Name: _____ Automotive Technology/Four Main Areas

Directions:
Evaluate the student by checking the appropriate number to indicate the degree of competency. The rating for each task should reflect employability readiness rather than the grades given in class.

Student Rating Scale:

0 **No Exposure** – no experience/knowledge in this area; program/course did not provide instruction in this area
1 **Unsuccessful Attempt** – unable to meet knowledge or performance criteria and/or required significant assistance
2 **Partial Demonstration** – met some of the knowledge or performance criteria with or without minor assistance
3 **Knowledge Demonstrated** – met knowledge criteria without assistance at least once
4 **Performance Demonstrated** – met performance criteria without assistance at least once
5 **Repetitive Demonstration** – met performance and/or knowledge criteria without assistance on multiple occasions
6 **Mastered** – successfully applied knowledge or skills in this area to solve related problems independently

NOTE: This profile contains Introduction to Automotive Technology and the four main areas according to the National Automotive Technicians Education Foundation (NATEF).
NOTE: The Roman numerals are not sequential as they correspond to the NATEF Task List Areas.

NOTE: All tasks have a NATEF designated Priority level. "NATEF Standards recognize that program content requirements vary by program type and regional employment needs. Therefore, flexibility has been built into the NATEF task list by assigning each task a priority number. The priority number simply indicates the minimum percentage of those tasks, by area, that a program must include in their curriculum in order to be certified in that area."
The NATEF priority levels are:

- **Ninety-five percent (95%) of Priority 1 (P-1) items must be taught in the curriculum.**
- **Eighty percent (80%) of Priority 2 (P-2) items must be taught in the curriculum.**
- **Fifty percent (50%) of the Priority 3 (P-3) items must be taught in the curriculum.**

Source: ASE PROGRAM CERTIFICATION STANDARDS FOR AUTOMOBILE TECHNICIAN TRAINING PROGRAMS; ©2008

INTRODUCTION TO AUTOMOTIVE TECHNOLOGY

0	1	2	3	4	5	6	A. Safety	Notes:
							1. Describe how to use chemicals safely	
							2. Demonstrate the safe use of hand tools	
							3. Demonstrate the safe use of power tools	
							4. Practice the safe use of personal protective equipment (i.e., clothing and safety glasses)	
							5. Describe how to use fire protection equipment safely	
							6. Demonstrate the safe use of shop equipment	
							7. Comply with personal and environmental safety practices in accordance with federal, state, and local safety and environmental regulations/guidelines	
							8. Identify and provide access to information involving **hybrid** electrical systems emphasis on safety including location of disconnect features of specific vehicle high voltage systems	
							9. Other:	

0	1	2	3	4	5	6	B. Shop Operation	Notes:
							1. Demonstrate effective communication skills (oral and written)	
							2. Complete work order and estimates to include customer information, customer concern, related service history, cause, and correction	
							3. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins	
							4. Other:	

0	1	2	3	4	5	6	C. Employability Skills	Notes:
							1. Demonstrate a good work ethic (i.e., relations with other, dependability, attitude, and personal hygiene)	
							2. Demonstrate teamwork	
							3. Demonstrate job-seeking techniques (i.e., write a resume, search for a job, arrange references, and apply interview techniques)	
							4. Describe legal issues of sexual harassment in the workplace	
							5. Identify employment eligibility requirements (e.g. valid driver's license, background check ect.)	
							6. Other:	

0	1	2	3	4	5	6	Leadership Competencies**	Notes:
							1. Demonstrate an understanding of SkillsUSA, its structure, and activities	
							2. Demonstrate an understanding of one's personal values	
							3. Perform tasks related to effective personal management skills	
							4. Demonstrate interpersonal skills	
							5. Demonstarte etiquette and courtesy	
							6. Demonstrate effectiveness in oral and written communication	
							7. Develop and maintain a code of professional ethics	
							8. Maintain a good professional appearance	
							9. Perform basic tasks related to securing and terminating employees	
							10. Perform basic parliamentary procedures in a group meeting	
							11. Other:	

NOTE: These competencies are addressed in the Missouri SkillsUSA Curriculum Guide lessons.

IV. STEERING AND SUSPENSION

0	1	2	3	4	5	6	A. General Suspension and Steering Systems Diagnosis	Priority	Notes:
							1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	
							2. Identify and interpret suspension and steering system concerns; determine necessary action.	P-1	
							3. Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.	P-1	
							4. Locate and interpret vehicle and major component identification numbers.	P-1	
							5. Other:		

0	1	2	3	4	5	6	B. Steering Systems Diagnosis and Repair	Priority	Notes:
							1. Disable and enable supplemental restraint system (SRS).	P-1	
							2. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1	
							3. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2	
							4. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2	
							5. Diagnose power steering gear (rack and pinion) binding, uneven turning effort,	P-2	

							looseness, hard steering, and noise concerns; determine necessary action.		
							6. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2	
							7. Adjust non-rack and pinion worm bearing preload and sector lash.	P-3	
							8. Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2	
							9. Inspect and replace rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.	P-2	
							10. Determine proper power steering fluid type; inspect fluid level and condition.	P-1	
							11. Flush, fill, and bleed power steering system.	P-2	
							12. Diagnose power steering fluid leakage; determine necessary action.	P-2	
							13. Remove, inspect, replace, and adjust power steering pump belt.	P-1	
							14. Remove and reinstall power steering pump.	P-2	
							15. Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2	
							16. Inspect and replace power steering hoses and fittings.	P-2	
							17. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-2	
							18. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	P-1	
							19. Test and diagnose components of electronically controlled steering systems using a scan tool; determine necessary action.	P-3	
							20. Inspect and test electric power assist steering.	P-3	
							21. Identify hybrid vehicle power steering system electrical circuits, service and safety precautions.	P-3	
							22. Other:		

0	1	2	3	4	5	6	C. Suspension Systems Diagnosis and Repair	Priority	Notes:
							1. Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1	
							2. Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1	
							3. Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers.	P-2	
							4. Remove, inspect and install strut rods and bushings.	P-2	
							5. Remove, inspect, and install upper and/or lower ball joints.	P-1	
							6. Remove, inspect, and install steering knuckle assemblies.	P-2	
							7. Remove, inspect, and install short and long arm suspension system coil springs and spring insulators.	P-3	

							8. Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts.	P-3	
							9. Remove, inspect, and install stabilizer bar bushings, brackets, and links.	P-2	
							10. Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	P-1	
							11. Remove, inspect, and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.	P-3	
							12. Other:		

0	1	2	3	4	5	6	D. Related Suspension and Steering Service	Priority	Notes:
							1. Inspect, remove, and replace shock absorbers.	P-1	
							2. Remove, inspect, and service or replace front and rear wheel bearings.	P-1	
							3. Test and diagnose components of electronically controlled suspension systems using a scan tool; determine necessary action.	P-3	
							4. Diagnose, inspect, adjust, repair or replace components of electronically controlled steering systems (including sensors, switches, and actuators); initialize system as required.	P-3	
							5. Describe the function of the idle speed compensation switch. (i.e., pressure switch)	P-3	
							6. Lubricate suspension and steering systems.	P-2	
							7. Other:		

0	1	2	3	4	5	6	E. Wheel Alignment Diagnosis, Adjustment, and Repair	Priority	Notes:
							1. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action.	P-1	
							2. Perform prealignment inspection and measure vehicle ride height; perform necessary action.	P-1	
							3. 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.	P-1	
							4. Check toe-out-on-turns (turning radius); determine necessary action.	P-2	
							5. Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2	
							6. Check rear wheel thrust angle; determine necessary action.	P-1	
							7. Check for front wheel setback; determine necessary action.	P-2	
							8. Check front and/or rear cradle (subframe) alignment; determine necessary action.	P-3	
							9. Identify vehicles with systems which require steering angle sensor recalibration.		
							10. Other:		

0	1	2	3	4	5	6	F. Wheel and Tire Diagnosis and Repair	Priority	Notes:
							1. Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.	P-1	
							2. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2	
							3. Rotate tires according to manufacturer's recommendations.	P-1	
							4. Measure wheel, tire, axle flange, and hub runout; determine necessary action.	P-2	
							5. Diagnose tire pull problems; determine necessary action.	P-2	
							6. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static, dynamic, and road force).	P-1	
							7. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2	
							8. Reinstall wheel; torque lug nuts.	P-1	
							9. Inspect tire and wheel assembly for air loss; perform necessary action.	P-1	
							10. Repair tire using internal patch.	P-1	
							11. Inspect, diagnose, and calibrate tire pressure monitoring system.	P-2	
							12. Other:		

V. BRAKES

0	1	2	3	4	5	6	A. General Brake Systems Diagnosis	Priority	Notes:
							1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	
							2. Identify and interpret brake system concern; determine necessary action.	P-1	
							3. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.	P-1	
							4. Locate and interpret vehicle and major component identification numbers.	P-1	
							5. Other:		

0	1	2	3	4	5	6	B. Hydraulic System Diagnosis Repair	Priority	Notes:
							1. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1	
							2. Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1	
							3. Check master cylinder for internal/external leaks and proper operation; determine necessary action.	P-1	

							4. Remove, bench bleed, and reinstall master cylinder.	P-1	
							5. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-2	
							6. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.	P-1	
							7. Replace brake lines, hoses, fittings, and supports.	P-2	
							8. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2	
							9. Select, handle, store, and fill brake fluids to proper level.	P-1	
							10. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.	P-3	
							11. Inspect, test, and/or replace components of brake warning light system.	P-3	
							12. Bleed and/or flush brake system.	P-1	
							13. Test brake fluid for contamination. (e.g., copper sulfate, water, etc.)	P-1	
							14. Other:		

0	1	2	3	4	5	6	C. Drum Brake Diagnosis and Repair	Priority	Notes:
							1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1	
							2. Remove, clean, inspect, and measure brake drums; determine necessary action.	P-1	
							3. Refinish brake drum; measure final drum diameter.	P-1	
							4. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1	
							5. Inspect and install wheel cylinders.	P-2	
							6. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.	P-2	
							7. Install wheel, torque lug nuts, and make final checks and adjustments.	P-1	
							8. Other:		

0	1	2	3	4	5	6	D. Disc Brake Diagnosis Repair	Priority	Notes:
							1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1	
							2. Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.	P-1	
							3. Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.	P-1	

							4. Remove, inspect and replace pads and retaining hardware; determine necessary action.	P-1	
							5. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.	P-3	
							6. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1	
							7. Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.	P-1	
							8. Remove and reinstall rotor.	P-1	
							9. Refinish rotor on vehicle; measure final rotor thickness.	P-1	
							10. Refinish rotor off vehicle; measure final rotor thickness.	P-1	
							11. Retract caliper piston on an integrated parking brake system.	P-3	
							12. Install wheel, torque lug nuts, and make final checks and adjustments.	P-1	
							13. Check brake pad wear indicator system operation; determine necessary action.	P-2	
							14.		

0	1	2	3	4	5	6	E. Power Assist Units Diagnosis and Repair	Priority	Notes:
							1. Test pedal free travel; check power assist operation.	P-2	
							2. Check vacuum supply to vacuum-type power booster.	P-1	
							3. Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1	
							4. Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3	
							5. Measure and adjust master cylinder pushrod length.	P-3	
							6. Other:		

0	1	2	3	4	5	6	F. Miscellaneous Diagnosis and Repair	Priority	Notes:
							1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-1	
							2. Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1	
							3. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2	
							4. Check parking brake and indicator light system operation; determine necessary action.	P-1	
							5. Check operation of brake stop light system; determine necessary action.	P-1	
							6. Replace wheel bearing and race.	P-2	
							7. Inspect and replace wheel studs	P-1	

							8. Remove and reinstall sealed wheel bearing assembly.	P-1	
							9. Other:		

0	1	2	3	4	5	6	G. Electronic Brake and Traction Control Systems	Priority	Notes:
							1. Identify and inspect electronic brake control system components; determine necessary action.	P-1	
							2. Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action.	P-2	
							3. Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	P-1	
							4. Depressurize high-pressure components of the electronic brake control system (includes disabling of electronic braking system and other appropriate safety procedures).	P-3	
							5. Bleed the electronic brake control system hydraulic circuits.	P-1	
							6. Remove and install electronic brake control system electrical/electronic and hydraulic components.	P-3	
							7. Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	P-1	
							8. Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb/vehicle height, final drive ratio, etc.).	P-3	
							9. Identify traction control/vehicle stability control system components.	P-3	
							10. Describe the operation of a regenerative braking system.	P-3	
							11. Other:		

VI. ELECTRICAL/ELECTRONIC SYSTEMS

0	1	2	3	4	5	6	A. General Electrical System Diagnosis	Priority	Notes:
							1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	
							2. Identify and interpret electrical/electronic system concern; determine necessary action.	P-1	
							3. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.	P-1	

							4. Locate and interpret vehicle and major component identification numbers.	P-1	
							5. Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).	P-1	
							6. Use wiring diagrams during diagnosis of electrical circuit problems.	P-1	
							7. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance.	P-1	
							8. Check electrical circuits with a test light; determine necessary action.	P-2	
							9. Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2	
							10. Check electrical circuits using fused jumper wires; determine necessary action.	P-2	
							11. Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.	P-1	
							12. Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.	P-1	
							13. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1	
							14. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.	P-1	
							15. Remove and replace terminal end from connector; replace connectors and terminal ends.	P-1	
							16. Repair wiring harness (including CAN/BUS systems).	P-1	
							17. Perform solder repair of electrical wiring.	P-1	
							18. Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures	P-2	
							19. Other:		

0	1	2	3	4	5	6	**B. Battery Diagnosis and Service**	**Priority**	**Notes:**
							1. Perform battery state-of-charge test; determine necessary action.	P-1	
							2. Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.	P-1	
							3. Maintain or restore electronic memory functions.	P-1	
							4. Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.	P-1	
							5. Perform battery charge.	P-1	
							6. Start a vehicle using jumper cables or an auxiliary power supply.	P-1	
							7. Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3	

							8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1	
							9. Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3	
							10. Other:		

0	1	2	3	4	5	6	C. Starting System Diagnosis and Repair	Priority	Notes:
							1. Perform starter current draw tests; determine necessary action.	P-1	
							2. Perform starter circuit voltage drop tests; determine necessary action.	P-1	
							3. Inspect and test starter relays and solenoids; determine necessary action.	P-2	
							4. Remove and install starter in a vehicle.	P-1	
							5. Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2	
							6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2	
							7. Other:		

0	1	2	3	4	5	6	D. Charging System Diagnosis and Repair	Priority	Notes:
							1. Perform charging system output test; determine necessary action.	P-1	
							2. Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions (includes PCM controlled charging).	P-1	
							3. Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.	P-1	
							4. Remove, inspect, and install generator (alternator).	P-1	
							5. Perform charging circuit voltage drop tests; determine necessary action.	P-1	
							6. Other:		

0	1	2	3	4	5	6	E. Lighting Systems Diagnosis and Repair	Priority	Notes:
							1. Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action (includes BCM controlled lighting).	P-1	
							2. Inspect, replace, and aim headlights and bulbs.	P-2	
							3. Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	P-2	
							4. Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2	
							5. Other:		

0	1	2	3	4	5	6	F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair	Priority	Notes:
							1. Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-1	
							2. Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	P-3	
							3. Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-1	
							4. Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	P-3	
							5. Other:		

0	1	2	3	4	5	6	G. Horn and Wiper/Washer Diagnosis and Repair	Priority	Notes:
							1. Diagnose incorrect horn operation; perform necessary action.	P-1	
							2. Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-1	
							3. Diagnose incorrect washer operation; perform necessary action.	P-2	
							4. Other:		

0	1	2	3	4	5	6	H. Accessories Diagnosis and Repair	Priority	Notes:
							1. Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.	P-1	
							2. Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	P-3	
							3. Diagnose incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-1	
							4. Diagnose incorrect operation of cruise control systems; determine necessary action.	P-3	
							5. Diagnose supplemental restraint system (SRS) concerns; determine necessary action.	P-1	
							6. Disarm and enable the airbag system for vehicle service.	P-1	
							7. Diagnose radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3	
							8. Remove and reinstall door panel.	P-1	
							9. Diagnose body electronic system circuits using a scan tool; determine necessary action.	P-2	
							10. Check for module communication (including CAN/BUS systems) errors using a scan tool.	P-2	
							11. Diagnose the cause of false, intermittent, or no operation of anti-theft systems.	P-3	
							12. Describe the operation of keyless entry/remote-start systems.	P-3	
							13. Perform software transfers, software updates, or flash reprogramming on electronic modules.	P-3	
							14. Other:		

VIII. ENGINE PERFORMANCE

0	1	2	3	4	5	6	A. General Engine Diagnosis	Priority	Notes:
							1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	
							2. Identify and interpret engine performance concern; determine necessary action.	P-1	
							3. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.	P-1	
							4. Locate and interpret vehicle and major component identification numbers.	P-1	
							5. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-2	
							6. Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3	
							7. Diagnose abnormal exhaust color, odor, and sound; determine necessary action.	P-2	
							8. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1	
							9. Perform cylinder power balance test; determine necessary action.	P-2	
							10. Perform cylinder cranking and running compression tests; determine necessary action.	P-1	
							11. Perform cylinder leakage test; determine necessary action.	P-1	
							12. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-1	
							13. Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	P-3	
							14. Verify engine operating temperature; determine necessary action.	P-1	
							15. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	P-1	
							16. Verify correct camshaft timing.	P-1	
							17. Other:		

0	1	2	3	4	5	6	B. Computerized Engine Controls Diagnosis and Repair	Priority	Notes:
							1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1	
							2. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1	
							3. Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1	
							4. Check for module communication (including	P-2	

							CAN/BUS systems) errors using a scan tool.		
							5. Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-1	
							6. Access and use service information to perform step-by-step diagnosis.	P-1	
							7. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3	
							8. Perform active tests of actuators using a scan tool; determine necessary action.	P-1	
							9. Describe the importance of running all OBDII monitors for repair verification.	P-1	
							10. Other:		

0	1	2	3	4	5	6	**C. Ignition System Diagnosis and Repair**	**Priority**	**Notes:**
							1. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-1	
							2. Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	P-1	
							3. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1	
							4. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3	
							5. Other:		

0	1	2	3	4	5	6	**D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair**	**Priority**	**Notes:**
							1. Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-1	
							2. Check fuel for contaminants and quality; determine necessary action.	P-2	
							3. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1	
							4. Replace fuel filters.	P-2	
							5. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2	
							6. Inspect and test fuel injectors.	P-1	

							7. Verify idle control operation.	P-1	
							8. 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.	P-1	
							9. Perform exhaust system back-pressure test; determine necessary action.	P-1	
							10. Test the operation of turbocharger/supercharger systems; determine necessary action	P-3	
							11. Other:		

0	1	2	3	4	5	6	**E. Emissions Control Systems Diagnosis and Repair**	**Priority**	**Notes:**
							1. Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-2	
							2. Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2	
							3. Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-1	
							4. Inspect, test, service and replace components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-1	
							5. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2	
							6. Diagnose emissions and driveability concerns caused by the secondary air injection and catalytic converter systems; determine necessary action.	P-2	
							7. Inspect and test mechanical components of secondary air injection systems; perform necessary action.	P-3	
							8. Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3	
							9. Inspect and test catalytic converter efficiency.	P-1	
							10. Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-1	
							11. Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1	
							12. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-1	
							13. Other:		

0	1	2	3	4	5	6	F. Engine Related Service	Priority	Notes:
							1. Adjust valves on engines with mechanical or hydraulic lifters.	P-1	
							2. Remove and replace timing belt; verify correct camshaft timing (includes evaluation of tensioner and related parts).	P-1	
							3. Remove and replace thermostat and gasket/seal.	P-1	
							4. Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	P-1	
							5. Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	P-1	
							6. Perform engine oil and filter change.	P-1	
							7. Identify hybrid vehicle internal combustion engine service precautions.	P-3	
							8. Other:		