition that happens with no apparent or predictable pattern.

Invert - To change to the opposite polarity. Puts the waveform display upside down.

Inverter – An electronic device used to convert DC (direct current) into AC (alternating current).

IOD-Ignition off draw. A Chrysler term used to describe battery electrical drain or parasitic draw.

Ion - An atom with an excess or deficiency of electrons forming either a negative or a positive charged particle.

Ion-Sensing Ignition – An electronic ignition system that uses the spark plug as a sensor to determine camshaft position, misfire, and knock.

IP-Abbreviation for instrument panel.

IP certification – Interprovincial certification in Canada.

IPCC – Intergovernmental Panel on Climate Change.

IPM – Interior permanent magnet. Describes the arrangement of the permanent magnets on the inside of the rotor shell in an AC synchronous electric motor.

Iron - Refined metal from iron ore (ferrous oxide) in a furnace. (Also see steel.)

IRS - Independent rear suspension.

ISC - Idle speed control.

ISO - International Standards Organization.

Isolation solenoid – A solenoid used in an antilock braking system to isolate the master cylinder from the wheel brakes.

Isolator bushing - Rubber bushing used between the frame and the stabilizer bar. Also known as a stabilizer bar bushing.

IVR - Instrument voltage regulator.

i-VTEC – Intelligent Variable Valve Timing and Lift Electronic Control. A system used to control the valve train on some Honda vehicles.

Jack stand – See safety stand.

Jam nut - A second nut used to prevent the first nut from loosening.

Joule - A unit of electrical energy. One joule equals 1 watt x 1 second (1 V x 1 A x 1 s).

Jounce - A term used to describe up and down movement or to cause up and down motion.

Jounce bumper - A rubber or urethane stop to limit upward suspension travel. Also called a bump stop, a strike-out bumper suspension bumper or compression bumper.

Julian date - The number of the day of the year. Also called *JD*.

Jumper cables - Heavy-gauge (4 to 00) electrical cables with large clamps, used to connect a vehicle that has a discharged battery to a vehicle that has a good battery.

Junction - The point where two types of materials join.

JWL – Japan Wheel Light Metal Standard Mark.

KAM-Keep alive memory.

Kelvin (K)-A temperature scale where absolute zero is zero degrees. Nothing is colder than absolute zero.

Kerf - Large water grooves in the tread of a tire.

Kevlar - Dupont brand name of aramid fibers.

Key fob- A decorative unit attached to keys. Often includes a remote control to unlock/lock vehicles.

Keyword-A type of network communications used in many General Motors vehicles.

Kickback – The movement of the steering wheel when the front wheels strike a curb or bump.

Kicker - A throttle kicker is used on some computer engine control systems to increase engine speed (RPM) during certain operating conditions, such as when the air conditioning system is on.

Kilo - Means 1000; abbreviated k or K.

Kinetic energy - The energy in any moving object. The amount of energy depends on the weight (mass) of the object and the speed of the object.

Kinetic friction – Friction between two surfaces which are moving against each other.

King pin - A pivot pin commonly used on solid axles or early model twin I-beam axles that rotate in bushings and allow the front wheels to rotate. The knuckle pivots about the king pin.

King pin inclination - Inclining the tops of the king pins toward each other creates a stabilizing force to the vehicle.

Kirchhoff's current law - A law that states "The current flowing into any junction of an electrical circuit is equal to the current flowing out of that junction."

Kirchhoff's voltage law - A law about electrical circuits that states: "The voltage around any closed circuit is equal to the sum (total) of the resistances."

Knock sensor - A sensor that can detect engine spark knock.

KPI - King pin inclination (also known as *steering axis inclination*, SAI). The angle formed between true vertical and a line drawn between the upper and lower pivot points of the spindle.

Kyoto Protocol – An agreement reached among most of the world's industrialized nations for limiting the production of carbon dioxide and other greenhouse gases.

kW – Abbreviation for kilowatt, a measure of power. One kilowatt is 1,000 watts, and 746

watts is equivalent to 1 horsepower.

Labor guides – A book or service information that provides the time that is needed to perform a service or repair operation.

Labyrinth seal – A water seal formed by the curved area at the lip of the backing plate and the notch in the brake drum.

Ladder frame - A steel frame for a vehicle that uses cross braces along the length, similar to the rungs of a ladder.

Lambda sensor - Oxygen sensor or O₂ sensor. Lambda is the Greek letter that represents ratio, as in air-fuel ratio.

Lateral accelerometer sensor – A sensor used in many vehicles equipped with electronic suspension and/or traction control systems used to detect sideways movement of the vehicle.

Lateral links – Suspension arms that control the side-to-side movement of the wheels and vehicle. Also called transverse links.

LCD - Liquid-crystal display.

LDWS- Lane departure warning system.

Lead peroxide - The positive plate of an automotive-style battery, the chemical symbol is PbSO₄.

Lead sulfate - Both battery plates become lead sulfate when the battery is discharged. The chemical symbol for lead sulfate is PbSO₄.

Leading shoe - The forward facing brake shoe on a leading/trailing type of drum brake.

Leading-trailing brakes – A type of drum brake design which anchors the bottom of both shoes to the backing plate.

Leaf spring - A spring made of several pieces of flat spring steel.

Least likely questions – A type of question asked on the ASE certification tests.

LED - Light-emitting diode. A high-efficiency light source that uses very little electricity and

produces very little heat.

Ledges – Also called shoe pads, where the brake lining controls the backing plate.

Left hand rule – A method of determining the direction of magnetic lines of force around a conductor. The left-hand rule is used with the electron flow theory (- flowing to +).

Legs- Another name for the branches of a parallel circuit.

Lenz's law – The relative motion between a conductor and a magnetic field is opposed by the magnetic field of the current it has induced.

LEV – Low emission vehicle.

Leverage – The ability of a lever or other mechanical device used to increase force.

Leyden jar- A device first used to store an electrical charge. The first type of capacitor.

Li-ion – Lithium-ion battery design.

Linesman's gloves – Type of gloves worn by technicians when working around high-voltage circuits. Usually includes a rubber inner glove rated at 1,000 volts and a protective leather outer glove when used for hybrid electric vehicle service.

Lining edge codes – Letters and numbers that indicate the friction code cold and hot, as well as the manufacturer and details about the lining.

Lining fade – A condition where the brake lining overheats, reducing the coefficient of friction.

Lining table - The part of a drum brake shoe where the lining is attached.

Li-poly – Lithium-polymer battery design.

Liquid crystal display (LCD) - A display that uses liquid crystals to display waveforms and text on its screen.

LLR – Low roll resistance.

LLVW – Lightly loaded vehicle weight.

Load- A term used to describe a device when an electrical current is flowing through it.

Load Index - An abbreviated method that uses a number to indicate the load carrying capabilities of a tire.

Load-carrying ball-joint - A ball-joint used in a suspension system to provide support and control and through which the weight (load) of the vehicle is transferred to the frame.

Load test- A type of battery test where an electrical load is applied to the battery and the voltage is monitored to determine the condition of a battery.

Load tester – **A device for applying a heavy current load to a battery, which is usually half of the CCA rating for 15 seconds.**

Lock plate – A plate located in the steering column that is used to lock the steering wheel when the key is removed from the ignition.

Lock tang- A mechanical tab that is used to secure a terminal into a connector. This lock tang must be depressed to be able to remove the terminal from the connector.

Locking pliers – Pliers that can be used to grasp an object and then be locked into position. Often called by a popular brand name VISE-GRIPS®.

Lockout switch- A lock placed on the circuit breaker box to insure that no one turns on the electrical circuit while repairs are being made.

Lodestone – **A type of iron ore that exists as a magnet in its natural state.**

Logic probe- A type of tester that can detect either power or ground. Most testers can detect voltage but most of the others can not detect if a ground is present without further testing.

Loose – A term used to describe an over steering condition.

Low-drag caliper – A type of disc brake caliper where the piston retracts more than usual, reducing the brake drag between the pad and the rotor.

Low-pass filter- A device used in a audio system that block high frequencies and only allow low frequencies to pass to the speakers.

Low-water loss battery- A type of battery that uses little water in normal service. Most batteries used in cars and light trucks use this type of battery.

LPA – Low pressure accumulator.

LPG – **Liquefied petroleum gas. Another term for propane.**

LRO – An abbreviation for lateral runout.

LSD – Low side driver.

LSD - An abbreviation commonly used for limited slip differentials.

LT - Light truck.

Lug nuts – Nuts used on wheel studs to attach wheels to hubs.

Lumbar - The lower section of the back.

M85 – **Internal combustion engine fuel containing 85% methanol and 15% gasoline.**

M & S - Mud and snow.

M/C solenoid - Mixture control solenoid.

MacPherson strut - A type of front suspension with the shock absorber and coil spring in one unit which rotates when the wheels are turned. Assembly mounts to the vehicle body at top and to one ball-joint and control arm at the lower end. Named for its inventor, Earle S. MacPherson.

Magnasteer – A type of electronically controlled hydraulic power steering.

Magnequench - A magnetic alloy made from neodymium, iron, and boron.

Magnetic flux-The lines of force produced in a magnetic field.

Magnetic induction- The transfer of the magnetic lines of force to another nearby metal object or coil of wire.

Magnetic timing - A method of measuring ignition that uses a magnetic pickup tool to sense the location of a magnet on the harmonic balancer.

Magnetism – **A form of energy that is recognized by the attraction it exerts on other materials.**

Magneto-rheological suspension – A type of electronic suspension that uses magneto

rheological fluid shocks.

Maintenance-free battery- A type of battery that does not require routine adding of water to the cells. Most batteries used in cars and light truck are maintenance free design.

Major splice – A place in a tire where the tread rubber and one or more body plies are spliced during tire construction.

Major thrust surface – **The side of an engine cylinder that receives the greatest thrust or force from the piston during the power stroke.**

Malfunction indicator lamp (MIL) - This amber dash board warning light may be labeled check engine or service engine soon.

Manifold absolute pressure (MAP) - Sensor used to measure the pressure inside the intake manifold compared to a perfect vacuum.

Manifold vacuum - Low pressure (vacuum) measured at the intake manifold of a running engine (normally between 17 and 21 inches Hg at idle).

MAP - Manifold absolute pressure.

Mass – The weight of an object. A measure of the amount of material contained in an object. Gravity acts on a mass to give it weight.

Mass air flow (MAF) - The volume of air passing into the engine. Varies with temperature and humidity. Used in calculating injector operation and spark timing.

Master certified technician - A technician who has successfully passed all eight ASE certification tests and has completed at least two years of experience.

Master control switch- The control switch for the power windows located near the driver who can operate all of the windows.

Master cylinder - The part of the brake hydraulic system where the pressure is generated.

Match mount - The process of mounting a tire on a wheel and aligning the valve stem with a mark on the tire. The mark on the tire represents the high point of the tire and the valve stem

location represents the smallest diameter of the wheel.

MCA- Marine cranking amps. A battery specification.

MEA – See *Membrane Electrode Assembly*.

Mechanical advantage – The use of levers, such as a brake pedal to increase the force applied by the driver.

Mechanical brakes - Brakes that are operated by a mechanical linkage or cable connecting the brakes to the brake pedal.

Mechanical fade – Braking reduction caused by the heat expansion of the brake drum away from the brake lining.

Medium hybrid – A hybrid electric vehicle design that utilizes “medium” voltage levels (between 50 and 200 volts). Medium hybrids use regenerative braking and idle stop but are not capable of starting the vehicle from a stop using electric mode.

Mega (M) - Million. Used when writing larger numbers or measuring large amount of resistance.

Membrane electrode assembly (MEA) - The part of the PEM fuel cell that contains the membrane, catalyst coatings, and electrodes.

Memory steer - Memory steer is a lead or pull of a vehicle caused by faults in the steering or suspension system. If after making a turn, the vehicle tends to pull in the same direction as the last turn, then the vehicle has memory steer.

Meniscus - The puckering or curvature of a liquid in a tube. A battery is properly filled with water when the electrolyte first becomes puckered.

Mentor – An experienced technician who offers to help a beginning technician learn all aspects of the trade.

Menu - A list of choices for selecting a test, function, or setting.

Mercury – A heavy metal.

Mesh spring- A spring used behind the starter pinion on a starter drive to force the drive pinion

into mesh with the ring gear on the engine.

Mesothelioma - A fatal type of cancer of the lining of the chest or abdominal cavity, which can be caused by asbestos inhalation.

Metal hydride – A hydrogen storage alloy used in the negative electrode of a NiMH cell.

Meter accuracy- The accuracy of a meter measured in percent.

Meter resolution-The specification of meter that indicates how small or fine a measurement the meter can detect and display.

Metering valve - (Hold-off valve) - A valve installed between the master cylinder and front disc brakes which prevents operation of front disc brakes until 75-125 psi is applied to overcome rear drum brake return spring pressure.

Methanol (wood alcohol) - Typically manufactured from natural gas. Methanol content, including co-solvents, in unleaded gasoline is limited by law to 5 percent.

Methyl alcohol – See *Methanol*.

Methyl tertiary butyl ether (MTBE) - A fuel oxygenate which is permitted in unleaded gasoline up to a level of 15 percent.

Metric bolts – Bolts manufactured and sized in the metric system of measurement.

Metric wire gauge- The metric method for measuring wire size in the square millimeters. This is the measure of the core of the wire and does not include the insulation.

Micro (μ)-One-millionth of a volt or ampere.

Micro-hybrid drive – A term used to describe Belt Alternator Starter (BAS) and other mild hybrid systems.

Micro inches – One-millionth of an inch; a unit of measure of surface finish. The lower the number, the smoother the surface.

Microbe - A microorganism that is too small to be seen by the human eye.

MIL - See malfunction indicator lamp.

Mild hybrid – A hybrid electric vehicle design that utilizes regenerative braking and idle stop but cannot propel the vehicle in electric-only mode. Also called an assist hybrid and typically operates below 50 volts.

Miller cycle – A four-stroke cycle engine design that utilizes the Atkinson cycle along with a forced induction system such as a supercharger.

Milli (m) - One thousandth of a volt or ampere.

Millisecond - One thousandths of one second (1/1,000).

Minutes - A unit of measure of an angle. Sixty minutes equal one degree.

Misfire - When complete combustion does not occur in one or more cylinders due to fuel, ignition, or cylinder compression.

Mm Hg – Abbreviation for millimeters of Mercury. A metric measure of vacuum.

Mode select switch – A switch used to select ride comfort settings on a vehicle equipped with electronic suspension.

Model year (MY) – The year of a vehicle, which may be different from the calendar year when it is sold.

Modified X – A method of tire rotation.

Modulation- The combination of these two frequencies is referred to as **modulation**.

Module - A group of electronic components functioning as a component of a larger system.

Mold bonded lining – A design of disc brake pads where the lining material is molded into holes in the steel backing plate.

Moly grease - Grease containing molybdenum disulfide.

Momentary switch- A type of switch that toggles between on and off.

Mono leaf – A leaf spring that uses only one leaf.

Morning sickness – A slang term used to describe temporary loss of power steering assist when

cold caused by wear in the control valve area of a power rack and pinion unit.

MOS - Metal oxide semiconductor.

MOSFET - Metal oxide semiconductor field-effect transistor; a type of transistor.

Most likely – A type of test question used on ASE certification tests.

Motor – An electromechanical device that converts electrical energy into mechanical movement.

Motoring mode – A phase of BAS hybrid vehicle operation where the motor-generator cranks the ICE to start it.

MOV- metal oxide varistor. An electronic device that operates like two back-to-back zener diodes.

MR – Magneto-Rheological.

MRFS – Mechanical returnless fuel system. A returnless fuel delivery system design that uses a mechanical pressure regulator located in the fuel tank.

MRRTD – Magneto-rheological real time dampening.

MSDS – Material safety data sheets.

MSI – MacPherson Strut Inclination.

Mode - A particular state of operation.

Module - A group of electronic components functioning as a component of a larger system.

Moly grease - Grease containing molybdenum disulfide.

Morning sickness - A slang term used to describe temporary loss of power steering assist when cold caused by wear in the control valve area of a power rack and pinion unit.

MSDS - Material safety data sheets.

MTBE – Methyl tertiary butyl ether. MTBE is an oxygenated fuel that is used as a gasoline additive to enhance its burning characteristics being phased out due to ground water contamination concerns.

MTG – Methanol-to-gasoline. A refining process in which methanol is converted into liquid gasoline.

MTHF – Methyltetrahydrofuron. A component of P-series nonpetroleum-based fuels.

M μ - The Greek letter that represents the coefficient of friction.

Multi-groove adjustable pliers – Pliers that are capable of grasping a wide range of object sizes; also called *water pump pliers* or by a popular brand name of Channel Locks®

Multiple choice - The type of questions used on the ASE certification tests.

Multiplexing - A process of sending multiple signals of information at the same time over a signal wire.

Mutual induction - The generation of an electric current due to a changing magnetic field of adjacent coil.

MY – Model year.

NAO - Non-asbestos organic.

NAS - Non-asbestos synthetic.

Natural frequency – The frequency where the brake pads tend to vibrate.

N.C. - Normally closed.

NEDRA – National Electric Drag Racing Association.

Needle-nose pliers – Pliers that are equipped with pointed jaws, which allow use in restricted areas or for small parts.

Negative temperature coefficient (NTC) - Usually used in reference to a temperature sensor(coolant or air temperature). As the temperature increases, the resistance of the sensor decreases.

Net pay - Amount earned minus deductions. Also called *take home pay*.

Network- A communications system used to link multiple computers or modules.

Neutral charge- An atom that has the same number electrons as protons.

Neutral run-up test – A test used to help determine the source of a vibration. Engine speed is increased and vibration is measured with the transmission in neutral.

Neutral safety switch A switch connected in series in the starter control circuit that allows operation of the starter motor to occur only when the gear selection is in neutral (N) or park (P).

Neutrons - A neutral-charged particle; one of the basic particles of the nucleus of an atom.

Newton – A unit of force in the metric system.

NGV – Natural gas vehicle.

NHTSA - Abbreviation for the National Highway Traffic Safety Administration.

Nibs – Small V-shaped notches on the side of brake shoes where they rest against the backing plate.

NiCD –**Nickel-cadmium battery design; also called an *alkaline battery*.**

NiMH – **Nickel-metal hydride. A battery design used for the high-voltage batteries in most hybrid electric vehicles.**

Nitrile - A type of rubber that is okay for use with petroleum.

Nitrogen – **An inert gas that comprises approximately 78% of the earth's atmosphere.**

NLEV – **National Low-Emission Vehicle.**

NLGI - National Lubricating Grease Institute. Usually associated with grease. The higher the NLGI number, the firmer the grease. #000 is very fluid whereas #5 is very firm. The consistency most recommended is NLGI #2 (soft).

N.O. - Normally open.

Node- A module and computer that is part of a communications network.

Noise - Noise is the vibration of air caused by a body in motion.

Nominal voltage – **The approximate voltage of a fully charged battery cell.**

Nonasbestos – Brake linings or pads that do not contain asbestos.

Nonhygroscopic – Brake fluid, such as DOT 5 that does not absorb moisture from the air.

Nonintegral ABS – A antilock braking system (ABS) that uses a conventional master cylinder and power brake booster.

Non-servo brakes – A drum brake design where the primary lining (forward facing) does not control or transmit a force to the secondary (rearward facing) brake shoe.

Nonvolatile memory - Computer memory capability that is not lost when power is removed. See also read-only memory (ROM).

NO_x - Oxides of nitrogen; when combined with HC and sunlight, form smog.

NPN transistor- A type of transistor that has the P-type material in the base and the N-type material is used for the emitter and collector.

NTC - Negative temperature coefficient. Usually used in reference to a temperature sensor (coolant or air temperature). As the temperature increases, the resistance of the sensor decreases.

NTC Negative temperature coefficient. Usually used in reference to a temperature sensor (coolant or air temperature). As the temperature increases, the resistance of the sensor decreases.

N-type material - Silicon or germanium doped with phosphorus, arsenic, or antimony.

Nucleus - The central part of an atom which has a positive charge and contains almost all the mass of the atom.

Nut splitter – A hand tool designed to break a nut that is rusted onto a bolt or stud.

Nuts- A female threaded fastener to be used with a bolt or stud.

NVH - Abbreviation for noise, vibration and harshness.

NVRAM - Nonvolatile random access memory.

O₂ sensor - Oxygen sensor; also called O₂S.

OAD- Override alternator dampener.

OAP- Override alternator pulley

OAT – Organic Acid Technology. A corrosion inhibitor additive containing no silicates or phosphates. Used in DEX-COOL and some other extended-life coolants.

Occupant detection systems- An airbag system that includes a sensor in the passenger seat used to detect whether or not a passenger is seated in the passenger side and the weight range of that passenger.

Octane rating - The measurement of a gasoline's ability to resist engine knock. The higher the octane rating, the less prone the gasoline is to cause engine knock (detonation).

OE - Original equipment.

OEM - Original equipment manufacturer.

Offset - The distance the center section (mounting pad) is offset from the centerline of the wheel.

Offset aviation snip – A tin snip that has curved jaws allowing it to make curved cuts either left or right.

Offset crankshaft – **The internal combustion engine crankshaft is offset from the centerline of the cylinders to reduce internal friction.**

Off-time - The part of an electrical signal during which an electrical device is deenergized.

Ohm - The unit of electrical resistance. Named for Georg Simon Ohm (1787–1854).

Ohmmeter - An electrical test instrument used to measure ohms (unit of electrical resistance).

Ohm's Law - An electrical law that requires 1 volt to push 1 ampere through 1 ohm of resistance.

OL-Overload or over limit.

Omega - The last letter of the Greek alphabet; a symbol for ohm, (Ω) the unit for electrical resistance.

Op-amps - Used in circuits to control and simplify digital signals.

Open circuit - Any circuit that is not complete and in which no current flows.

Open circuit voltage- Voltage measured without the circuit in operation.

Open end – The end of a wrench that is open to allow the wrench to be inserted onto a fastener from the side.

Open-loop operation – A phase of computer-controlled engine operation where air/fuel mixture is calculated in the absence of oxygen sensor signals. **During open loop, calculations are based primarily on throttle position, engine RPM, and engine coolant temperature.**

Opposite phase steering - Used on a 4-wheel steer vehicle at low speeds where the rear wheels steer in the opposite direction of the front wheels.

Orbital steer - See bump steer.

Organic – A term used to describe anything that was alive at one time.

Oscilloscope - A visual display of electrical waves on a fluorescent screen or cathode ray tube.

OSHA Occupational Safety and Health Administration. **OSHA is the main federal agency responsible for enforcement of workplace safety and health legislation.**

OT – Orifice tube. **Refers to an A/C system design that uses an orifice tube as a refrigerant expansion device.**

Out-of-round – A fault with a brake drum, which is not perfectly round.

Output – The command from an electronic control module.

Over center adjustment - An adjustment made to a steering gear while the steering is turned through its center straight-ahead position. Also known as a *sector lash adjustment*.

Over inflation - Used to describe a tire with too much tire pressure (greater than maximum allowable pressure).

Overdrive – **In a transmission or drive axle, when the input shaft turns slower than the output shaft. A gear ratio of 0.87:1 is considered to be an overdrive gear ratio because only 0.87 turns of the input shaft will result in 1 full turn of the output shaft.**

Overrunning alternator dampener- An alternator (generator) drive pulley that has a one-way clutch and a dampener spring used to smooth the operation of the alternator and reduce the stress on the drive belt.

Overrunning alternator pulley- An alternator (generator) drive pulley that has a one-way clutch used to smooth the operation of the alternator and reduce the stress on the drive belt.

Overrunning clutch – **A mechanical coupling device that allows torque to be transmitted in one direction of rotation, but freewheels when turned in the opposite direction. Also known as a *one-way clutch*.**

Oversteer - A term used to describe the handling of a vehicle where the driver must move the steering wheel in the opposite direction from normal while turning a corner. Oversteer handling is very dangerous. Most vehicle manufacturers design their vehicles to understeer rather than oversteer.

Over-travel spring – A spring used as part of the self-adjusting components that allow normal operation even if the star wheel adjuster does not move.

Oxidation catalysts - Platinum and palladium used in the catalytic converter to combine oxygen (O_2) with hydrocarbons (HC) and carbon monoxide (CO) to form nonharmful tailpipe emissions of water (H_2O) and carbon dioxide (CO_2).

Oxides of nitrogen (NO_x) - A primary emission produced in the combustion chamber under high temperatures when nitrogen combines with oxygen. Oxides of nitrogen contribute to the formation of smog (ground level ozone [O_3]) when combined with HC and sunlight.

Oxygen – **A colorless, odorless gas that is a direct supporter of combustion. Earth's atmosphere contains approximately 21% oxygen.**

Oxygenate - An octane component containing hydrogen, carbon, and oxygen in its molecular structure. Types of oxygenates include ethers such as MTBE and alcohols such as ethanol and methanol.

Oxygenated fuels – Fuels such as ETBE or MTBE that contain extra oxygen molecules to promote cleaner burning. Oxygenated fuels are used as gasoline additives to reduce CO

emissions.

Oz-in. - Measurement of imbalance. 3 oz-in. means that an object is out of balance; it would require a 1 oz weight placed 3 inches from the center of the rotating object or a 3 oz weight placed 1 in. from the center or any other combination that when multiplied equals 3 oz-in.

Ozone - Oxygen rich (O_3) gas created by sunlight reaction with unburned hydrocarbons (HC) and oxides of nitrogen (NO_x); also called smog.

Pacific fuse element- A type of automotive fuse.

Pad wear indicators – A metal strap or notch in the disc brake pad to indicate that the pads are worn to the point of needing replacement.

PAG – Polyalkylene glycol. A type of refrigerant oil used in most R-134a A/C systems.

Pal nut - See jam nut.

Pancake engine – See boxer.

Panhard rod - A horizontal steel rod or bar attached to the rear axle housing at one end and the frame at the other to keep the center of the body directly above the center of the rear axle during cornering and suspension motions. Also called a *track rod*.

Parallel circuit- An electrical circuit with more than one path from the power side to the ground side. Has more than one branch or leg.

Parallel hybrid – A hybrid vehicle design where the electric machine (or other source of energy) assists the ICE to propel the vehicle.

Parallelism – A measurement of a brake rotor to determine that both sides of the rotors are perfectly parallel.

Parallelogram - A geometric box shape where opposite sides are parallel (equal distance apart).

Parallelogram linkage - A geometric box shape where opposite sides are parallel (equal distance apart). A type of steering linkage used with a conventional steering gear that uses a pitman arm, center link, idler arm and tie rods.

Parasitic load test- An electrical test that measures how much current (amperes) is draining from the battery with the ignition off and all electrical loads off.

Parking brake - Components used to hold a vehicle on a 30° incline. Formerly called an emergency brake before 1967 when dual master cylinders and split braking systems became law. The parking brake is also called the hand brake.

Partitions - Separations between the cells of a battery. Partitions are made of the same material as that of the outside case of the battery.

Pascal's law – A law of hydraulics named for the person who developed it, Blaise Pascal (1632-1662).

PASS - A word used to help remember how to use a fire extinguisher; pull pin, aim, squeeze the lever, and sweep the nozzle from side to side.

Passenger presence system (PPS)- An airbag system that includes a sensor in the passenger seat used to detect whether or not a passenger is seated in the passenger side and the weight range of that passenger.

Passkey I and II- A type of anti-theft system used in General Motors vehicles.

Passlock I and II- A type of anti-theft system used in General Motors vehicles.

Pasting - The process of applying active battery materials onto the grid framework of each plate.

PATS- Passive Anti-Theft System. A type of anti-theft system used in Ford, Lincoln and Mercury vehicles.

Pawl - A lever for engaging in a notch. Used to rotate the notched star wheel on self-adjusting brakes.

PCI – Programmable Communication Interface, a type of serial data transmission used by Chrysler.

PCM- Powertrain control module.

PCV - Positive crankcase ventilation.

Peak value - The highest and lowest value of a waveform.

Peak-and-hold - A method for regulating the current flow through electronic fuel injectors. Supplies higher current necessary to energize the injector, then drops to a lower level just enough to keep the injector energized.

Peak inverse voltage (PIV) - The rating of resistance to reverse-bias voltage. Also called peak reverse voltage (PRV).

Peak oil – A term used to describe the peak of worldwide oil production.

Pedal free play – The amount of brake pedal movement where no pressure is built up in the master cylinder.

Pedal height perform ride mode – A mode of operation for a General Motors vehicle equipped with electronic suspension. In this mode, the suspension is set to a firm setting.

Pedal ratio – The mechanical advantage of the brake pedal due to the location of the fulcrum and the length of the pedal arm.

Pedal reserve distance – A measurement from the floor to the top of the brake pedal when the brakes are applied.

PEFC – Polymer Electrolyte Fuel Cell. Another term for PEM fuel cell.

Peltier Effect- A French scientist Peltier found that electrons moving through a solid can carry heat from one side of the material to the other side. This effect is called the **Peltier effect**.

PEM – Proton Exchange Membrane fuel cell. A low-temperature fuel cell known for fast starts and relatively simple construction.

Penetrating oil - A thin oil that is designed to penetrate through rust and provide lubrication for the threads of a fastener.

Penetration - A test for grease where the depth of a standard cone is dropped into a grease sample and its depth is measured.

Perimeter frame penetration - A test for grease where the depth of a standard cone is dropped

into a grease sample and its depth is measured.

Perimeter frame - A steel structure for a vehicle that supports the body of the vehicle under the sides, as well as the front and rear.

Permalloy - A permanent-magnet alloy of nickel and iron.

Permanent magnet electric motors- Electric motors that use permanent magnets for the field instead of electro-magnets.

Permeability - The measure of how well a material conducts magnetic lines of force.

Petrodiesel – Another term for petroleum diesel, which is ordinary diesel fuel refined from crude oil.

Petroleum – Another term for crude oil. The literal meaning of petroleum is “rock oil.”

pH – A measure of the acidity or alkalinity of a material. A pH of 7 is neutral, higher than 7 is alkaline, and lower than 7 is acidic.

Phase-change liquid – A fluid used to transfer heat efficiently from electronic components. The components are immersed in the fluid, which changes from a liquid to a vapor as it absorbs heat.

Phenolic brake pistons - Hard type of plastic disc brake caliper pistons which do not rust or corrode.

PHEV – Plug-in hybrid electric vehicle.

Phosphor- A chemical-coated light-emitting element called a phosphor is hit with high-speed electrons which cause it to glow and creates light.

Photocell – A type of sensor that uses light-emitting diodes and a photo transistor to detect location.

Photodiodes- A type of diode used as a sun-load sensor. Connected in reverse bias, the current flow is proportional to the sun load.

Photoelectric principle - The production of electricity created by light striking certain sensitive

materials, such as selenium or cesium.

Photoelectricity-When certain metals are exposed to light, some of the light energy is transferred to the free electrons of the metal. This excess energy breaks the electrons loose from the surface of the metal. They can then be collected and made to flow in a conductor which is called photoelectricity.

Photons-Light is emitted from an LED by the release of energy in the form of photons.

Photoresistor-A semiconductor that changes in resistance with the presence or absence of light. Dark is high resistance and light is low resistance.

Phototransistor – An electronic device that can detect light and turn on or off. Used in some suspension height sensors.

PHT – Parallel hybrid truck. A term used to describe the Chevrolet Silverado/GMC Sierra hybrid pickup truck.

Pickle fork - A tapered fork used to separate chassis parts that are held together by a nut and a taper. Hitting the end of the pickle fork forces the wedge portion of the tool between the parts to be separated and "breaks the taper". A pickle fork tool is generally *not* recommended because the tool can tear or rip the grease boot of the part being separated.

PID – Parameter identification. The information found in the vehicle datastream as viewed on a scan tool.

Piezoelectric principle - The principle by which certain crystals become electrically charged when pressure is applied.

Pin bushings – The small roller bearings used in a universal joint.

Pinch bolt – A bolt used to retain a ball joint in some designs of suspensions.

Pinch weld seam – A strong section under a vehicle where two body panels are welded together.

Ping - Secondary rapid burning of the last 3 to 5% of the air-fuel mixture in the combustion chamber causes a second flame front that collides with the first flame front causing a knock noise. Also called *detonation* or *spark knock*.

Pinion gear - A small gear on the end of the starter drive which rotates the engine flywheel ring gear for starting.

Pin-slider caliper – A disk brake caliper design that uses guide pins and is able to move slightly during a brake application.

Pinion torque – The torque required to rotate the pinion shaft on a rack and pinion steering gear.

Piston assemblies – A part of a master cylinder where the sealing cups and the piston are replaceable as an assembly.

Piston stops – Metal tangs next to drum brake wheel cylinders used to prevent cylinder pistons from coming out of their bores when the brake lining is removed.

Pitch - The pitch of a threaded fastener refers to the number of threads per inch.

Pitman arm - A short lever arm that is splined to the steering gear cross shaft. It transmits the steering force from the cross shaft to the steering linkage.

Pitman shaft - See sector shaft.

Pixel - The smallest graphic detail possible for the liquid crystal display (LCD).

PIV- Peak Inverse Voltage. A rating for a diode.

Planet carrier – **The part of a planetary gearset that houses the planet pinions.**

Planetary gearset – **A simple mechanism made up of a ring gear, a planet carrier, and a sun gear. A single planetary gearset can be used to achieve a reduction, a direct drive, an overdrive, or a reverse.**

Platform - The platform of a vehicle includes the basic structure (frame and/or major body panels), as well as, the basic steering and suspension components. One platform may be the basis for several different brand vehicles.

Plenum - A chamber, located between the throttle body and the runners of the intake manifold, used to distribute the intake charge more evenly and efficiently.

Pliers- A hand tool with two moveable jaws.

Plowing – A term used to describe an understeering condition.

Plug-in hybrid vehicle (PHEV) – A hybrid electric vehicle utilizing batteries that can be recharged by plugging into a household electrical outlet.

Plunge joint – An inner constant velocity joint that is able to move in and out and transmit torque while the vehicle suspension moves up and down over bumps.

Ply steer – A term used to describe why a tire can cause a pulling condition based on the angle of the cords of the belt layers.

PM – Particulate matter. PM can be made up of any airborne liquid or solid, and its concentration is regulated by both the CARB and the EPA.

PM generator- A sensor that has a permanent magnet and a coil of wire and produces an analog voltage signal if a metal wheel with notches passes close to the sensor.

PM motor - A permanent-magnet electric motor.

PNP transistor- A type of transistor that used N-type material for the base and P-type material for the emitter and collector.

Polarity - The condition of being positive or negative in relation to a magnetic pole.

Pole – The point where magnetic lines of force enter or leave a magnet.

Pole shoes-The metal part of the field coils in a starter motor.

Polyglycol – A term used to describe brake fluid.

Polymer electrolyte fuel cell (PEFC) – Another term for Proton Exchange Membrane fuel cell. See *PEM*.

Pop rivet – A type of fastener that uses a rivet gun to pull out the rivet until the end deforms and thereby creating a light clamping form.

Poppet valve steering gear – A type of power steering gear used on medium trucks that uses a poppet valve to control the direction and amount of assist.

Porous lead - Lead with many small holes to make a surface porous for use in battery negative

plates; the chemical symbol for lead is Pb.

Portable crane – A piece of shop equipment that is used to lift and move heavy pieces of equipment, such as an engine.

Ported vacuum - Low pressure (vacuum) measured above the throttle plates. As the throttle plates open, the vacuum increases and becomes of the same value as the manifold vacuum.

Positive crankcase ventilation (PCV) - System used to prevent corrosive blow-by gases (by-products of combustion) in the crankcase from entering the atmosphere.

Positive temperature coefficient (PTC) - Usually used in reference to a conductor or electronic circuit breaker. As the temperature increases, the electrical resistance also increases.

Post-ignition - When the air-fuel mix self-ignited during combustion, resulting in a second flame front that collides with the first, causing a knock noise. See also detonation, ping or spark knock.

Potentiometer - A 3-terminal variable resistor that varies the voltage drop in a circuit.

Pound foot - A measurement of torque. A 1-pound pull, 1 foot from the center of an object.

Power – The rate of doing work, measured in horsepower as kilowatts. In electrical terms, is amperes x volts (Power = $I \times E$).

Power assist mode – A phase of hybrid vehicle operation in which the ICE is assisted by the electric motor(s) to propel the vehicle.

Power bleeding – Also called pressure bleeding.

Power chamber – The enclosure of a vacuum brake booster assembly which is separated into the vacuum side and the atmospheric air pressure side by a flexible diaphragm.

Power line capacitor- A capacitor used to boost the output of a sound system to move the speakers especially when reproducing low frequencies.

Power side - The wires leading from the power source (battery) to the resistance (load) of a circuit.

Power source- In electrical terms the battery or generator (alternator).

Powertrain - An engine and transmission in combination.

Powertrain control module (PCM) - The on-board computer that controls both the engine management and transmission functions of the vehicle.

PPE – Personal protective equipment, which can include gloves, safety glasses, and other items.

PPM - Parts per million.

Pre-alignment checks – The checks that should be performed before checking or changing the wheel alignment of a vehicle.

Preignition - Ignition of the air-fuel mix before the timed ignition spark occurs.

Preload – A term used to describe a tightening of a nut or bolt to provide a force.

Pressure – A force applied to a surface divided by its area.

Pressure bleeder - A device that forces pressure into the master cylinder, so that when the bleeder screws are opened at the wheel cylinder, air will be forced from the system.

Pressure bleeding – A method used to bleed air out of a brake hydraulic system using compressed air above the master cylinder reservoir.

Pressure cap – A device used to maintain and limit pressure in the cooling system.

Pressure decay stage – A stage during ABS operation where the pressure of the brake fluid at a wheel brake is reduced.

Pressure differential - A difference in pressure from one brake circuit to another.

Pressure-differential switch - Switch installed between the two separate braking circuits of a dual master to light the dash board "brake" light in the event of a brake system failure, causing a *difference* in brake pressure.

Pressure dump stage – See pressure decay stage.

Pressure holding stage – A stage during ABS operation where the pressure of the brake fluid at a wheel brake is held at the correct level.

Pressure increase stage – A stage during ABS operation where the pressure of the brake fluid at a wheel brake is increasing due to a driver brake application.

Pressure reduction stage – See pressure decay stage.

Pressure regulator - A regulating device that maintains a specified pressure in a system.

Pressure relief valve – A valve located in a power steering pump that uses a check ball, which unseats allowing fluid to return to the reservoir if pressure exceeds a certain volume.

Pretensioners-An explosive devices used to remove the slack from a safety belt when an airbag is deployed.

Prevailing torque nut - A special design of nut fastener that is deformed slightly or has other properties that permit the nut to remain attached to the fastener without loosening.

Primary battery – Nonrechargeable battery.

Primary shoe - A brake shoe installed facing the front of the vehicle.

Primary wire- Wire used for low voltage automotive circuits, typically 12 volts.

Principal end – The end of the engine that the flywheel is attached to.

Prismatic cell – A battery cell made with flat plates.

Processing-The act of a computer when input data is run through computer programs to determine what output is needed to be performed.

Programmable Controller Interface (PCI)- A type of network communications protocol used in Chrysler brand vehicles.

PROM - Programmable read-only memory.

Prop shaft - An abbreviation for propeller shaft.

Propane – See *LPG*.

Propeller shaft - A term used by many manufacturers for a drive shaft.

Proportioning valve - Valve installed between the master cylinder and rear brakes which limits

the amount of pressure to the rear wheels to prevent rear wheel lock-up.

Proton - A positive-charged particle; one of the basic particles of the nucleus of an atom.

Proton exchange membrane (PEM) – See *PEM*.

PRV - See peak inverse voltage.

PSCM – Power steering control module.

Proton - A positive-charged particle; one of the basic particles of the nucleus of an atom.

PSI - Pounds per square inch.

PSP – Power steering pressure

PTC - Positive temperature coefficient. Normally used in reference to a conductor or electronic circuit breaker. As the temperature increases, the electrical resistance also increases.

PTC heater – An electric heater used to supplement a coolant heater that operates on the principle of positive-temperature coefficient, where electrical resistance of the heater increases as temperature increases.

P-type material - Silicon or germanium doped with boron or indium.

Pull - Vehicle tends to go left or right while traveling on a straight, level road.

Pull-in windings - One of two electromagnetic windings inside a solenoid used to move a movable core.

Pulse - A voltage signal that increases or decreases from a constant value, then returns to the original value.

Pulse generators - An electromagnetic unit that generates a voltage signal used to trigger the ignition control module that controls (turns on and off) the primary ignition current of an electronic ignition system.

Pulse modulated - A circuit that maintains average voltage levels by pulsing the voltage on and off.

Pulse train - A DC voltage that turns on and off in a series of pulses.

Pulse width - The amount of "on" time of an electronic fuel injector.

Pulse width modulation (PWM) - Operation of a device by an on/off digital signal that is controlled by the time duration the device is turned on and off.

Pulse wipers- Windshield wipers that operate intermittently. Also called delay wipers.

Pumping losses – The energy lost due to restrictions in the air intake system, such as caused by a closed throttle plate.

Punch – A hand tool designed to be used with a hammer to drive out pins.

Push rod - The link rod connecting the brake pedal to the master cylinder piston.

PVV – Pressure vent valve. A valve located in the fuel tank to prevent overpressure due to the thermal expansion of the fuel.

PWM – Pulse-width modulation. The control of a device by varying the on-time of the current flowing through the device.

Quad driver - Integrated circuit that is capable of four separate outputs. Some have digital and some have pulse width modulated outputs.

Quick take-up master cylinder – A type of master cylinder that uses a large and small diameter bore for use with a low-drag caliper.

R-134a – A refrigerant used in the A/C systems of most domestic vehicles built since 1994.

Ra – Roughness average; a measurement of surface finish. The lower the number, the smoother the surface.

RABS - Rear antilock braking system.

Race - Inner and outer machined surface of a ball or roller bearing.

Rack and pinion - A type of lightweight steering unit that connects the front wheels through tie rods to the end of a long shaft called a *rack*. When the driver moves the steering wheel, the force is transferred to the rack and pinion assembly. Inside the rack housing is a small pinion gear that

meshes with gear teeth, which are cut into the rack.

Rack support – A spring-loaded unit that is used to hold the rack part of a rack and pinion steering gear assembly in proper position.

Radial force variation – The variation in force a tire exerts as it rotates and contacts the road surface.

Radial grid - A lead-alloy framework for the active materials of a battery that has radial support spokes to add strength and to improve battery efficiency.

Radial load – The load applied to a bearing 90 degrees from the axis. The weight of the vehicle applies a radial load to the wheel bearing.

Radial runout - A measure of the amount a tire or wheel is out of round. Excessive radial runout can cause a tramp-type vibration.

Radial tire - A tire whose carcass plies run straight across (or almost straight across) from bead to bead.

Radiator – A cooling system component used to dissipate heat from the coolant to the surrounding air.

Radiator hose – A flexible hose used to transfer coolant between the various cooling system components.

Radio choke - A small coil of wire installed in the power lead, leading to a pulsing unit such as an IVR to prevent radio interference.

Radio frequency interference (RFI) - A high-frequency type of EMI that is in the radio frequency band.

Radius rod - A suspension component to control longitudinal (front-to-back) support and is usually attached with rubber bushings to the frame at one end and the axle or control arm at the other end. Also see strut rod.

Rag joint - *See* Flexible coupling.

Rain-sense wipers-Windshield wiper that use an electronic sensor to detect the presence of rain

on the windshield and start operating automatically if the wiper switch is in the Auto position.

RAM - Random access memory.

Random access memory (RAM) - A nonpermanent type of computer memory used to store and retrieve information.

Range – The distance a vehicle can travel on a full charge or full-fuel tank without recharging or refueling. Range is measured in miles or kilometers.

Ratchet – A handle used to rotate a socket, which is reversible and allows the socket to be rotated in one direction and then free movement in the opposite direction of rotation.

Ratio - The expression for proportion. For example, in a typical rear axle assembly, the drive shaft rotates 3 times faster than the rear axles. Expressed as a ratio of 3:1 and rear as "three to one". Power train ratios are always expressed as driving divided by driven gears.

RBS - Rubber bonded socket.

RBS – Regenerative braking system. A hybrid electric vehicle system that allows vehicle kinetic energy to be converted into electrical energy for charging the high-voltage battery.

RBWL - Red brake warning lamp.

RCRA – Resource Conservation and Recovery Act.

Reaction Disc - A feature built into a power brake unit to provide the driver with a "feel" of the pedal.

Read-only memory (ROM) - A permanent type of computer memory programmed by the computer manufacturer to store the operating instructions and parameters of the computer.

Real time dampening – A General Motors term for an electronically controlled suspension system that uses solenoid-operated shock absorbers.

Rear spacing - See back spacing.

Rear steer - A construction design of a vehicle that places the steering gear and steering linkage behind the centerline of the front wheels.

Rebound clips – Clips used around the leaves of a leaf spring.

Rebuilt - *See* Remanufactured.

Recall – A notification to the owner of a vehicle that a safety issue needs to be corrected.

Receiver-drier – An A/C system component used to filter and remove moisture from liquid refrigerant on the high side of the system.

Recirculating ball-steering gear - A steering gear that uses a series of ball bearings that feed through and around the grooves in the worm and nut.

Recombinant battery – A battery design that does not release gasses during normal operation. AGM batteries are known as recombinant batteries.

Rectifier - An electronic device that converts alternating current into direct current.

Rectifier bridge - A group of six diodes, three positive (+) and three negative (-) commonly used in alternators.

Red brake warning lamp – The dash-mounted warning lamp that lights if a hydraulic system fault is detected.

Reduction – A drive train mechanism designed to decrease speed and increase torque. A gear ratio of 3.56:1 would be considered to be a reduction because the input shaft must turn 3.56 times in order to achieve 1 turn of the output shaft.

Reference voltage - A voltage applied to a circuit. Battery plus and ground are examples of reference voltages.

Refractometer – A device used to measure battery state of charge by allowing light to pass through an electrolyte sample.

Refrigerant – A fluid used in A/C systems to absorb, transfer, and release heat energy.

Regen – An abbreviation for *regenerative braking*.

Regeneration – A process of taking the kinetic energy of a moving vehicle and converting it to electrical energy and storing it in a battery.

Regenerative braking – A hybrid vehicle function that recovers kinetic energy while the vehicle is decelerating and stores it for later use.

Reid vapor pressure (RVP) - A method of determining vapor pressure of gasoline and other petroleum products. Widely used in the petroleum industry as an indicator of the volatility of gasoline.

Relay - An electromagnetic switch that uses a movable arm.

Release solenoid – A solenoid used to open a vent port to release pressure from a brake circuit.

Reluctance - The resistance to the movement of magnetic lines of force.

Remanufactured - A term used to describe a process where a component is disassembled, cleaned, inspected and re-assembled using new or reconditioned parts. According to the Automotive Parts Rebuilders Association (APRA), this same procedure is also called *rebuilt*.

Remote reservoir – A type of power steering pump where the fluid is in a reservoir separate from the pump.

Removers – This term is used to describe hand tools, which are designed to remove broken studs, bolts, and other fasteners.

Renewal - A part built to be used as a replacement for the original equipment (OE) part.

Repair order – Also called an *R.O.* or *work order*. Contains all vehicle and customer information and the list of service work that is to be completed.

Replenishing port - The Society of Automotive Engineers (SAE) term for the rearward lowpressure master cylinder port. Also called inlet port, bypass port, filler port or breather port.

Reserve capacity - The number of minutes a battery can produce 25 A and still maintain a battery voltage of 1.75 V per cell (10.5 V for a 12 V battery).

Residual check valve - A valve in the outlet end of the master cylinder to keep the hydraulic system under a light pressure on drum brakes only.

Residual magnetism - Magnetism remaining after the magnetizing force is removed.

Resistance - The opposition to current flow measured in ohms.

Resolver – A speed sensor that utilizes three coils to determine rotor position.

Resume – A statement of your background and experience submitted to a potential employer.

Retainer-type axles – A type of rear axle that uses a retainer plate instead of a C-clips to keep the axle retained to the axle housing.

Returnability – The ability of the steering wheel to return to the straight ahead position after making a turn.

Reverse bias - Current flow in the opposite direction from normal.

Reverse fluid injection – A hand-operated device used to inject brake fluid into the bleeder valves at the wheel brake.

Revolutions per minute (RPM) - A measure of how fast an object is rotating around an axis.

RF- Radio frequency.

RFG - Reformulated gasoline. RFG has oxygenated additives and is refined to reduce both the lightest and heaviest hydrocarbon content from gasoline in order to promote cleaner burning.

RGB – Regenerative braking.

Rheostat - A two-terminal variable resistor.

Ride height – The height of the vehicle. Also called the trim height.

Right-hand rule – A method of determining the direction of the magnetic lines of force in a current-carrying conductor. The right-hand rule is used with conventional current flow theory (+ flowing to -).

Right-to-know laws – Laws that state that employees have a right to know when the materials they use at work are hazardous.

RIM - Reaction injection molded.

Rim width – The width of a wheel measured between bead sections.

Ring gear – The large gear inside a differential assembly, which meshes with the drive pinion gear.

Ripple voltage- Excessive AC voltage produced by a generator (alternator usually caused by a defective diode.

Rise time - The time, measured in microseconds, for the output of a coil to rise from 10% to 90% of its maximum output.

Riveted linings - Brake lining that is held to the brake shoe using rivets.

RMP - reaction moldable polymer.

RMS – Root mean square.

R.O. – An abbreviation for repair order.

Road crown - A roadway where the center is higher than the outside edges. Road crown is designed into many roads to drain water off the road surface.

Role model – A role played by a mentor.

Roll bar - *See* Stabilizer bar.

Roll steer - *See* Bump steer.

Roller bearings - Antifriction bearings that use hardened steel rollers between the inner and outer races.

Rolling circumference – The distance a tire travels when rotated one revolution.

ROM - Read-only memory.

Root mean square (RMS) - Conversion of AC voltages to the effective DC value.

Rosin-core solder- A type of solder for use in electrical repairs. Inside the center of the solder is a rosin that acts as a flux to clean and help the solder flow.

Rotary control valve – A power steering valve that operates by rotating an inner valve inside an outer valve to control the amount of steering assist.

Rotor-The rotating part of a generator where the magnetic field is created.

RPA- Rear Park Assist. The General Motors term to describe the system used to detect objects and warn the driver when backing.

RPM - Engine speed expressed in revolutions per minute of the crankshaft.

RPO – Regular Production Order

RSS – Road sensing suspension.

RTD – Real time dampening.

RTV - Room-temperature vulcanization.

Rubber coupling-A flexible connection between the power seat motor and the drive cable.

Run-flat tires - Tires specially designed to operate for reasonable distances and speeds without air inside to support the weight of the vehicle. Run-flat tires usually require the use of special rims designed to prevent the flat tire from coming off the wheel.

RVP – Reid vapor pressure. A measure of the volatility at exactly 100 degrees F.

RVS- Remote Vehicle Start. A general Motor's term for the system that allows the driver to start the engine using a remote control.

RWAL - Rear wheel antilock.

RWD – Rear wheel drive

Rzeppa – A type of constant velocity (CV) joint named after its inventor, Alfred H. Rzeppa.

SAE - Society of Automotive Engineers.

Safety stand - A metal device with an adjustable vertical support that is designed to support a vehicle after it has been raised off the ground. Also called a *jack stand*.

Saginaw - Brand name of steering components manufactured in Saginaw, Michigan, USA.

SAI - Steering axis inclination (same as KPI).

Same phase steering – A vehicle equipped with four-wheel steering where the front and the rear

wheels move in the same direction.

Sample - A reading taken from an electrical signal. A waveform is created from a successive number of samples.

Sampling rate - The number of readings taken from an electrical signal every second.

SAR-Supplemental Air Restraints. Another term used to describe an airbag system.

Saturated driver - Fuel-injection circuit that maintains the same voltage level throughout its on-time.

Saturation - The point of maximum magnetic field strength of a coil.

SBR - Styrene butadiene rubber.

Scavenging - The process of drawing air-fuel into the cylinder of the engine, due to the relative movement of exhaust gases out of the cylinder.

Schrader valve - A type of valve used in tires, air-conditioning, and fuel injection systems. Invented in 1844 by August Schrader.

SCI - Serial Communication Interface, a type of serial data transmission used by Chrysler.

Scoring - Grooves worn into the drum or disc braking surface.

SCP - Standard Corporate Protocol. A type of serial data transmission used by Ford.

SCR-Silicon Controller Rectifier

Screwdriver - A hand tool designed to remove or insert screws.

Screw jack assembly- A screw jack that is used to raise or lower a power seat.

Scroll compressor – An A/C compressor design known for its efficiency and excellent NVH characteristics.

Scrub radius - Refers to where an imaginary line drawn through the steering axis intersects the ground compared to the centerline of the tire. *Zero* scrub radius means the line intersects at the center line of the tire. *Positive* scrub radius means that the line intersects below the road surface.

Negative scrub radius means the line intersects above the road surface. It is also called *steering offset* by some vehicle manufacturers.

SDARS- Satellite Digital Audio Radio Services. Another term used to describe satellite radio.

Seal driver – A hand tool used with a mallet or hammer to seat seals into a seal groove.

Seal puller – A hand tool designed to remove seals.

Second class lever – A type of lever where the fulcrum is at one end of the lever and the applied force is at the other end of the lever with the load in the center.

Secondary battery – Rechargeable battery.

Secondary pickup - An accessory that can be clamped on the high voltage coil wire used to measure secondary ignition patterns.

Secondary shoe - The brake shoe installed facing the rear of the vehicle.

Sector gear – A section of a gear inside a steering gear that is attached to the sector shaft. Also called the pitman shaft.

Sector lash - Refers to clearance (lash) between a section of gear (sector) on the pitman shaft in a steering gear. *Also see* Overcenter adjustment.

Sector shaft - The output shaft of a conventional steering gear. It is a part of the sector shaft in a section of a gear that meshes with the worm gear and is rotated by the driver when the steering wheel is turned. It is also called a *pitman shaft*.

Sediment chamber - A space below the cell plates of some batteries to permit the accumulation of sediment deposits flaking from the battery plates. A sediment chamber keeps the sediment from shorting the battery plates.

Select low – The principle where during an ABS stop, the wheel on the same axle that is slowing the fastest is the one which determines when to increase, hold, or decrease pressure to both wheel brakes.

Select low principle – See select low.

Selectable Ride – A brand name for a type of electronic suspension system.

Self-adjusting brakes - Brakes that maintain the proper lining-to-drum clearance by automatic adjusting mechanism.

Self aligning spacer – A double cone used to spread the force of the retaining nut on the spindle of a brake lathe.

Self apply – A condition where the brakes apply without the driver depressing the brake pedal.

Self-energizing - A brake shoe, that when applied, develops a wedging action that assists the braking force applied by the wheel cylinder.

Self-energizing action - A brake shoe, that when applied, develops a wedging action that assists the braking force applied by the wheel cylinder.

Self-induction - The generation of an electric current in the wires of a coil created when the current is first connected or disconnected.

Self-tapping screw – A screw that has a tapered tip which allows the screw to form threads in the metal.

SEMA – Specialty Equipment Manufacturers Association.

Semi-closed loop – A phase of computer-controlled engine operation in which lean air-fuel mixtures are used to maximize fuel economy.

Semiconductor - A material that is neither a conductor nor an insulator; has exactly four electrons in the atom's outer shell.

Semi-floating – A type of line axle where the inner end of the axle floats and the outer end is supported by a bearing.

Semi-independent suspension – A type of rear suspension that allows some transfer of motion to the opposite side.

Semi-mets - Semi-metallic brake linings.

Semi-trailing arm – A type of rear suspension that controls both side-to-side and front-to-rear

motion.

Senseless DC motor – An AC synchronous electric motor that does not require a rotor position sensor for operation.

Separators - In a battery, nonconducting porous, thin materials used to separate positive and negative plates.

Serial Communication Interface (SCI)- Serial Communication Interface, a type of serial data transmission used by Chrysler.

Serial data – Data that is transmitted by a series of rapidly changing voltage signals.

Series circuit – An electrical circuit that provides only one path for current to flow.

Series circuit laws- Laws that were developed by Kirchhoff which pertain to series circuits.

Series hybrid – A hybrid vehicle design in which there is no mechanical connection between the ICE and the drive wheels. Instead, the ICE drives a generator that is used to produce electricity for recharging the high-voltage battery and for propelling the vehicle through an electric motor.

Series-parallel circuit - Any type of circuit containing resistances in both series and parallel in one circuit.

Series-parallel hybrid – A hybrid vehicle design that can operate as a series hybrid, a parallel hybrid, or both series and parallel at the same time.

Series-wound field- A typical starter motor circuit where the current through the field windings is connected in series with the armature before going to ground. Also called a series-wound starter.

Service advisor – A person who talks to the customer about a vehicle service and completes the work order.

Service bay – A work area for a vehicle, with or without a lift. Also called a *stall*.

Service manager – The person in charge of a shop or dealer service department.

Service plug – A high-voltage electrical disconnect device on hybrid electric vehicles. The

service plug should always be disconnected whenever working on a hybrid electric vehicle's high-voltage circuits.

Series wound - In a starter motor, the field coils and the armature are wired in series. All the current flows through the field coils, through the hot brushes, through the armature, then to the ground through the ground brushes.

Service brake - The main driver-operated vehicle brakes.

Service information - Includes service manuals, owner's manuals, CD ROM discs, Internet sites, or other sources where vehicle information is found.

Servo action - Brake construction having the end of the primary shoe bear against the secondary shoe. When the brakes are applied, the primary shoe applies force to the secondary shoe.

Servo brake – A type of drum brake that uses the primary (forward facing) brake shoe to increase the application force to the rear facing brake shoe.

Servomotor – The actuator in an electronic throttle control (ETC) system.

Servo unit - A vacuum-operated unit that attaches to the throttle linkage to move the throttle on a cruise control system.

Setback - The amount the front wheels are set back from true parallel with the rear wheels. Positive setback means the right front wheel is set back farther than the left. Setback can be measured as an angle formed by a line perpendicular (90°) to the front axles.

SFI – Sequential fuel injection. A fuel injection system in which injectors are pulsed individually in sequence with the firing order.

SGCM – **Starter Generator Control Module. The module in a GM parallel hybrid truck that controls the current to and from the integrated starter generator.**

Shackle - A mounting that allows the end of a leaf spring to move forward and backward as the spring moves up and down during normal operation of the suspension.

Shelf life - The length of time that something can remain on a storage shelf and not be reduced in performance level from that of a newly manufactured product.

Shielded test lead - A test lead that is surrounded by a conductive screen to protect the measurement signal against environmental influences such as electrical noise or radiation.

Shim - A thin metal spacer.

Shim chart – A chart used to help align a vehicle that uses shims for camber and caster adjustment.

Shimmy - A vibration that results in a rapid back and forth motion of the steering wheel. A bent wheel or a wheel assembly that is not correctly dynamically balanced are common causes of shimmy.

Shock absorbers – A suspension component that links and controls the action and reaction of the springs.

Shoe anchors – A round part at the top of most backing plates used to prevent the brake shoes from rotating with the drum during a brake application.

Shoe contact area – Raised areas on the backing plate of a drum brake where the brake shoes contact.

Shoe pad - A raised support on the backing plate against which the shoe edge rests; also called a shoe ledge.

Shoe rim – Another name for the lining table where the brake lining is attached to the brake shoe.

Shoe support pads – Six areas on the backing plate of a drum brake where the lining makes contact.

Shoe web – The support under the shoe table on a drum brake shoe.

Shop Foreman – A journeyman service technician who helps solve technical problems and helps service technicians.

Short circuit - A circuit in which current flows, but bypasses some or all the resistance in the circuit. A connection that results in a “copper-to-copper” connection.

Short/long arm suspension – Abbreviated SLA. A suspension system with a short upper control

arm and a long lower control arm. The wheel changes very little in camber with a vertical deflection. Also called *double-wishbone-type suspension*.

Short to ground - A short circuit in which the current bypasses some or all the resistance of the circuit and flows to ground. Because ground is usually steel in automotive electricity, a short to ground (grounded) is a “copper-to-steel” connection.

Shorted- a condition of being shorted such as a short circuit.

Short-to-voltage- A circuit in which current flows, but bypasses some or all the resistance in the circuit. A connection that results in a “copper-to-copper” connection.

Shunt - A device used to divert or bypass part of the current from the main circuit.

Shunt field- A field coil used in a starter motor that is not connected to the armature in series but is grounded to the starter case.

Side gears – The gears inside a differential that attach to the axles.

Sidewall – The side of a tire.

Silicon - A semiconductor material.

Silicone brake fluid – A type of brake fluid that is purple and does not absorb moisture.

Single cut file – A file that has just one row of cutting teeth.

Single stroke bleeding method – A method of manual brake bleeding where the brake pedal is depressed one time, held until the bleeder is closed and then released.

Sintered metal - see sintering.

Sintering - A process where metal particles are fused together without melting.

Sipes - Small traction improving slits in the tread of a tire.

SIR-Supplemental Inflatable restraints. Another term for air bags.

SKIS-Sentry Key Immobilizer System. A type of anti theft system used in Chrysler vehicles.

SLA - Abbreviation for short/long arm suspension.

SLI battery – The battery that is responsible for starting, charging, and lighting in a vehicle's electrical system.

Sliding caliper – A type of disc brake caliper that is free to move within a limited range.

Slip angle - The angle between the true centerline of the tire and the actual path followed by the tire while turning.

Slip-joint pliers – A hand tool which has two positions allowing the use of two different ranges of sizes.

Slip-ring end (SRE)-The end of a generator (alternator) that has the brushes and the slip rings.

Slope – The ratio of front to rear brake pressure by a proportioning valve.

Small-hole gauge – A handheld measuring tool that is adjustable to fit inside small holes. A micrometer is then used to measure the gauge to determine the inside diameter of the hole. Also called a *split-ball gauge*.

SMC - Sheet molding compound.

Smog - The term used to describe a combination of *smoke* and *fog*. Formed by NO_x and HC with sunlight.

SMR – System main relay. The high-voltage disconnect relays used in most hybrid electric vehicles.

Snap ring – A spring steel clip that is used to retain an object in a bore by being inserted into a groove.

Snap ring pliers – A hand tool, which is designed to install or remove snap rings.

Snub – One brake application.

SOC – State-of-charge. Expressed as a percentage, this refers to the charge level of a battery.

Society of Automotive Engineers (SAE) - A professional organization made up of automotive engineers and designers that establishes standards and conducts testing for many automotive-

related functions.

Socket – A tool that fits over the head of a bolt or nut and is rotated by a ratchet or breaker bar.

Socket adapter – An adapter that allows the use of one size of driver (ratchet or breaker bar) to rotate another drive size of socket.

Snips- A hand tool designed to cut sheet metal.

Solar cells-A device that creates electricity when sunlight hits a semiconductor material and electrons are released. About one kilowatt from a solar cell that is one square meter in size.

Solenoid - An electromagnetic switch that uses a movable core.

Solenoid valves – Valves that are opened and closed using an electromagnetic solenoid.

Solid axle - A solid supporting axle for both front or both rear wheels. Also referred to as a straight axle or nonindependent axle.

Solid state – A term used to describe electronic components that have no moving parts.

Solenoid - An electromagnetic device that uses a moveable core which can be connected to linkage to move a valve or other device.

Solenoid controlled damper – a shock absorber that is electronically controlled by a solenoid.

Solvent – Usually colorless liquids that are used to remove grease and oil.

Soot – **Particulate matter emitted by diesel engines.**

Space frame - A type of vehicle construction that uses the structure of the body to support the engine and drive train, as well as the steering and suspension. The outside body panels are nonstructure.

Spalling - A term used to describe a type of mechanical failure caused by metal fatigue. Metal cracks then break out into small chips, slabs or scales of metal. This process of breaking up is called spalling.

Spark knock - Secondary rapid burning of the last 3 to 5% of the air-fuel mixture in the

combustion chamber. Causes a second flame front that collides with the first flame front causing a knock noise.

SPDT-Single pole, double throw. A type of electrical switch.

Speakers- A device consisting of a magnet, coil of wire and a cone which reproduces sounds from the electrical signals sent to the speakers from a radio or amplifier.

Specific gravity - The ratio of the weight of a given volume of a liquid divided by the weight of an equal volume of water.

Speed nuts – Also called Tinnerman nuts. Used to keep the brake drum on at the assembly plant. Can be removed and discarded when servicing drum brakes for the first time.

Speed rating – A letter on most tires that indicates the maximum speed at which the tire is designed to perform.

Spider - Center part of a wheel. Also known as the center section.

Spider gears – Another name for the pinion gear used in a differential.

Spike - A (high) voltage pulse during a short period of time (sharp pulse).

Spike protection resistor- A resistor usually between 300 and 500 ohms that is connected in a circuit in parallel with the load to help reduce a voltage spike caused when a current following through a coil is turned off.

Spindle – The part of a micrometer that moves and contacts the object being measured.

Spindle nut - Nut used to retain and adjust the bearing clearance of the hub to the spindle.

Spline bind – A condition where the splines on the yoke of a driveshaft bind and then release as a vehicle is first accelerated after a stop.

Splice pack – A central point where many serial data lines jam together, often abbreviated SP.

Split-ball gauge – see *small hole gauge*.

Split μ - A term used to describe two different friction (μ) surfaces under the wheels of a vehicle. Mu is the Greek letter for coefficient of friction.

Split point – The pressure point where reduction of pressure to the rear brake begins in a proportioning valve.

Split system - A divided hydraulic brake system.

Spoke angle – The angle of the steering wheel.

SPM – Surface permanent magnet. A type of rotor in an AC synchronous electric motor that places the magnets on its outside circumference.

Sponge lead - Lead with many small holes used to make a surface porous or sponge-like for use in battery negative plates; the chemical symbol for lead is Pb.

Spongy pedal - When there is air in the brake lines, the pedal will have a springy or spongy feeling when applied.

Spontaneous combustion – A condition that can cause some materials, such as oily rags to catch fire without a source of ignition.

Spring pocket – Also called a spring seat.

Spring rate – The spring rate is the amount of weight it takes to compress a spring a certain distance, such as 200 pounds per inch.

Springs – Used as a buffer between the suspension and the frame or body and used to absorb wheel movement plus support the weight of the vehicle.

Sprung weight – The weight of a vehicle that is supported by the suspension.

SPS – Suspension position sensor.

SPST- Single pole, single throw. A type of electrical switch.

Squeal - A high pitched noise caused by high-frequency vibrations when brakes are applied.

Squib- The heating element of an inflator module which starts the chemical reaction to create the gas which inflates an air bag.

Squirrel-cage rotor – A rotor design utilized in AC induction motors. The conductors in the rotor are made in the shape of a squirrel cage.

SR – Selectable Ride

SRS-Supplemental Restraint System. Another term for an airbag system.

SSS – Speed sensitive steering.

SST – Special service tools.

Stabilizer links - Usually consists of a bolt, spacer and nut to connect (link) the end of the stabilizer bar to the lower control arm.

Stabilitrack – A brand name of the General Motors Corporation electronic stability control (ESC) system.

Stabilizer bar - A hardened steel bar connected to the frame and both lower control arms to prevent excessive body roll. Also called an *anti-sway* or *anti-roll bar*.

Stabilizer links - Usually consists of a bolt, spacer and nut to connect (link) the end of the stabilizer bar to the lower control arm.

Stall - See *service bay*.

Standard Corporate Protocol (SCP) – A network communications protocol used by Ford.

Star wheel - A notched wheel with a left or right-hand threaded member for adjusting brake shoes.

Starter drive - A term used to describe the starter motor drive pinion gear with overrunning clutch.

Starter solenoid- A type of starter motor that uses a solenoid to activate the starter drive.

State of charge - The degree or the amount that a battery is charged. A fully charged battery would be 100% charged.

State-of-health (SOH)- A signal sent by modules to all of the other modules in the network indicating that it is well and able to transmit.

State tax – A typical payroll deduction.

Static balance - A type of wheel balancer that is in one plane; when a tire has an even distribution of weight about its axis, it is in static balance.

Static electricity- An electrical charge that builds up in insulators and then discharges to conductors.

Static friction – The friction between two surfaces at rest (not moving).

Static seal – A seal used between two surfaces that are not moving.

Stator - A name for three interconnected windings inside an alternator. A rotating rotor provides a moving magnetic field and induces a current in the windings of the stator.

Steady bearing - *See* Center support bearing.

Steel - Refined iron metal with most of the carbon removed.

Steering arms - Arms bolted to or forged as a part of the steering knuckles. They transmit the steering force from the tie rods to the knuckles, causing the wheels to pivot.

Steering coupling disc - *See* Flexible coupling.

Steering damper – A shock absorber installed on the steering linkage to reduce road shock from being transferred to the steering wheel.

Steering gear - Gears on the end of the steering column that multiply the driver's force to turn the front wheels.

Steering knuckle - The inner portion of the spindle that pivots on the king pin or ball joints.

Steering offset - *See* Scrub radius.

Steering shaft – The part of the steering that connects the steering wheel to the steering gear assembly.

Steering stop – The location where the steering linkage stops at the extreme left and right end of travel.

Steering wheel position sensor – A sensor that determines in which direction and how fast the steering wheel is being turned.

Step-bore cylinder - A wheel cylinder having a different diameter at each end.

Stepper motor - A motor that moves a specified amount of rotation.

Stiffening capacitor-See powerline capacitor.

Stoichiometric - An air-fuel ratio of exactly 14.7: 1. At this specific rate, all the gasoline is fully oxidized by all the available oxygen.

Stone wheel – A grinding stone attached to a grinder used for cleaning, sharpening, or other similar operations.

Storage- The process inside of a computer where data is stored before and after calculations have been made.

Straight axle – *See* Solid axle.

Straight cut aviation snip – A tin snip that is designed with curved jaws that allow a straight cut through sheet metal.

Straight time – The amount of time actually spent performing a service operation.

Stratosphere – **The earth's upper atmosphere. Most of the earth's ozone is located in the stratosphere.**

Stress riser – A nick or rust area in a spring that could cause the spring to break.

Strikeout bumper - *See* Jounce bumper.

Stroboscopic - A very bright pulsing light triggered from the firing of one spark plug. Used to check and adjust ignition timing.

Strong hybrid – Another term for “full hybrid.” *See Full hybrid.*

Strut rod - Suspension member used to control forward/backward support to the control arms. Also called *tension* or *compression rod* (TC rod) or *drag rod*.

Strut rod bushing - A rubber component used to insulate the attachment of the strut rod to the frame on the body of the vehicle.

Strut suspension – A type of suspension system that uses struts.

Struts – A structural part of a suspension that includes the shock absorber.

Stub shaft – A short shaft which is part of the steering gear and attaches to the steering shaft assembly.

Stub-type frame – A type of vehicle frame that only supports the front suspension and engine.

Stud – A short rod with threads on both ends.

Stud removal tool – A hand tool used with a breaker bar or ratchet to remove what is left of a broken stud.

Subwoofer- A type of speaker that is used to reproduce low frequency sounds.

SULEV – **Super-Ultra-Low-Emission Vehicle.**

Sulfation – **Permanent damage in a lead-acid battery caused by the hardening of lead sulfate on the battery plates. Sulfation takes place when a lead-acid battery is discharged for an extended period of time.**

Sun gear – **The center member of a planetary gearset. The other members (planet carrier and ring) rotate around the sun gear, thus the term “planetary.”**

Suppression diode- A diode installed in the reverse bias direction and used to reduce the voltage spike that is created when a circuit that contains a coil is opened and the coil discharges.

Surface charge – **A “false” charge that exists on the battery plates when a vehicle is first turned off.**

Surge tank – **A reservoir mounted at the highest point in the cooling system.**

Suspension - Parts or linkages by which the wheels are attached to the frame or body of a vehicle. These parts or linkages support the vehicle and keep the wheels in proper alignment.

Suspension bumper - *See* Jounce bumper.

SUV – Sport utility vehicle.

SVR- Sealed Valve Regulated. A term used to describe a type of battery that is valve regulated lead acid or sealed lead acid.

Sway bar - Shortened name for anti-sway bar. *See* Stabilizer bar.

SWCAN- An abbreviation for single wire CAN (Controller Area Network).

Swept area – The amount of brake drum or rotor friction surface that moves past the brake linings every time the drum or rotor completes a rotation.

Switchgrass – **A feedstock for ethanol production that requires very little energy or fertilizer to cultivate.**

SWPS – Steering Wheel Position Sensor.

Syn-Gas – **Synthesis gas generated by a reaction between coal and steam. Syn-gas is made up of mostly hydrogen and carbon monoxide and is used to make methanol. Syn-gas is also known as *town gas*.**

Synthetic fuel – **Fuels generated through synthetic processes such as Fischer-Tropsch.**

Synthetic retainers – A type of retention method for holding together parts of a universal joint.

Table - The portion of the shoe to which the lining is attached.

Tach - Tachometer, instrument, or gauge used to measure RPM (revolutions per minute).

Tachometer (tach) - Instrument or gauge used to measure RPM (revolutions per minute).

TAME – **Tertiary amyl methyl ether. TAME is an oxygenating fuel and is used as a gasoline additive similar to ETBE or MTBE.**

Tandem cylinder - A master cylinder with two pistons arranged one ahead of the other. One cylinder operates rear brakes and the other front brakes.

Tandem diaphragm – A type of vacuum brake booster that uses two diaphragms.

Tap - A metal cutting tool used to create threads in metal after a hole of the proper size has been

drilled.

Tapered roller bearings – A type of antifriction bearing that uses tapered rollers between the inner and outer races.

TBI - Throttle body injection.

TC - Traction control.

TCC – Torque converter clutch. Used to lock the turbine to the housing, thus producing a direct drive through the torque converter assembly.

TC rod - See Strut rod.

TCM – Transmission control module. The electronic control module that is responsible for the operation of the vehicle's transmission or transaxle.

TDC - Top dead center.

Teacher – A role played by a mentor.

Team leader – An experienced technician who helps advise a small group of technicians who are paid according to the total amount of work completed by all members of the team.

Technical service bulletin - When a problem has a correction, the vehicle manufacturer releases a technical service bulletin (TSB), which details the repair. Also called *technical service bulletin information (TSBI)*.

Technician - A person who performs diagnosis and service work to a vehicle.

Technician A and B questions – A type of question used on ASE certification tests.

Telescoping steering column – A steering column that can be adjusted toward and away from the driver.

Tell-tale light - Dash warning light (sometimes called an idiot light).

Tensile strength – The maximum stress used under tension (lengthwise force) without causing failure.

Tension rod – See *strut rod*.

Terminal- The metal end of a wire which fits into a plastic connector and is the electrical connection part of a junction.

Terminating resistor – Resistors placed at the end of a high-speed serial data circuit to help reduce electromagnetic interference.

Test light- A light used to test for voltage. Contains a light bulb with a ground wire at one end and a pointed tip at the other end.

TFI - Thick-film integration.

TFE – Two-flow electronic. A type of variable assist steering.

THD-Total Harmonic Distortion. A rating for an amplifier used in sound system.

Thermistor - A resistor that changes resistance with temperature. A positive-coefficient thermistor has increased resistance with an increase in temperature. A negative-coefficient thermistor has increased resistance with a decrease in temperature.

Thermocouple- Two dissimilar metal when connected and heated creates a voltage. Used for measuring temperature.

Thermoelectric meters - A type of dash instrument that uses heat created by current flow through the gauge to deflect the indicator needle.

Thermoelectric principle - The production of current flow created by heating the connection of two dissimilar metals.

Thermoelectric switch – An electrical switch designed to actuate at a specified temperature.

Thermoelectricity- The production of current flow created by heating the connection of two dissimilar metals.

Thermostat - A device that controls the flow in a system such as the engine cooling system based on temperature.

Third-class lever – A type of lever where the fulcrum is located at the end of the lever and the

force is applied to the middle of the lever.

Thick-film integration (TFI) - Type of Ford electronic ignition system.

Thickness gauge – see *feeler gauge*.

Thimble – The part of a micrometer that is rotated to move the spindle.

Threaded insert – A type of thread repair where the original threads are replaced by an insert that contains the same size threads as the original on the inside of the insert.

Three Cs – Technicians need to complete the work order by informing the customers of the three Cs – complaint (concern), cause, and the correction.

Three-quarter floating – A type of rear drive axle where some of the weight of the vehicle is supported by the axle shaft.

Threshold voltage-Another name for barrier voltage or the voltage difference needed to forward bias a diode.

Throttle body - A housing containing a valve to regulate the airflow through the intake manifold.

Throttle position (TP) sensor - Signals the computer as to the position of the throttle.

Through bolts-The bolts used to hold the parts of a starter motor together. The long bolts go through field housing and into the drive-end housing.

Throws- The term used to describe the number of output circuits there are in a switch.

Thrust angle - The angle between the geometric centerline of the vehicle and the thrust line.

Thrust line - The direction the rear wheels are pointed as determined by the rear wheel toe.

THS – **Toyota Hybrid System.**

Tie bars – Rubber segments molded between grooves of a tire to help support tread blocks.

Tie rod - A rod connecting the steering arms together.

Tier – **A level of environmental regulation created by the EPA. Tier 1 is gradually being**

phased out in favor of stricter Tier 2 regulations.

Tight – A term used to describe an understeering condition.

Tilt steering column – A type of steering column that can be moved upward or downward to fit the driver.

Time base - The time defined per each horizontal division on the display.

Tin snips – A hand tool used to cut sheet metal, thin cardboard, or similar material.

Tinnerman nuts – Used to keep the brake drums on at the assembly plant. Can be removed and discarded when servicing the drum brake for the first time.

Tire rotation – A term used to describe moving wheel/tire assemblies from one position on a vehicle to another.

Tire slip – The difference between the actual speed and the rate at which the tire tread moves across the road surface.

TLEV – Transitional Low-Emission Vehicle.

Toe – The inward or outward angle of the front or rear wheels as viewed from overhead.

Toe-in - The difference in measurement between the front of the wheels and the back of the wheels (the front are closer than the back).

Toe-out - The back of the tires are closer than the front.

Tolerance adjustment – An alignment method that involves loosening all suspension mounting fasteners and retightening.

Tone generator tester- A type of tester used to find a shorted circuit that uses a tone generator. Headphones are used along with a probe to locate where the tone stops which indicates where in the circuit the fault is located.

Tone ring – A notched wheel used as a reluctor for the wheel speed sensor.

TOOT – Toe out on turns.

Top dead center (TDC) - The highest point in the cylinder that the piston can travel. The measurement from bottom dead center (BDC) to TDC determines the stroke length of the crankshaft.

Top tier gasoline – Gasoline with a higher detergent content than that specified by the U.S. EPA.

Torque - A twisting force measured in pounds-feet (lb-ft) or Newton-meters (N-m) which may result in motion.

Torque arm – An arm that attaches the rear differential assembly to the body of the vehicle.

Torque converter - A special form of fluid coupling in which torque is increased.

Torque converter clutch - A clutch located inside the torque converter that locks the turbine and the impeller together to prevent any slippage. Also called a *lockup torque converter*.

Torque prevailing nut – A type of nut that does not loosen, but rather retains its holding torque.

Torque steer - Torque steer occurs in front-wheel-drive vehicles when engine torque causes a front wheel to change its angle (toe) from straight ahead. The resulting pulling effect of the vehicle is most noticeable during rapid acceleration, especially whenever upshifting of the transmission creates a sudden change in torque.

Torque wrench - A wrench that registers the amount of applied torque.

Torsion bar - A type of spring in the shape of a straight bar. One end is attached to the frame of the vehicle, and the opposite end is attached to a control arm of the suspension. When the wheels hit a bump, the bar twists and then untwists.

Torx - A type of fastener which features a star-shaped indentation for a tool. A registered trade mark of the Camcar Division of Textron.

Total circuit resistance (R_T)-The total resistance in a circuit.

Total toe - The total (combined) toe of both wheels, either front or rear.

TP – **Throttle position sensor. The sensor that provides feedback concerning the position of**

the throttle plate.

TPC – Tire Performance Criteria.

TPD – Tire problem detector.

TPMS – Tire pressure monitoring system.

TRAC – **Traction control. A function of the vehicle antilock brake system that enables application of the brake on wheels that have lost traction.**

Trace - The displayed waveform that shows the variations of the input signal as a function of time.

Track - The distance between the center line of the wheels as viewed from the front or rear.

Track rod - A horizontal steel rod or bar attached to rear axle housing at one end and the frame at the other to keep the center of the rear axle centered on the body. Also known as a *panhard rod*.

Tracking - Used to describe the fact that the rear wheels should track directly behind the front wheels.

Traction – The friction (traction) between tires and the pavement.

Traction control – The electromechanical parts used to control wheel slip during acceleration.

Traction motor – **A motor-generator in a hybrid electric vehicle that is responsible for propelling or assisting the internal combustion engine.**

Trade number - The number stamped on an automotive light bulb. All bulbs of the same trade number have the same candlepower and wattage, regardless of the manufacturer of the bulb.

Trailing arm – A rear suspension arm that attaches to the frame or body in front of the rear axle.

Trailing shoe – The rear facing drum brake shoe on a leading/trailing type of drum brake.

Trainer – A beginning service technician just learning about the trade.

Tramp - An up and down vibration of a tire/wheel assembly usually due to out-of-round tire or

out-of-balance condition.

Transducer - An electrical and mechanical speed sensing and control unit used on cruise control systems.

Transistor - A semiconductor device that can operate as an amplifier or an electrical switch.

Tread – The rubber part of a tire that touches the road.

Trigger - Determines the beginning point of a waveform.

Trigger level - The voltage level that a waveform must reach to start display.

Trigger slope - The voltage direction that a waveform must have to start display. A positive slope requires the voltage to be increasing as it crosses the trigger level; a negative slope requires the voltage to be decreasing.

Trigger source - The test tool input that supplies the signal to provide the trigger.

Troposphere – **The earth's lower atmosphere. The layer above the troposphere is known as the stratosphere.**

Trouble light - A light used for close viewing of dark areas. Also called a *work light*.

Troxler effect- The Troxler effect is a visual effect where an image remains on the retina of the eye for a short time after the image has been removed. The effect was discovered in 1804 by Ignéy Paul Vital Troxler (1780 – 1866), a Swiss physician. Because of the Troxler effect, headlight glare can remain on the retina of the eye and create a blind spot.

Trunnions – The four arms of a typical universal joint.

TSB - Technical service bulletin.

TSBi – See technical service bulletin.

TTL-Transistor-Transistor Logic

Tube-nut wrench – See fitting wrench.

Turbocharger - An exhaust-powered supercharger.

Turbulence - The state of being violently disturbed, as in an engine; the rapid swirling motion of the air-fuel mixture entering the cylinder.

Turning radius - Refers to the angle of the steering knuckles that allow the inside wheel to turn at a sharper angle than the outside wheel whenever turning a corner. Also known as toe out on turns (TOOT) or the Ackerman angle.

Turns ratio-The ratio between the number of turns used in the primary winding of the coil to the number of turns used in the secondary winding. In a typical ignition coil the ratio is 100:1.

TV – Thickness variation.

Tweeter- A type of speaker used in a audio system that is designed to transmit high frequency sounds.

Twisted pair- A pair of wires that are twisted together from 9 to 16 turns per foot of length. Most are twisted once every inch (12 per foot) to help reduce electromagnetic interference from being induced in the wires as one wire would tend to cancel out any interference pickup up by the other wire.

TXV – **Thermostatic expansion valve. An A/C system component that acts as a refrigerant expansion device.**

UART – **Universal Asynchronous Receive/Transmit, a type of serial data transmission.**

UBP- UART based protocol.

UCG – **Underground coal gasification.**

U-joints – Universal joints.

ULEV – **Ultra-Low-Emission Vehicle.**

ULEV II – **Ultra Low-Emission Vehicle certified under the Phase II LEV standard.**

ULSD – **Ultra-Low-Sulfur Diesel. Diesel fuel with a maximum sulfur content of 15 parts per million.**

Ultraviolet radiation – **A spectrum of radiation emitted by the sun that is mostly absorbed**

in the earth's upper ozone layer. Ultraviolet radiation is a major contributor to health issues such as cataracts and skin cancer.

UNC - Unified national coarse.

Undercut- A process of cutting the insulation, usually mica, from between the segments of a starter commutator.

Underinflation - A term used to describe a tire with too little tire pressure (less than minimum allowable pressure).

Understeer - A term used describe the handling of a vehicle where the driver must turn the steering wheel more and more while turning a corner.

UNF - Unified national fine.

Unit body - A type of vehicle construction first used by the Budd Company of Troy, Michigan, that does not use a separate frame. The body is built strong enough to support the engine and the power train, as well as the suspension and steering system. The outside body panels are part of the structure. *Also see* Space frame construction.

Universal joint – A joint in a steering or drive shaft that allows torque to be transmitted at an angle.

Universal joint wrench – A hand tool that is used with a socket and ratchet to allow use at an angle. A joint is a steering shaft or drive shaft that allows torque to be applied through an angle.

Unsprung weight - The parts of a vehicle not supported by the suspension system. Examples of items that are typical unsprung weight include wheels, tires, and brakes.

Used oil – Any petroleum-based or synthetic oil that has been used.

UST – Underground storage tank.

Utility knife – A handheld knife that uses replaceable blades.

UTQGS – Uniform Tire Quality Grading System.

UVA – Ultraviolet radiation from the sun that is not absorbed by the ozone layer and is not damaging to biological organisms.

UVB – Ultraviolet radiation from the sun that is only partially absorbed by the ozone layer. UVB can cause damage to biological organisms.

VAC - Vacuum sensor.

Vacuum - Any pressure less than atmospheric pressure (14.7 psi).

Vacuum advance - A spark advance unit that advances the ignition timing in relation to engine vacuum.

Vacuum bleeding – Using a vacuum source to draw air from a brake hydraulic system.

Vacuum booster - A vacuum power brake unit.

Vacuum kicker - A computer-controlled throttle device used to increase idle RPM during certain operating conditions, such as when the air conditioning system is operating.

Vacuum, manifold - Vacuum in the intake manifold that develops as a result of the intake stroke of the cylinders.

Vacuum, ported - A vacuum that develops on the intake side of the throttle plate as air moves past it.

Vacuum power unit - A device utilizing engine manifold vacuum to assist application of the brakes, reducing pedal effort.

Vacuum servo - A vacuum controlled parking brake release mechanism controlled by an electrical solenoid.

Valence ring- The outer most ring or orbit of electrons around a nucleus of an atom.

Valve overlap - The amount of time, in degrees of crank rotation, the intake and exhaust valves are both open.

Valvetrain - The collection of parts that make the valves operate. The valvetrain includes the camshaft(s), related drive components, the various parts that convert the camshaft's rotary

motion into reciprocating motion, and the valves and their associated parts.

Variable-delay wipers-Windshield wipers whose speed can be varied.

Variable fuel sensor – See *Fuel compensation sensor*.

Variable ratio – A steering gear design that provides a variable steering gear ratio.

Varistors- Resistors whose resistance depends on the amount of voltage applied to them.

VATS- Vehicle Antitheft System. A system used on some General Motors vehicles.

VCM – **Variable cylinder management. A function of some Honda HEVs that allows some ICE cylinders to be disabled in order to enhance regenerative braking action.**

VDIM – **Vehicle Dynamic Integrated Management.**

VECI – Vehicle emission control information. This sticker is located under the hood on all vehicles and includes emission-related information that is important to the service technician.

Vehicle control module (VCM) - The on-board computer that controls the engine management, transmission, and other vehicle systems such as antilock brakes.

Vehicle identification number (VIN) - Alphanumeric number identifying vehicle type, assembly plant, powertrain, etc.

Vehicle stability enhancement system – the name for a General Motors electronic stability control system.

Vent port - The Society of Automotive Engineers (SAE) term for the front port of a master cylinder, also called the compensating port or bypass.

Vertical scale - The scale used for vertical display (vertical sensitivity) expressed in certain units per division.

VES – Variable effort steering.

V-FFV – **Virtual Flexible Fuel Vehicle. This fuel system design does not use a fuel compensation sensor and instead uses the vehicle's oxygen sensor to adjust for different fuel compositions.**

VI – Viscosity index. An index of the change in a motor oil's viscosity between hot and cold extremes.

Vibration – An oscillation, shake or movement that alternates in opposite directions.

Vibration order – A description used to help define a vibration.

VIN – Vehicle identification number.

Viscous coupling – A type of device used to allow a limited difference in speed of two axles.

VISE GRIPS® - A brand name for locking pliers.

VOC – Volatile organic compounds. These compounds include gases emitted from paints, solvents, glass, and many other products.

Voice recognition-A system which uses a microphone and a speaker connected to an electronic module which can control the operation of electronic devices in a vehicle.

Volatility - A measurement of the tendency of a liquid to change to vapor. Volatility is measured using RVP, or Reid Vapor Pressure.

Volt - The unit of measurement for the amount of electrical pressure; named for Alessandro Volta (1745–1827).

Voltage drop - Voltage loss across a wire, connector, or any other conductor. Voltage drop equals resistance in ohms times current in amperes (Ohm's law).

Voltage regulator - An electronic or mechanical unit that controls the output voltage of an electrical generator or alternator by controlling the field current of the generator.

Voltmeter - An electrical test instrument used to measure volts (unit of electrical pressure). A voltmeter is connected in parallel with the unit or circuit being tested.

Volumetric efficiency - The ratio between the amount of air-fuel mixture that actually enters the cylinder and the amount that could enter under ideal conditions expressed in percent.

VPW – Variable pulse width, a type of data transmission to a scan tool.

VRLA battery – Valve regulated lead-acid battery. A sealed battery that is both spill proof

and leakproof. AGM and gelled electrolyte are both examples of VRLA batteries.

VS sensor – Vehicle speed sensor.

VSC – Vehicle stability control.

VSES – Vehicle Stability Enhancement System.

VSS - Vehicle speed sensor.

VTEC – Variable Valve Timing and Lift Electronic Control. A valve train control system developed by Honda Motor Company to enhance engine output and efficiency over a wide RPM range.

VTF - Vacuum-tube fluorescent.

Vulcanization - A process where heat and pressure combine to change the chemistry of rubber.

Wander - A type of handling which requires constant steering wheel correction to keep the vehicle going straight.

Warning light - A light on the instrument panel to alert the driver when one half of a split hydraulic system fails as determined by the pressure differential switch.

Washers – Flat or shaped pieces of round metal with a hole in the center used between a nut and a part or casting.

Water fade – A lack of braking caused by water getting between the friction material and the brake drum or rotor.

Water jacket – The coolant passages around the cylinders that are used to absorb and transfer heat away from the ICE assembly.

Water pump – A mechanical device responsible for circulating coolant through a liquid cooling system.

Water pump pliers – See multiple-groove adjustable pliers.

Watt - An electrical unit of power; 1 watt equals current (amperes) x voltage (1/746 hp). Named after James Watt, a Scottish inventor.

Watt's Law- the formula for Watts is the voltage times the amperes in the circuit which represents the electrical power in the circuit.

Watt's link - A type of track rod which uses two horizontal rods pivoting at the center of the rear axle.

Waveform - The pattern defined by an electrical signal.

Ways – Places where the disc brake caliper contacts on a sliding-type caliper design.

Wear bars - *See* Wear indicators.

Wear indicator - Bald area across the tread of a tire when 2/32" or less of tread depth remains.

Wear indicator ball joint - A ball joint design with a raised area around the grease fitting. If the raised area is flush or recessed with the surrounding area of the ball joint, the joint is worn and must be replaced.

Wear Indicators - bald area across the tread of a tire when only 2/32" or less of tread depth remains.

Web - The stiffening member of the shoe to which the shoe table is attached.

Weight bias – The amount of weight on the front compared to the rear of a vehicle.

Weight-carrying ball-joint - *See* load-carrying ball-joint.

Weight transfer – The movement of weight forward during braking.

Wheel brakes – Brakes at each wheel of a vehicle that slows and stops the rotation of that wheel.

Wheel cover - A functional and decorative cover over the entire wheel. Also see hub cap.

Wheel cylinder - The part of the hydraulic system that receives pressure from the master cylinder and applies the brake shoes to the drums.

Wheelbase - The distance between the center line of the two wheels as viewed from the side.

Wheel speed sensors – Sensors used to detect the speed of the wheels. Used by an electronic

controller for antilock brakes (ABS) and/or traction control.

Wheelbase – The distance between the centerline of the two wheels as viewed from the side.

Wheel mounting torque – The amount of torque applied to the lug nuts.

Wheel rate – Similar to spring rate, but includes the ratio of wheel travel to spring travel to determine the force per inch rate.

WHMIS – Workplace Hazardous Materials Information Systems.

Wide-band oxygen sensor – An oxygen sensor design that is capable of detecting actual air-fuel ratios. This is in contrast to a conventional oxygen sensor that only changes voltage when a stoichiometric air-fuel ratio has been achieved.

Wind farm – An area of land that is populated with wind-generating plants.

Window regulator- A mechanical device that transfers the rotating motion of the window hand crank or electric motor to a vertical motion to raise and lower a window in a vehicle.

Windshield wipers- The assembly of motor, motor control, operating linkage plus the wiper arms and blades which are used to remove rain water from the windshield.

Wire brush wheel – A wire brush wheel is often mounted on one end of a grinder and is used for cleaning parts and other similar operations.

Wiring schematic-A drawing showing the wires and the components in a circuit using symbols to represent the components.

Wishbone suspension - See SLA.

Witness mark – A mark made by an object which indicates where a noise or vibration could be located.

W/O - Without

Wood alcohol – See *Methanol*.

Work – The transfer of energy from one physical system to another. Actually moving an object is work.

Work experience – Two years of work experience as a service technician is needed plus passing one or more tests to be certified by ASE.

Work light – See trouble light.

Work order – Contains all vehicle and customer information plus what service work is requested by the customer. Also called a *repair order*.

Worm and roller - A steering gear that uses a worm gear on the steering shaft. A roller on one end of the cross shaft engages the worm.

Worm and sector - A steering gear that uses a worm gear that engages a sector gear on the cross shaft.

Worm gear – A type of gear used in an older type of steering gear, which is attached to the steering shaft.

WOT - Wide-open throttle.

WOW display- A dash display when it first comes on and lights all possible segments. Can be used to test the dash display for missing lighted segments.

Wrench – A hand tool used to grasp and rotate a threaded fastener.

WSS - wheel speed sensor.

WWFC – World Wide Fuel Charter. A fuel quality standard developed by vehicle and engine manufacturers in 2002.

Wye wound - A type of stator winding in which all three coils are connected to a common center connection. Called a wye because the connections look like the letter *Y*.

Xenon headlights-Headlights that use an arc tube assembly that has a xenon gas inside which produces a bright bluish light.

Yaw rate sensor – An input sensor usually located in the center of the vehicle that detects yaw as part of an electronic suspension system.

Zener diode - A specially constructed (heavily doped) diode designed to operate with a reverse-

bias current after a certain voltage has been reached. Named for Clarence Melvin Zener.

Zerk - A name commonly used for a grease fitting. Named for its developer, Oscar U. Zerk, in 1922, an employee of the Alamite Corporation. Besides a Zerk fitting, a grease fitting is also called an Alamite fitting.

ZEV – Zero-Emission Vehicle. This rating is typically only achieved by battery-powered vehicles or those powered by fuel cells.

Zinc-air – A type of battery design that uses a positive electrode of gaseous oxygen and a negative electrode made of zinc.

Zone valve – An electrically operated valve for controlling refrigerant flow in A/C systems with multiple evaporators.