ENGINE PERFORMANCE

For every task in Engine Performance the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

A. General: Engine Diagnosis	**Priority**	**Completed**
1. Identify and interpret engine performance concerns; determine necessary action.	P-1	
2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	
3. Diagnose abnormal engine noises or vibration concerns; determine necessary action.	P-3	
4. Diagnose the cause of excessive oil comsumption, coolant comsumpton, unusual exhaust color, odor, and sound; determine necessary action.	P-2	
5. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1	
6. Perform cylinder power balance test; determine necessary action.	P-2	
7. Perform cylinder cranking and running compression tests; determine necessary action.	P-1	
8. Perform cylinder leakage test; determine necessary action.	P-1	
9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2	
10. Verify engine operating temperature; determine necessary action.	P-1	
11. Verify correct camshaft timing.	P-1	
B. Computerized Controls Diagnosis and Repair		
1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1	
2. Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1	
3. Perform active tests of actuators using a scan tool; determine necessary action.	P-2	

4. Describe the importance of running all OBDII monitors for repair verification.	P-1	
5. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph and interpret scan tool data.	P-1	
6. Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1	
7. 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-2	
8. 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	
C. Ignition System Diagnosis and Repair		
1. Diagnose (troubleshoot) 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-2	
2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1	
3. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3	
4. Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1	
D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair		
1. Diagnose (troubleshoot) 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-2	
2. Check for fuel contaminants; 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 filter(s).	P-1	
5. Inspect, service, or replace air filters, filter housings, and intake duct work.	P-1	

6. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2	
7. Inspect and test fuel injectors.	P-2	
8. Verify idle control operation.	P-1	
9. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonantor(s), tail pipe(s), and heat shields; perform necessary action.	P-1	
10. Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1	
11. Perform exhaust system back-pressure test; determine necessary action.	P-2	
12. Check and refill diesel exhaust fluid (DEF).	P-3	
13. Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3	
E. Emissions Control Systems Diagnosis and Repair		
1. Diagnose oil leaks, emissions, and driveability concerns cause by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3	
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-3	
4. Diagnose emissions and driveability concerns caused by the secondary air injection and catalytic converter systems; determine necessary action.	P-2	
5. Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-2	
6. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2	
7. Inspect, test, service, and replace components of the EGR system including tubing, exhaust passages, vacuum/pressure controls, filters, and hoses; perform necessary action.	P-2	
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-2	
10. Inspect and test components of hoses of the evaporative emissions control system; perform necessary action.	P-1	

11. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3	