Correlation of

Auto Engine Performance and Driveability, Johanson

(Goodheart-Willcox Publisher ©2021)

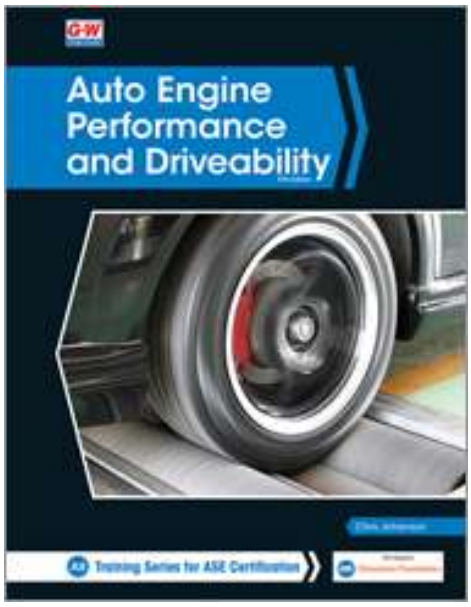
to the

2022 ASE Education Foundation Master Automobile Service Technology (MAST) Task List

The following chart correlates the *Auto Engine Performance and Driveability* textbook and shop manual (©2021) to the 2022 ASE Education Foundation Master Automobile Service Technology (MAST) Task List.

The correlation below lists the ASE Education Foundation Master Automobile Service Technology Tasks, priority levels, corresponding page numbers from the *Auto Engine Performance and Driveability* textbook, and corresponding job numbers from the *Auto Engine Performance and Driveability Shop Manual*.

For more information on the ASE Education Foundation standards, please visit www.aseeducationfoundation.org.



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.

Task Number and Description	Priority	G-W Content
VIII. ENGINE PERFORMANCE **A. General**		
1. Research vehicle service information such as fluid type, vehicle service history, service precautions, technical service bulletins, and recalls including vehicles equipped with advanced driver assistance systems (ADAS).	P-1	Textbook Pages: 57-60, 250-253 Shop Manual Job: 3, 4, 31
2. Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.	P-1	Textbook Pages: 199-200, 290-295, 318-319, 350-352 Shop Manual Job: 4, 8, 12
3. Verify proper engine cooling system operation; determine needed action.	P-1	Textbook Pages: 80-85, 424, 426 Shop Manual Job: 13
4. Verify correct camshaft timing including engines equipped with variable valve timing (VVT) systems; determine needed action.	P-1	Textbook Pages: 79–80, 187, 417–418 Shop Manual Job: 33
5. Identify and interpret engine performance concerns; determine needed action.	P-1	Textbook Pages: 226–227, 237, 242–244, 246–254, 256-258, 404–421 Shop Manual Job: 7
6. Diagnose abnormal engine noises or vibration concerns; determine needed action.	P-2	Textbook Pages: 226–228, 406–408, 436–437 Shop Manual Job: 7
7. Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine needed action.	P-2	Textbook Pages: 184, 201–202, 226–228, 229–237, 413–414 Shop Manual Jobs: 6, 7, 25
8. Perform engine manifold pressure tests (vacuum/boost); determine needed action.	P-1	Textbook Pages: 407–409 Shop Manual Job: 12
9. Perform cylinder power balance test; determine needed action.	P-1	Textbook Pages: 351, 407 Shop Manual Job: 12
10. Perform cylinder cranking and running compression tests; determine needed action.	P-1	Textbook Pages: 409–411 Shop Manual Job: 12

Task Number and Description	Priority	G-W Content
11. Perform cylinder leakage test; determine needed action.	P-1	Textbook Pages: 411–412 Shop Manual Job: 12
12. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine needed action.	P-1	Textbook Pages: 226–228, 230–237, 316–334, 345-365 Shop Manual Jobs: 7, 15- 21
VIII. ENGINE PERFORMANCE **B. Computerized Controls**		
1. Identify computerized control system components and configurations.	P-1	Textbook Pages:118-141, 155-156 Shop Manual Jobs: 4, 8
2. Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1	Textbook Pages: 55–58, 226–237, 242–244 Shop Manual Jobs: 3, 7, 9-13
3. Perform active test of actuators using a scan tool; determine needed action.	P-1	Textbook Pages: 139–141, 288-295 301–303, Appendix A
4. Describe the use of OBD monitors for repair verification.	P-1	Textbook Pages: 138–139, 288–295, 310-311, Appendix A Shop Manual Job: 4,
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), and/or scan tool; determine needed action.	P-1	Textbook Pages: 47–48, 262–267, 271–282, 288–303 Shop Manual Jobs: 4, 9-11
6. Describe the process for reprogramming or recalibrating the powertrain/engine control module (PCM/ECM).	P-1	Textbook Pages: 307-311 Shop Manual Job: 8, 11
7. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes (DTC); obtain, graph, and interpret scan tool data.	P-1	Textbook Pages: 226–228, 230, 233–235, 288–295, Appendix A Shop Manual Jobs: 4, 8
8. Diagnose emissions or driveability concerns without stored or active diagnostic trouble codes; determine needed action.	P-1	Textbook Pages: 226–228, 231–238, 288–311 Shop Manual Jobs: 7, 15-16

Task Number and Description	Priority	G-W Content
9. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, HVAC, automatic transmissions, non-OEM installed accessories, or similar systems); determine needed action.	P-2	Textbook Pages: 206–222, 226–237, 435–455 Shop Manual Job: 7, 11
VIII. ENGINE PERFORMANCE **C. Ignition System**		
1. Identify ignition system components and configurations.	P-1	Textbook Pages: 144-156 Shop Manual Jobs: 15-16
2. Remove and replace spark plugs; inspect secondary ignition components for wear and damage; determine needed action.	P-1	Textbook Pages: 327-339, Shop Manual Job: 15
3. 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 needed action.	P-1	Textbook Pages: 155–156, 226–228, 242–244, 316–332 Shop Manual Jobs: 15-16
4. Inspect and test crankshaft and camshaft position sensor(s); determine needed action.	P-1	Textbook Pages: 301–302 Shop Manual Job: 16, 33
5. Inspect, test, and/or replace ignition control module and/or powertrain/engine control module; reprogram/initialize as needed.	P-2	Textbook Pages: 288–295, 332 Shop Manual Jobs: 8, 16
VIII. ENGINE PERFORMANCE **D. Fuel, Air Induction, and Exhaust Systems**		
1. Identify fuel, air induction, and exhaust system components and configurations.	P-2	Textbook Pages: 159-179 Shop Manual Jobs: 7, 15-16, 18-23, 25
2. Replace fuel filter(s) where applicable.	P-2	Textbook Pages: 353 Shop Manual Job: 18
3. Inspect, service, or replace air filters, filter housings, and intake duct work.	P-1	Textbook Pages: 178-179, 344–345, 390, 427 Shop Manual Job: 19

Task Number and Description	Priority	G-W Content
4. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine needed action.	P-1	Textbook Pages: 377–383, 391–393 Shop Manual Jobs: 25-26, 29
5. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; determine needed action.	P-1	Textbook Pages: 393-396 Shop Manual Jobs: 25-26
6. Check and refill diesel exhaust fluid (DEF).	P-3	Textbook Pages: 200 Shop Manual Job: 25
7. Check fuel for quality, composition, and contamination; determine needed action.	P-1	Textbook Pages: 355–356 Shop Manual Jobs: 17
8. Inspect and test fuel pump(s) and pump control system for pressure, regulation, and volume; determine needed action.	P-1	Textbook Pages: 346–349, Shop Manual Job: 18
9. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-1	Textbook Pages: 359-360, 365-367, 407-409 Shop Manual Job: 6
10. Inspect, test, and/or replace fuel injectors on low- and high-pressure systems.	P-1	Textbook Pages: 348-352, 366–369 Shop Manual Jobs: 21–24
11. Verify proper idle speed; determine needed action.	P-1	Textbook Pages: 359- 360 Shop Manual Job: 20
12. Perform exhaust system back-pressure test; determine needed action.	P-2	Textbook Pages: 379- 380 Shop Manual Job: 25
13. 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 needed action.	P-2	Textbook Pages: 226–228, 230–236, 288–295, 378–393 Shop Manual Jobs: 7, 16-18
14. Test the operation of turbocharger/supercharger systems; determine needed action.	P-2	Textbook Pages: 360, 415 Shop Manual Job: 24
VIII. ENGINE PERFORMANCE **E. Emissions Control Systems**		

Task Number and Description	Priority	G-W Content
1. Identify emission control system components and configurations.	P-1	Textbook Pages: 185-197 Shop Manual Jobs: 27-30
2. Inspect, test, service, and/or replace positive crankcase ventilation (PCV) filter/breather, valve, tubes, orifices, and hoses; determine needed action.	P-2	Textbook Pages: 190–191, 226–228, 242–244, 384 Shop Manual Jobs: 6, 30
3. Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine needed action.	P-2	Textbook Pages: 190–191, 226–228, 242–244, 248, 257, 384 Shop Manual Jobs: 6, 30
4. Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; inspect, test, service and/or replace electrical/electronic sensors, controls, wiring, tubing, exhaust passages, vacuum/pressure controls, filters, and hoses of exhaust gas recirculation (EGR) systems; determine needed action.	P-1	Textbook Pages: 196–197, 226–228, 230, 242–244, 253, 388–389 Shop Manual Job: 27
5. Inspect and test electrical/electronically operated components and circuits of secondary air injection systems; determine needed action.	P-3	Textbook Pages: 389-390 Shop Manual Jobs: 4, 28
6. Diagnose emission and driveability concerns caused by catalytic converter system; determine needed action.	P-1	Textbook Pages: 198–199, 226–228, 391-292, 397–398 Shop Manual Job: 29
7. Diagnose emissions and driveability concerns caused by the evaporative emissions control (EVAP) system; determine needed action.	P-1	Textbook Pages: 192–194, 226–228, 384-388, Shop Manual Job: 30
8. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine needed action.	P-1	Textbook Pages: 118-140, 288–303, 381– 385 Shop Manual Job: 4, 11