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| Unit/Standard Number |  <p style="text-align: right;"><b>High School Graduation Years 2013, 2014 and 2015</b></p> <p style="text-align: center;"><b>Automobile/Automotive Mechanics Technology/Technician<br/>CIP 47.0604<br/>Task Grid</b></p> |
|                      | <b>Secondary Competency Task List</b>   |
| 100                  | <b>ORIENTATION</b>  |
| 101                  | Explain and follow all lab rules.   |
| 102                  | Participate in basic shop management.   |
| 103                  | Participate in parts ordering.  |
| 104                  | Demonstrate auto shop safety and hygiene.   |
| 105                  | Demonstrate the use of service information.   |
| 106                  | Demonstrate proper telephone courtesy.  |
| 107                  | Identify vehicle by: sight, V.I.N. and/or ID tag.   |
| 108                  | Identify career paths within the career and technical education program.  |
| 200                  | <b>SAFETY</b>   |
| 201                  | Identify and follow all safety rules.   |
| 202                  | Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts.  |
| 203                  | Demonstrate the ability to safely set-up/shut-down oxygen acetylene welding equipment.  |
| 204                  | Identify chemical safety, "Right-To-Know Laws" and Materials Safety Data Sheets (MSDS).   |
| 205                  | Identify and demonstrate the safe use of hand tools.  |
| 206                  | Identify and demonstrate the safe use of power tools.   |
| 207                  | Identify and demonstrate the safe use of protective clothing and equipment.   |
| 208                  | Identify and demonstrate the safe use of fire protection equipment.   |
| 209                  | Identify and demonstrate the safe use of shop equipment.  |
| 210                  | Explain EPA and OSHA Regulations.   |
| 300                  | <b>TOOLS/FASTENERS</b>  |
| 301                  | Identify and use fasteners and bolts.   |
| 302                  | Demonstrate the ability to correctly drill and use re-threading tools.  |
| 303                  | Demonstrate the ability to correctly read and interpret precision automotive measuring tools.   |
| 304                  | Demonstrate the ability to correctly use automotive tools.  |
| 305                  | Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.  |
| 400                  | <b>CERTIFICATIONS</b>   |
| 401                  | Prepare to obtain PA Safety Inspection Certification.   |
| 402                  | Prepare to obtain EPA 609 Refrigerant Recovery, Recycling Certification.  |
| 403                  | Prepare to obtain Emission Inspection Certification.  |



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| 500                  | <b>SUSPENSION AND STEERING</b>  |
| 501                  | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.   |
| 502                  | Identify and interpret suspension and steering system concerns; determine necessary action.   |
| 503                  | Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.                 |
| 504                  | Locate and interpret vehicle and major component identification numbers.  |
| 505                  | Disable and enable supplemental restraint system (SRS).   |
| 506                  | Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).   |
| 507                  | Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.   |
| 508                  | Inspect and replace rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.   |
| 509                  | Determine proper power steering fluid type; inspect fluid level and condition.  |
| 510                  | Flush, fill, and bleed power steering system.   |
| 511                  | Diagnose power steering fluid leakage; determine necessary action.  |
| 512                  | Remove, inspect, replace, and adjust power steering pump belt.  |
| 513                  | Remove and reinstall power steering pump.   |
| 514                  | Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.   |
| 515                  | Inspect and replace power steering hoses and fittings.  |
| 516                  | Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.  |
| 517                  | Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.   |
| 518                  | Inspect and test electric power assist steering.  |
| 519                  | Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers.   |
| 520                  | Remove, inspect and install strut rods and bushings.  |
| 521                  | Remove, inspect, and install upper and/or lower ball joints.  |
| 522                  | Remove, inspect, and install steering knuckle assemblies.   |
| 523                  | Remove, inspect, and install short and long arm suspension system coil springs and spring insulators.   |
| 524                  | Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts.  |
| 525                  | Remove, inspect, and install stabilizer bar bushings, brackets, and links.  |
| 526                  | Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.   |
| 527                  | Inspect, remove, and replace shock absorbers.   |
| 528                  | Remove, inspect, and service or replace front and rear wheel bearings.  |
| 529                  | Lubricate suspension and steering systems.  |
| 530                  | Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.   |
| 531                  | Prepare vehicle for wheel alignment on the alignment machine; perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel. |



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| 532                  | Check SAI (steering axis inclination) and included angle; determine necessary action.  |
| 533                  | Check rear wheel thrust angle; determine necessary action.   |
| 534                  | Check for front wheel setback; determine necessary action.   |
| 535                  | Check front and/or rear cradle (subframe) alignment; determine necessary action.   |
| 536                  | Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.  |
| 537                  | Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.  |
| 538                  | Rotate tires according to manufacturer's recommendations.  |
| 539                  | Measure wheel, tire, axle flange, and hub runout; determine necessary action.  |
| 540                  | Diagnose tire pull problems; determine necessary action.   |
| 541                  | Dismount, inspect, and remount tire on wheel; Balance wheel and tire assembly (static and dynamic).  |
| 542                  | Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.   |
| 543                  | Reinstall wheel; torque lug nuts.  |
| 544                  | Inspect tire and wheel assembly for air loss; perform necessary action.  |
| 545                  | Repair tire using internal patch.  |
| 600                  | <b>BRAKES</b>  |
| 601                  | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.                    |
| 602                  | Identify and interpret brake system concern; determine necessary action.   |
| 603                  | Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.        |
| 604                  | Locate and interpret vehicle and major component identification numbers.   |
| 605                  | Measure brake pedal height, travel, and free play (as applicable); determine necessary action.   |
| 606                  | Check master cylinder for internal/external leaks and proper operation; determine necessary action.  |
| 607                  | Remove, bench bleed, and reinstall master cylinder.  |
| 608                  | Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action. |
| 609                  | Replace brake lines, hoses, fittings, and supports.  |
| 610                  | Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).   |
| 611                  | Select, handle, store, and fill brake fluids to proper level.  |
| 612                  | Inspect, test, and/or replace components of brake warning light system.  |
| 613                  | Bleed and/or flush brake system.   |
| 614                  | Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.   |
| 615                  | Remove, clean, inspect, and measure brake drums; determine necessary action.   |
| 616                  | Refinish brake drum; measure final drum diameter.  |



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| 617                  | Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.        |
| 618                  | Inspect and install wheel cylinders.   |
| 619                  | Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.   |
| 620                  | Install wheel, torque lug nuts, and make final checks and adjustments.   |
| 621                  | Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.   |
| 622                  | Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.  |
| 623                  | Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.  |
| 624                  | Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.  |
| 625                  | Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.  |
| 626                  | Remove and reinstall rotor.  |
| 627                  | Refinish rotor on vehicle; measure final rotor thickness.  |
| 628                  | Refinish rotor off vehicle; measure final rotor thickness.   |
| 629                  | Install wheel, torque lug nuts, and make final checks and adjustments.   |
| 630                  | Check brake pad wear indicator system operation; determine necessary action.   |
| 631                  | Test pedal free travel; check power assist operation.  |
| 632                  | Check vacuum supply to vacuum-type power booster.  |
| 633                  | Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.   |
| 634                  | Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.   |
| 635                  | Check parking brake and indicator light system operation; determine necessary action.  |
| 636                  | Check operation of brake stop light system; determine necessary action.  |
| 637                  | Replace wheel bearing and race.  |
| 638                  | Inspect and replace wheel studs.   |
| 639                  | Remove and reinstall sealed wheel bearing assembly.  |
| 640                  | Identify and inspect electronic brake control system components; determine necessary action.   |
| 641                  | Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action. |
| 642                  | Depressurize high-pressure components of the electronic brake control system.  |
| 643                  | Bleed the electronic brake control system hydraulic circuits.  |
| 644                  | Identify traction control/vehicle stability control system components.   |
| 700                  | <b>ELECTRICAL/ELECTRONIC SYSTEMS</b>   |
| 701                  | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.                                    |
| 702                  | Identify and interpret electrical/electronic system concern; determine necessary action.   |



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| 703                  | Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins. |
| 704                  | Locate and interpret vehicle and major component identification numbers.  |
| 705                  | Use wiring diagrams during diagnosis of electrical circuit problems.  |
| 706                  | Check electrical circuits with a test light; determine necessary action.  |
| 707                  | Check electrical circuits using fused jumper wires; determine necessary action.   |
| 708                  | Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.   |
| 709                  | Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.  |
| 710                  | Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.  |
| 711                  | Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.                                 |
| 712                  | Remove and replace terminal end from connector; replace connectors and terminal ends.   |
| 713                  | Repair wiring harness (including CAN/BUS systems).  |
| 714                  | Perform solder repair of electrical wiring.   |
| 715                  | Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.  |
| 716                  | Perform battery state-of-charge test; determine necessary action.   |
| 717                  | Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.   |
| 718                  | Maintain or restore electronic memory functions.  |
| 719                  | Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.   |
| 720                  | Perform battery charge.   |
| 721                  | Start a vehicle using jumper cables or an auxiliary power supply.   |
| 722                  | Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.                              |
| 723                  | Perform starter current draw tests; determine necessary action.   |
| 724                  | Perform starter circuit voltage drop tests; determine necessary action.   |
| 725                  | Inspect and test starter relays and solenoids; determine necessary action.  |
| 726                  | Remove and install starter in a vehicle.  |
| 727                  | Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.   |
| 728                  | Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.  |
| 729                  | Perform charging system output test; determine necessary action.  |
| 730                  | Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.  |
| 731                  | Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.   |
| 732                  | Remove, inspect, and install generator (alternator).  |
| 733                  | Perform charging circuit voltage drop tests; determine necessary action.  |
| 734                  | Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.   |
| 735                  | Inspect, replace, and aim headlights and bulbs.   |
| 736                  | Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.   |

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| 737                  | Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.  |   |
| 738                  | Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.  |   |
| 739                  | Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.   |   |
| 740                  | Diagnose incorrect horn operation; perform necessary action.   |   |
| 741                  | Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.  |   |
| 742                  | Diagnose incorrect washer operation; perform necessary action.   |   |
| 743                  | Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.   |   |
| 745                  | Disarm and enable the airbag system for vehicle service.   |   |
| 746                  | Remove and reinstall door panel.   |   |
| 800                  | <b>ENGINE PERFORMANCE</b>  |   |
| 801                  | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.  |   |
| 802                  | Identify and interpret engine performance concern; determine necessary action.   |   |
| 803                  | Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.                            |   |
| 804                  | Locate and interpret vehicle and major component identification numbers.   |   |
| 805                  | Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.   |   |
| 806                  | Diagnose abnormal engine noise or vibration concerns; determine necessary action.  |   |
| 807                  | Diagnose abnormal exhaust color, odor, and sound; determine necessary action.  |   |
| 808                  | Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.  |   |
| 809                  | Perform cylinder power balance test; determine necessary action.   |   |
| 810                  | Perform cylinder cranking and running compression tests; determine necessary action.   |   |
| 811                  | Perform cylinder leakage test; determine necessary action.   |   |
| 812                  | Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.   |   |
| 813                  | Verify engine operating temperature; determine necessary action.   |   |
| 814                  | Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.                                       |   |
| 815                  | Verify correct camshaft timing.  |   |
| 816                  | Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.  |   |
| 817                  | Diagnose the causes of emissions or drivability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.  |   |
| 818                  | Access and use service information to perform step-by-step diagnosis.  |   |
| 819                  | Perform active tests of actuators using a scan tool; determine necessary action.   |   |
| 820                  | Describe the importance of running all OBDII monitors for repair verification.   |   |
| 821                  | Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action. |   |



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| 822                  | Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.   |
| 823                  | Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.  |
| 824                  | Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.  |
| 825                  | Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action. |
| 826                  | Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.  |
| 827                  | Replace fuel filters.   |
| 828                  | Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.   |
| 829                  | Inspect and test fuel injectors.  |
| 830                  | Verify idle control operation.  |
| 831                  | Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.   |
| 832                  | Diagnose oil leaks, emissions, and drivability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.  |
| 833                  | Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.  |
| 834                  | Diagnose emissions and drivability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.   |
| 835                  | Inspect, test, service and replace components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.   |
| 836                  | Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.  |
| 837                  | Inspect and test mechanical components of secondary air injection systems; perform necessary action.  |
| 838                  | Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.   |
| 839                  | Inspect and test catalytic converter efficiency.  |
| 840                  | Diagnose emissions and drivability concerns caused by the evaporative emissions control system; determine necessary action.   |
| 841                  | Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.  |
| 842                  | Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.  |
| 843                  | Remove and replace timing belt; verify correct camshaft timing.   |
| 844                  | Remove and replace thermostat and gasket/seal.  |
| 845                  | Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.   |
| 846                  | Perform engine oil and filter change.   |